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Material 26: 5408.

APPENDICES

APPENDIX A

Physicochemical properties of drugs and substances

1. Diltiazem hydrochloride (Mazzo, Obetz and Shuster, 1994)

1.1 Chemical name

(2S-cis)-3-(acetyloxy-5-[2-(dimethylamino)ethyl]-2,3-dihydro-2-(4-methoxy-phenyl)-1,5-benzothiazepin-4-(5H)-one-mono hydrochloride

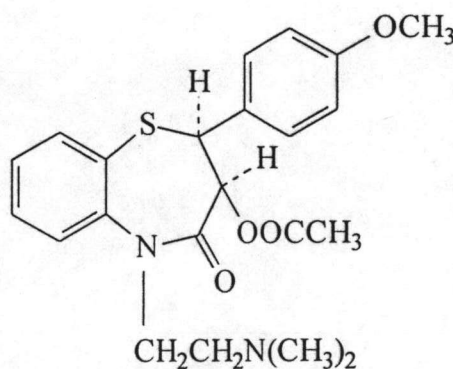
1.2 Molecular formula

$C_{22}H_{26}N_2O_4S$ HCl

1.3 Molecular weight

450.98 g/mole

1.4 Chemical structure



1.5 Appearance

Diltiazem hydrochloride is a white to off-white crystalline powder. It is odorless and has a bitter taste.

1.6 Solubility

Diltiazem hydrochloride is freely soluble in water, methanol, chloroform, formic acid; sparingly soluble in dehydrated alcohol; practically insoluble in benzene; and insoluble in ether.

1.7 Melting point

Diltiazem hydrochloride melts at about 210°C (207.5–212°C) with composition at higher temperature.

1.8 Dissociation constant

The pKa of diltiazem is 7.7 (Illum, Bundgaard and Davis, 1983).

1.9 Partition coefficient

Diltiazem is reported to have a partition coefficient of 597 between octanol and aqueous buffer pH 7.4 (Rabiskova, Polasek and Valaskova, 1997). Illum et al. (1983) reported that the log P of diltiazem was 2.70.

1.10 Crystal properties and conformation

Diltiazem hydrochloride exists as a crystalline powder. It has been crystallized as fine needle from ethanol-isopropanol. No polymorphs of diltiazem hydrochloride have been reported to date.

1.11 Stability

In the solid state, diltiazem is reported to be highly stable. In aqueous buffer solutions (pH 1-7), diltiazem undergoes hydrolysis to desacetyl diltiazem. Diltiazem is most stable at pH 5. The decomposition follows pseudo-first order kinetics. UV radiation causes more degradation.

1.12 Parenteral dosage form

Diltiazem hydrochloride is available as a 5 mg/ml solution (Hoechst Marion Roussel). It is administered intravenously by direct injection over two minutes. Following dilution in 100 to 500 ml of a compatible intravenous solution, the drug also may be given by continuous infusion for up to 24 hours (Trissel, 1994).

2. Theophylline (Cohen, 1975)

2.1 Chemical name

1,3-Dimethylxanthine

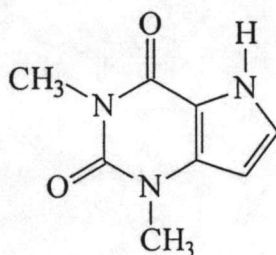
2.2 Molecular formula

$C_7H_8N_4O$

2.3 Molecular weight

180.17 g/mole

2.4 Chemical structure



2.5 Appearance

Theophylline is a white crystalline powder, odorless with a bitter taste.

2.6 Solubility

The reported solubility of theophylline is 8.3 mg/ml in water; 12.5 mg/ml in ethanol; 11.6 mg/ml in chloroform; and sparingly soluble in ether.

2.7 Melting point

The original synthetic literature reported melting point of 264°C for theophylline subsequently the melting range has been reported to be between 271°C and 274°C.

2.8 Dissociation constant

Theophylline is a weakly acidic compound with the proton on the nitrogen in position 7 being dissociable. The pKa in aqueous of theophylline

determined both potentiometrically and spectrophotometrically is 8.6. Theophylline is also very weakly basic and pK_b 's of 13.5 and 11.5 have been reported in the literature from aqueous potentiometric measurements.

2.9 Partition coefficient

Theophylline is reported to have a partition coefficient of 0.755 ± 0.01 between octanol and phosphate buffer pH 7.4 (Cotgreave and Caldwell, 1983).

2.10 Stability

Theophylline solutions are generally quite stable over the entire pH range. Strongly alkaline solutions (pH > 12) show decomposition and apparent ring opening after several weeks. Solutions of theophylline have been shown to be susceptible to oxidation at position 8 forming 1,3-dimethyluric acid in the presence of methylene blue which acts as a photosensitizing dye.

2.11 Parenteral dosage form

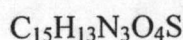
Theophylline is available as 0.4 – 4 mg/ml solution (Abbott, Baxter, McGaw). It may be administered by continuous or intermittent intravenous infusion. (Trissel, 1994)

3. Piroxicam (Lund, 1994; Mihalic' et al., 1986)

3.1 Chemical name

4-Hydroxy-2-methyl-N-(2-pyridyl)-2H-1,2-benzothiazine-3-carboxamide-1,1-dioxide

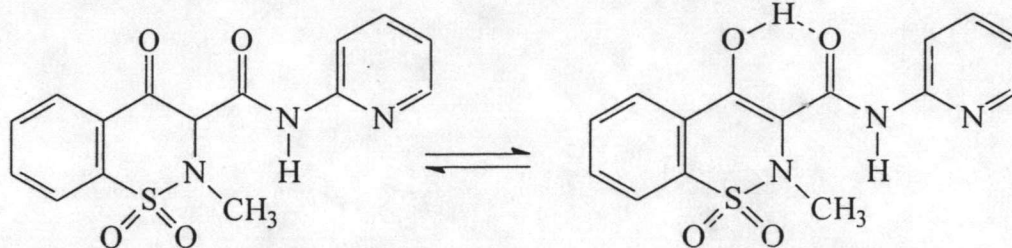
3.2 Molecular formula



3.3 Molecular weight

331.36 g/mole

3.4 Chemical structure



3.5 Appearance

Piroxicam is an off-white to light tan or light yellow, odourless powder. It forms a monohydrate that is yellow. It is reported to have a bitter taste.

3.6 Solubility

Piroxicam is not soluble in water and cyclohexane; sparingly soluble in di-isopropyl ether and in toluene: only slightly more soluble in lower aliphatic alcohols :methanol, ethanol, and isopropanol; soluble in some polar organic solvents such as dimethylformamide (1g/10ml), dimethylsulphoxide (1g/10ml), chloroform (1g/20ml), and somewhat less soluble in dioxane (1g/40ml), acetone (1g/50ml), and ethyl acetate (1g/80ml).

3.7 Melting point

Piroxicam melts in the range 198°C to 200°C.

3.8 Dissociation constant

A saturated solution of piroxicam in dioxan:water (2:1) has a pKa of 6.3 (enolic hydroxyl group at C-4) (Lombardino, Wiseman and Chiaini, 1973; Lund, 1994; Mihalic' et al., 1986). Some literature reported a pKa of 5.3 for piroxicam (Herzfeldt and Kümmel, 1983).

3.9 Partition coefficient.

Piroxicam is reported to have a partition coefficient of 1.8 between octanol and aqueous buffer pH 7.4.

3.10 Crystal properties and conformation

It is reported that piroxicam can exist in two interconvertible crystal polymorphic forms. When allowed to crystallize from an ethanolic solution by fast cooling, piroxicam precipitates as needle form (melts in the range 196°C to 198°C), while by slow cooling from the same solution precipitates in cubic form (melts in range 199°C - 201°C). The two forms can be differentiated by infrared absorption and by X-ray diffraction techniques.

The piroxicam molecule is not far from being planar (~bc plane). The thiazine ring exhibits a half-chair conformation. An amide group is involved in an intramolecular hydrogen bond with the hydroxy group. It also forms an intermolecular hydrogen bond with the oxygen atom bonded with the sulfur atom, connecting piroxicam molecules in an infinite chain along *b* axis. The molecular packing is also influenced by van der Waals interaction.

Piroxicam monohydrate, unlike the piroxicam structure, exists in a zwitterionic form, the enolic hydrogen having been transferred to the pyridine nitrogen. Two intramolecular hydrogen bonds are formed by an internal rotation of the neutral structure (between enolate oxygen and hydrogen on amide nitrogen, and between carbonyl oxygen and the hydrogen on pyridine nitrogen). The side chain and the atoms in the thiazine ring are planar.

Some study reported the piroxicam exists in four polymorphic forms and at least one pseudopolymorphic modification (Vrečer, Srcic and Šmid-Korbar, 1991).

3.11 Stability

In solid state, piroxicam is stable at 20°C and at 40°C for two years when protected from light.

In aqueous solution, a stability of piroxicam is a function of pH. Piroxicam changes into a yellow in acidic medium. At very low pH protonation of

the pyridine nitrogen can occur. At increasing pH, the enol hydroxy starts to deprotonate and the whole equilibrium shifts rightwards (see in the chemical structure). This change is related to a tautomeric equilibrium rather than to chemical decomposition as a consequence of a possible hydrolysis reaction (Fini and Rabasco, 1992).

3.12 Parenteral dosage form

Piroxicam is available as 20 mg/ml solution (Abbott, Baxter, McGaw). It may be administered by intramuscular injection (Lund, 1994).

4. Ibuprofen (Lund, 1994)

4.1 Chemical name

2-(4-Isobutylphenyl)-propionic acid

α -methyl-4-(2-methylpropyl)-benzene-acetic acid

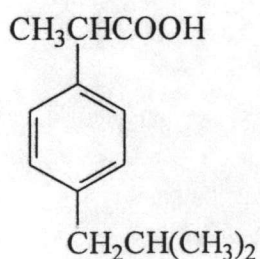
4.2 Molecular formula

$C_{13}H_{18}O_2$

4.3 Molecular weight

206.3 g/mole

4.4 Chemical structure



4.5 Appearance

Ibuprofen exists as a white crystalline powder or colourless crystals.

4.6 Solubility

Ibuprofen is practically insoluble in water; soluble 1:1.5 in ethanol, 1:2 in ether, 1:1 in chloroform, and 1:1.5 in acetone; soluble in most organic solvents; soluble in aqueous solutions of alkali hydroxides and carbonates; freely soluble in dichloromethane.

4.7 Melting point

Ibuprofen melts in the range 75°C to 78°C.

4.8 Dissociation constant

The pKa of ibuprofen is 5.3 (Herzfeldt and Kümmel, 1983; Lund, 1994). Some literature reported a pKa of 4.4 and 5.2 for ibuprofen (Greenfield et al., 1986).

4.9 Partition coefficient

Ibuprofen is reported to have a log of partition coefficient (log P) of 4.50 between octanol and aqueous buffer pH 7.4 for undissociated form. Fini, Laus, et al., (1986) reported the solubility of ibuprofen in aqueous buffer pH2 and in octanol as a function of temperature. The result is as following: 3.4×10^{-5} M and 0.059M in 5°C (log P = 3.24); 4.3×10^{-5} M and 0.091M in 25°C (log P = 3.33); 5.21×10^{-5} M and 0.122M in 37°C (log P = 3.37), respectively.

4.10 Crystal properties and conformation

Ibuprofen has a chiral centre and exist in two enantiomeric forms. After administration of the racemic mixture, the pharmacologically inactive *R*-(-)-enantiomer is converted to the active *S*-(+)-enantiomer.

4.11 Stability

In the absence of oxygen, ibuprofen is stable, even at high temperature (105°C to 110°C), for at least four days.

5. Triglyceride (Weiner, 1993)

5.1 Chemical name

Trimyristin: Tri-butadecanoic-glyceride

Tripalmitin: Tri-hexadecanoic-glyceride

Tristearin: Tri-octadecanoic-glyceride

5.2 Molecular formula

Trimyristin: $C_{45}H_{86}O_6$

Tripalmitin: $C_{51}H_{98}O_6$

Tristearin: $C_{57}H_{110}O_6$

5.3 Molecular weight

Trimyristin: 723.18 g/mole

Tripalmitin: 807.35 g/mole

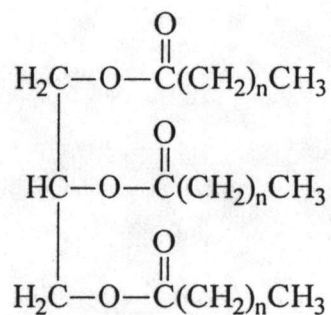
Tristearin: 891.51 g/mole

5.4 Chemical structure

Trimyristin: $n=12$

Tripalmitin: $n=14$

Tristearin: $n=16$



5.5 Appearance

Trimyristin and tristearin are hard, yellowish white powders, while tripalmitin is a hard and faintly yellow-white pellet. They have slight odor and taste suggesting tallow.

5.6 Solubility

Trimyristin, tripalmitin, and tristearin are insoluble in water.

5.7 Melting point

Trimyristin: 56-57°C

Tripalmitin: 58-64°C

Tristearin: 58-63°C

5.8 Purity

Trimyristin: ≥97%trimyristin assay by gas chromatography

Tripalmitin: ~95%tripalmitin assay by gas chromatography
~55%tripalmitin assay by thin layer chromatography

Tristearin: ~65%tristearin mixed with 30%tripalmitin assay by
gas chromatography

6. Stearic acid (Wade and Weller, 1994)

6.1 Chemical name

Octadecanoic acid

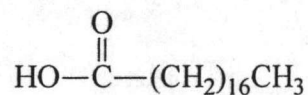
6.2 Molecular formula

C₁₈H₃₆O₂

6.3 Molecular weight

284.47 g/mole

6.4 Chemical structure



6.5 Appearance

Stearic acid is a hard, white or faintly yellow colored, somewhat glossy, crystalline solid or a white, or yellowish white, powder. It has a slight odor and taste suggesting tallow.

6.6 Solubility

Stearic acid is freely soluble in benzene, carbon tetrachloride, chloroform and ether; soluble in ethanol, hexane and propylene glycol; practically insoluble in water.

6.7 Melting point

Stearic acid melts at the temperature higher than 54°C.

6.8 Purity

The BP1993 and the USP NF 23 describe stearic acid as a mixture of stearic acid and palmitic acid. The content of stearic acid is not less than 40.0% and the sum of the two acids is not less than 90.0%.

6.9 Safety

Stearic acid is widely used in oral and topical pharmaceutical formulations; it is also used in cosmetics and food products. Stearic acid is generally regarded as a nontoxic and nonirritant material. However, consumption of excessive amounts may be harmful.

LD₅₀ (mouse, IV): 23 mg/kg

LD₅₀ (rabbit, skin): >5 g/kg

LD₅₀ (rat, IV): 21.5 mg/kg

7. Soybean oil (Wade and Weller, 1994)

7.1 Chemical name

Soybean oil

7.2 Appearance

Soybean oil is a pale yellow colored, odorless or almost odorless liquid, with a bland taste.

7.3 Solubility

Soybean oil is practically insoluble in ethanol (95%) and water; miscible with carbon disulfide, chloroform, ether and petroleum spirit (boiling range 40-60°C).

7.4 Typical properties

Autoignition temperature	: 445°C
Flash point	: 282°C
Freezing point	: -10 to -16°C
Density	: 0.916-0.922 g/cm ³ at 25°C

7.5 Purity

A typical analysis of refined soybean oil indicates the composition of the acids, present as glycerides, to be: linoleic acid 50-57%; linolenic acid 5-10%; oleic acid 17-26%; palmitin acid 9-13%; and stearic acid 3-6%. Other acids are present in trace quantities.

7.6 Safety

Soybean oil is widely used intramuscularly as a drug vehicle, or as a component of emulsions used in parenteral nutrition regimens; it is also consumed as an edible oil. Generally, soybean oil is regarded as an essentially nontoxic and nonirritant material. However, serious adverse reactions to soybean oil emulsions administered parenterally have been reported. These include cases of hypersensitivity, CNS reactions and fat embolism.

LD₅₀ (mouse, IV): 22.1 g/kg

LD₅₀ (rat, IV): 16.5 g/kg

8. Egg lecithin (Wade and Weller, 1994)

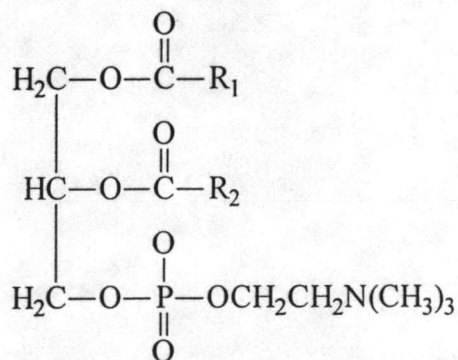
8.1 Chemical name

The chemical nomenclature and CAS registry numbering of lecithin is complex. The commercially available lecithin, used in cosmetics, pharmaceuticals and food products, although a complex mixture of phospholipids and other materials, may be referred to in some literature sources as 1,2-diacyl-*sn*-glycero-3-phosphocholine (trivial chemical name, phosphatidylcholine). This material is the principal constituent of egg lecithin and has the same CAS registry number.

8.2 Empirical formula

The USPNF 23 describes lecithin as a complex mixture of acetone-insoluble phosphatides, which consist chiefly of phosphatidylcholine, phosphatidylethanolamine, phosphatidylserine and phosphatidylinositol, combined with various amounts of other substances such as triglycerides, fatty acids and carbohydrates as separated from a crude vegetable oil source.

8.3 Chemical structure



Where, R_1 and R_2 are fatty acids which may be different or identical

α -phosphatidylcholine

The structure above shows phosphatidylcholine, the principal component of egg lecithin, in its α -form. In the β -form the phosphorus containing group and the R_2 group exchange positions.

8.4 Appearance

Lecithins vary greatly in their physical form, from viscous semiliquids to powders, depending upon the free fatty acid content. They may also vary in color from brown to light yellow, depending upon whether they are bleached or unbleached.

8.5 Solubility

Lecithins are soluble in aliphatic and aromatic hydrocarbons, halogenated hydrocarbons, mineral oil and fatty acids. They are practically insoluble in cold vegetable and animal oils, polar solvents and water. When mixed with water, however, lecithins hydrate to form emulsions.

8.6 Safety

Lecithin is a component of cell membranes and is therefore consumed as a normal part of the diet. Although excessive consumption may be harmful, oral doses of up to 80 g daily have been used therapeutically in the treatment of tardive dyskinesia. When used in topical formulations lecithin is generally regarded as a nonirritant and nonsensitizing material. It has been accepted as an additive in parenteral medicines.

9. Poloxamer407 (Wade and Weller, 1994)

9.1 Chemical name

α -Hydro- ω -hydroxypoly-(oxyethylene)-poly-(oxypropylene)-poly-(oxyethylene) block copolymer.

9.2 Molecular weight

9840-14600 g/mole

9.3 Chemical structure

$\text{HO}(\text{C}_2\text{H}_4\text{O})_a(\text{C}_3\text{H}_6\text{O})_b(\text{C}_2\text{H}_4\text{O})_a\text{H}$

Which a in the general formula given above averages 101 and b averages 56.

9.4 Appearance

Poloxamer407 generally occur as a white-colored, waxy, free flowing prilled granules or as cast solids. It is practically odorless and tasteless.

9.5 Solubility

Poloxamer407 is freely soluble in water, ethanol, and isopropyl alcohol.

9.6 Melting point

The melting point of poloxamer407 is about 56°C.

9.7 Safety

Poloxamer407 is used in variety of oral, parenteral and topical pharmaceutical formulations and is generally regarded as nontoxic and nonirritant material. Poloxamer407 is not metabolized in the body.

10. Tween80 (Wade and Weller, 1994)

10.1 Chemical name

Polyoxyethylene 20 sorbitan monooleate

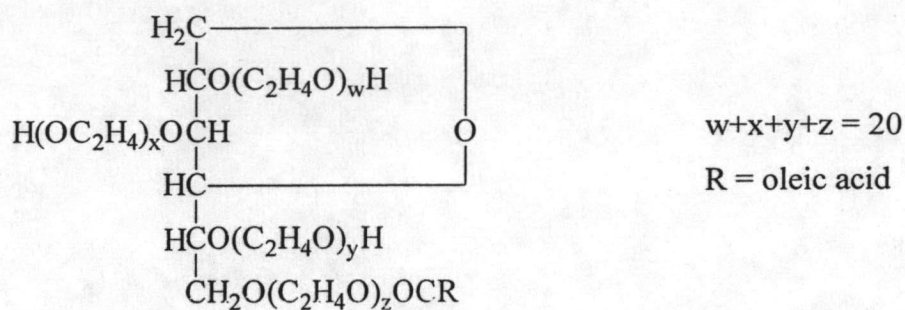
10.2 Molecular formula

$C_{64}H_{124}O_{26}$

10.3 Molecular weight

1310 g/mole

10.4 Chemical structure



10.5 Appearance

Tween80 is a clear yellowish or brownish-yellow oily liquid with a faint characteristic odor, somewhat bitter taste. It has a HLB value of 15.0.

10.6 Solubility

Tween80 is miscible with water, alcohol, dehydrate alcohol, ethyl acetate, and methyl alcohol; practically insoluble in liquid paraffin and fixed oils.

10.7 Safety

Tween80 is widely used in cosmetics, food products and oral, parenteral and topical pharmaceutical formulations and is generally regarded as nontoxic and nonirritant material. The WHO has set an estimated acceptable daily intake for tween80, calculated as total polysorbate esters, at up to 25 mg/kg.

APPENDIX B

Calibration Curve

B1. The UV-visible spectrophotometric method

The UV-visible spectrophotometric method was used to determine the quantity of diltiazem hydrochloride, theophylline and piroxicam. The drug concentrations in water and 0.9% sodium chloride solution were determined from a beers law plot of standard that were linear from 2-16 $\mu\text{g/ml}$ for diltiazem hydrochloride and theophylline, and 2-20 $\mu\text{g/ml}$ for piroxicam. The wavelength used to analyze diltiazem hydrochloride, theophylline, and piroxicam in this study were 237, 272, and 360 nm, respectively, which were the λ_{max} of drug absorbances in both two mediums. These spectra in water were shown in Figures b1-b3. And their spectra in 0.9% sodium chloride solution were the similar to these.

The data of relationship between concentration and absorbance of diltiazem hydrochloride in water and 0.9% sodium chloride solution at 237 nm are presented in Tables b1-b2, and the calibration curves of diltiazem hydrochloride in these mediums are illustrated in Figures b4-b5, respectively.

The data of relationship between concentration and absorbance of theophylline in water and 0.9% sodium chloride solution at 272 nm are presented in Tables b3-b4, and the calibration curves of theophylline in these mediums are illustrated in Figures b6-b7, respectively.

The data of relationship between concentration and absorbance of piroxicam in water and 0.9% sodium chloride solution at 360 nm are presented in Tables b5-b6, and the calibration curves of piroxicam in these mediums are illustrated in Figures b8-b9, respectively.

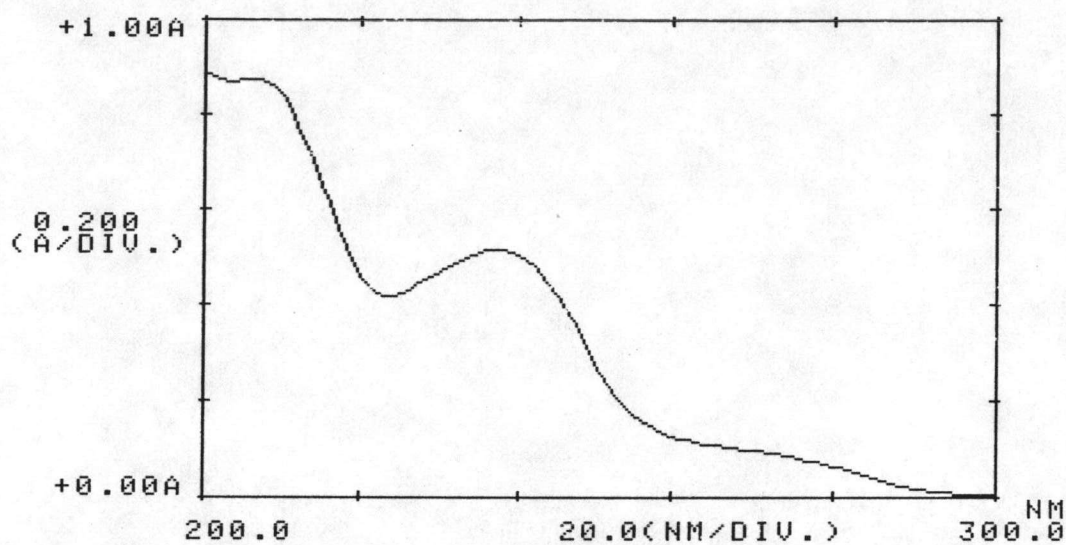


Figure b1. The UV spectrum of diltiazem hydrochloride in water.

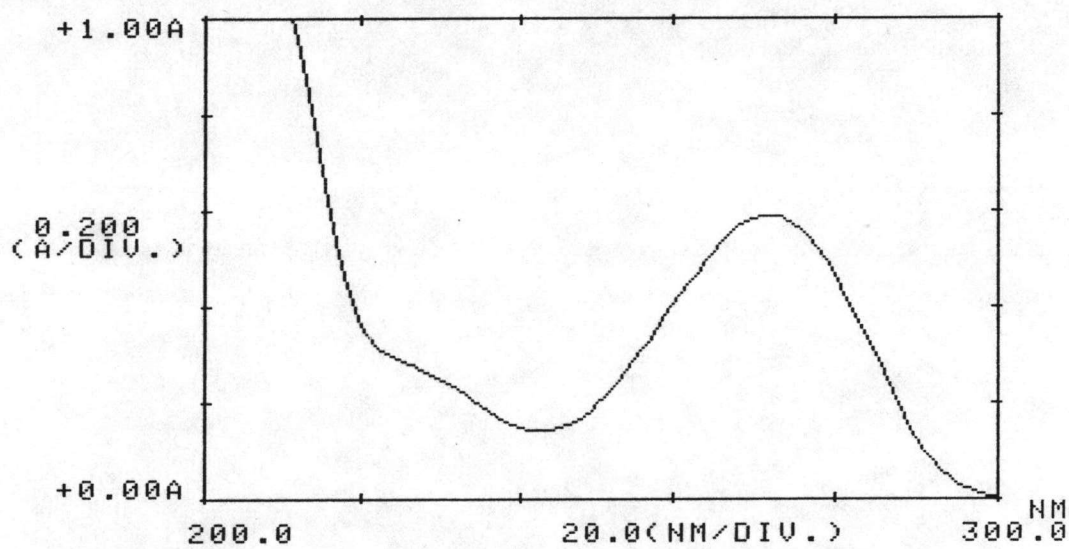


Figure b2. The UV spectrum of theophylline in water.

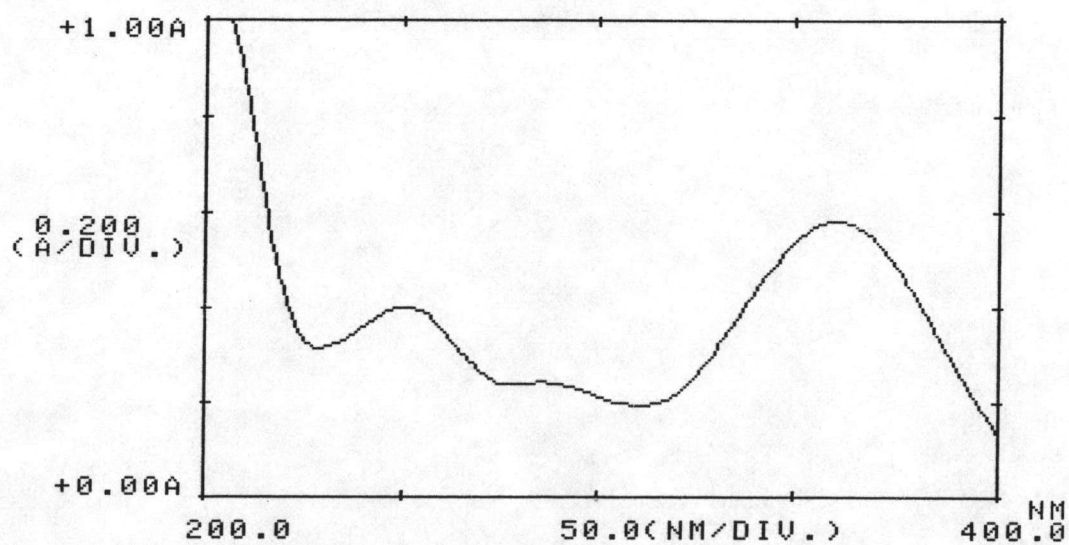


Figure b3. The UV spectrum of piroxicam in water.

Table b1. The relationship between absorbances and concentrations of diltiazem hydrochloride in water at 237 nm.

concentration ($\mu\text{g/ml}$)	absorbance					
	n1	n2	n3	mean	SD	%CV
2.059	0.106	0.106	0.108	0.107	0.001	1.08
4.118	0.209	0.209	0.209	0.209	0.000	0.00
6.177	0.317	0.316	0.314	0.316	0.002	0.48
8.236	0.424	0.421	0.422	0.422	0.002	0.36
10.295	0.534	0.537	0.534	0.535	0.002	0.32
12.354	0.641	0.641	0.641	0.641	0.000	0.00
16.472	0.858	0.859	0.857	0.858	0.001	0.12

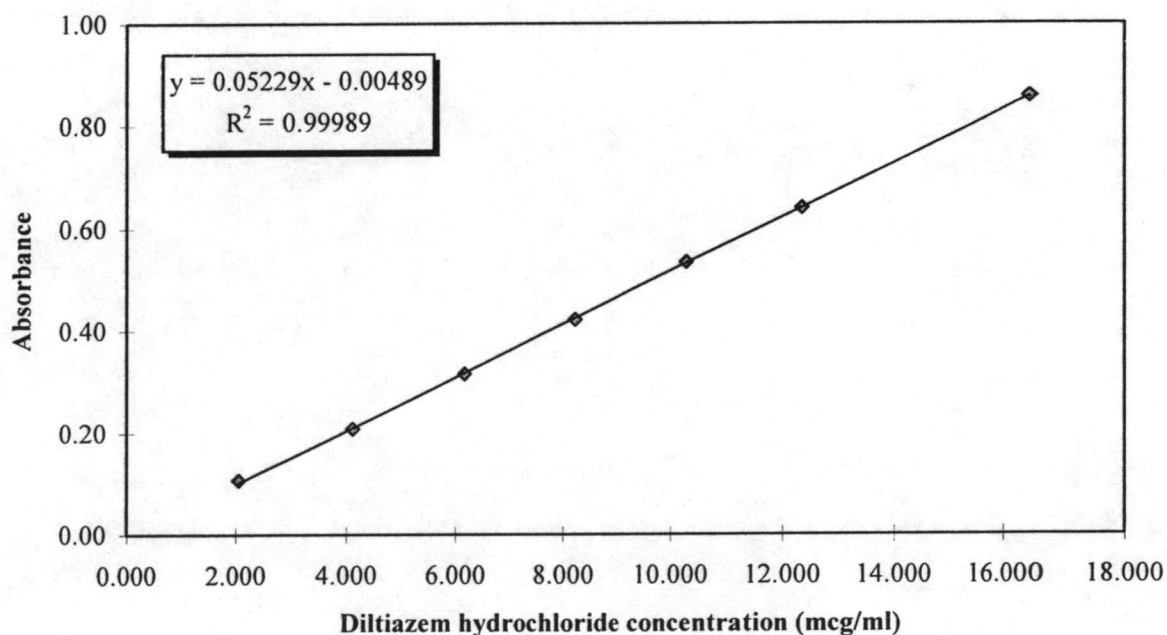


Figure b4. Calibration curve of diltiazem hydrochloride in water at 237 nm.

Table b2. The relationship between absorbances and concentrations of diltiazem hydrochloride in 0.9% sodium chloride solution at 237 nm.

concentration ($\mu\text{g/ml}$)	absorbance					
	n1	n2	n3	mean	SD	%CV
2.020	0.109	0.111	0.111	0.110	0.001	1.05
4.040	0.214	0.211	0.214	0.213	0.002	0.81
6.060	0.321	0.320	0.321	0.321	0.001	0.18
8.080	0.424	0.424	0.424	0.424	0.000	0.00
10.100	0.531	0.530	0.529	0.530	0.001	0.19
12.120	0.635	0.635	0.632	0.634	0.002	0.27
16.160	0.846	0.845	0.851	0.847	0.003	0.38

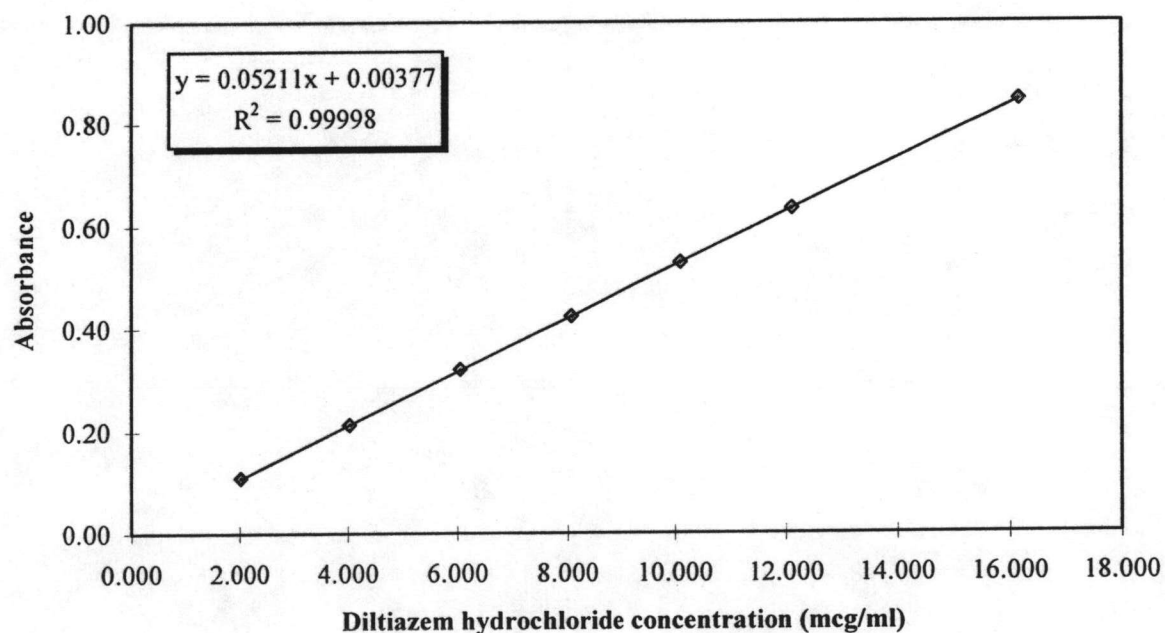


Figure b5. Calibration curve of diltiazem hydrochloride in 0.9% sodium chloride solution at 237 nm.

Table b3. The relationship between absorbances and concentrations of theophylline in water at 272 nm.

concentration ($\mu\text{g/ml}$)	absorbance					
	n1	n2	n3	mean	SD	%CV
2.013	0.118	0.119	0.118	0.118	0.001	0.49
4.026	0.230	0.227	0.226	0.228	0.002	0.91
6.039	0.340	0.341	0.341	0.341	0.001	0.17
8.052	0.453	0.452	0.451	0.452	0.001	0.22
10.065	0.571	0.572	0.573	0.572	0.001	0.17
12.078	0.687	0.686	0.686	0.686	0.001	0.08
16.104	0.911	0.908	0.905	0.908	0.003	0.33

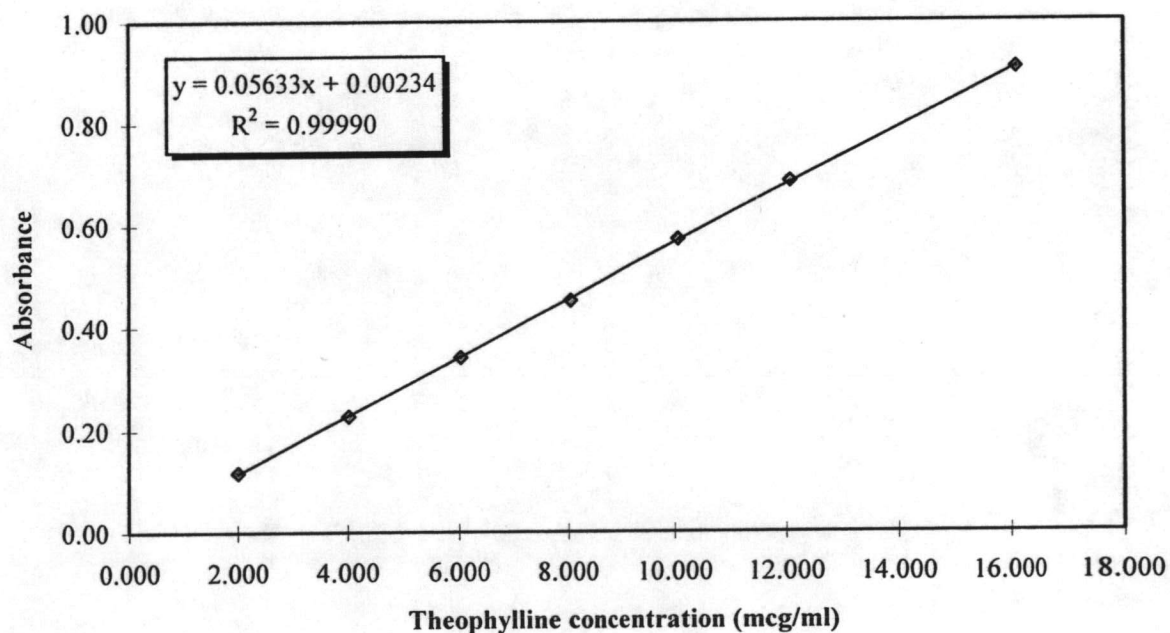


Figure b6. Calibration curve of theophylline in water at 272 nm.

Table b4. The relationship between absorbances and concentrations of theophylline in 0.9% sodium chloride solution at 272 nm.

concentration ($\mu\text{g/ml}$)	absorbance					
	n1	n2	n3	mean	SD	%CV
2.012	0.111	0.113	0.112	0.112	0.001	0.89
4.024	0.221	0.224	0.225	0.223	0.002	0.93
6.036	0.339	0.339	0.338	0.339	0.001	0.17
8.048	0.450	0.449	0.452	0.450	0.002	0.34
10.06	0.571	0.570	0.570	0.570	0.001	0.10
12.072	0.677	0.675	0.676	0.676	0.001	0.15
16.096	0.894	0.901	0.899	0.898	0.004	0.40

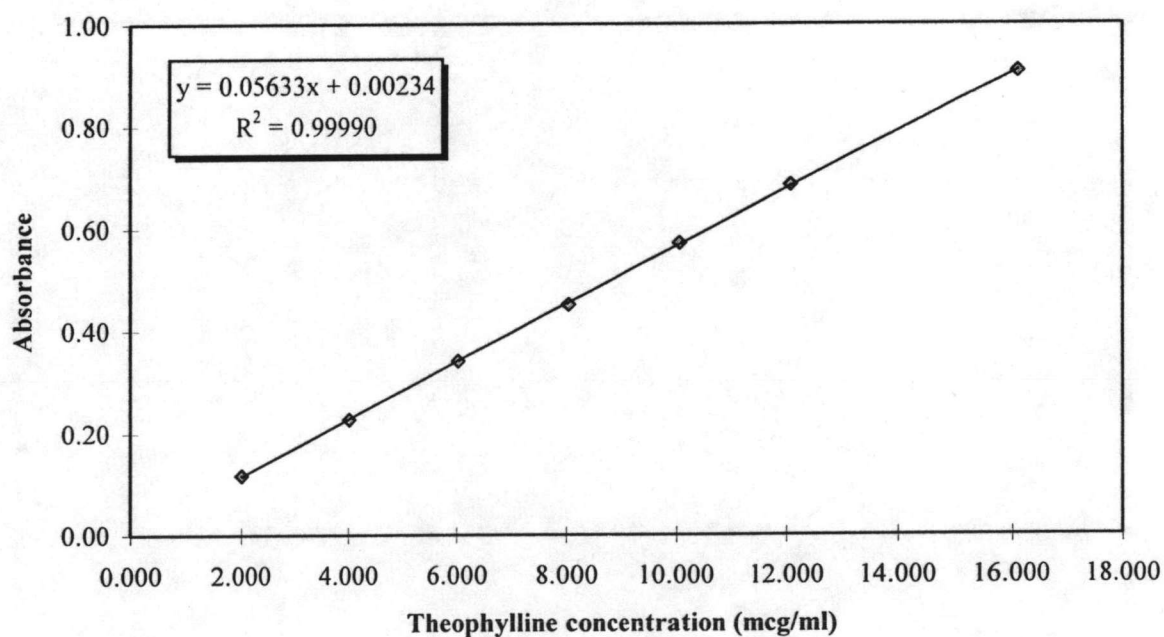


Figure b7. Calibration curve of theophylline in 0.9% sodium chloride solution at 272 nm.

Table b5. The relationship between absorbances and concentrations of piroxicam in water at 360 nm.

concentration ($\mu\text{g/ml}$)	absorbance					
	n1	n2	n3	mean	SD	%CV
2.010	0.097	0.096	0.097	0.097	0.001	0.60
4.020	0.188	0.189	0.190	0.189	0.001	0.53
6.030	0.286	0.285	0.288	0.286	0.002	0.53
8.040	0.377	0.378	0.378	0.378	0.001	0.15
10.050	0.476	0.477	0.477	0.477	0.001	0.12
12.060	0.565	0.567	0.569	0.567	0.002	0.35
16.080	0.761	0.762	0.764	0.762	0.002	0.20
20.100	0.949	0.951	0.952	0.951	0.002	0.16

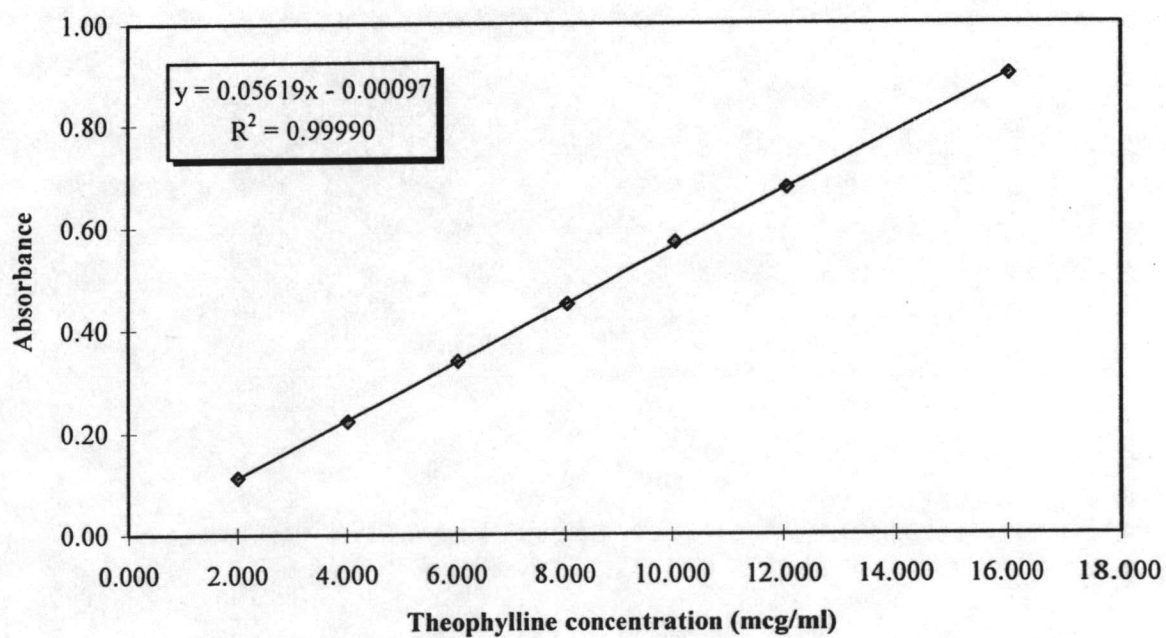


Figure b8. Calibration curve of piroxicam in water at 360 nm.

Table b6. The relationship between absorbances and concentrations of piroxicam in 0.9% sodium chloride solution at 360 nm.

concentration ($\mu\text{g/ml}$)	absorbance					
	n1	n2	n3	mean	SD	%CV
2.020	0.100	0.100	0.099	0.100	0.001	0.58
4.040	0.197	0.195	0.196	0.196	0.001	0.51
6.060	0.294	0.294	0.295	0.294	0.001	0.20
8.080	0.397	0.395	0.395	0.396	0.001	0.29
10.100	0.491	0.490	0.490	0.490	0.001	0.12
12.120	0.586	0.585	0.586	0.586	0.001	0.10
16.160	0.789	0.788	0.786	0.788	0.002	0.19
20.200	0.994	0.996	0.997	0.996	0.002	0.15

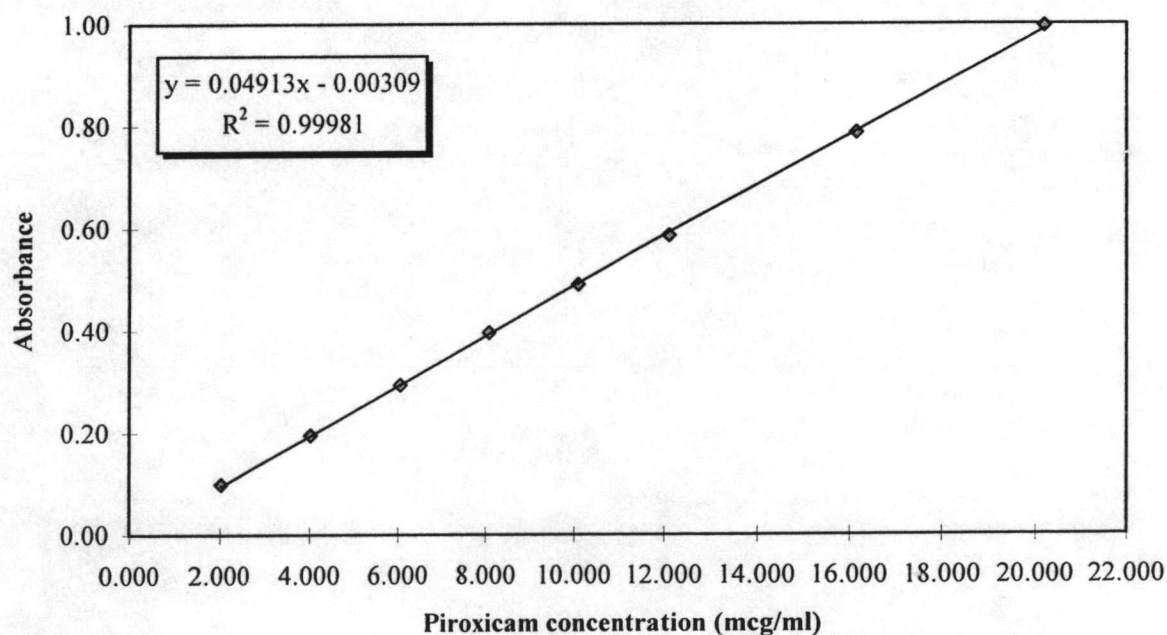


Figure b9. Calibration curve of piroxicam in 0.9% sodium chloride solution at 360 nm.

B2. The high performance liquid chromatography method

Validation for the quantitative determination of ibuprofen by HPLC

The ibuprofen concentrations for the percentage of drug loading and drug release testing could be determined by HPLC assay with UV detection. The wavelength used to analyze ibuprofen in this study was 220 nm which was the λ_{\max} of ibuprofen in this mobile phase as shown in Figure b10. The validation of the HPLC method used are presented as follows:

1 Specificity

Figure b11 shows the chromatograms of water, 0.9% sodium chloride solution, ibuprofen solution, internal standard solution and supernatant of blank preparation. Ibuprofen was eluted as a distinct peak with a retention time of 6.39 minutes. This peak was not interfered by the peak of internal standard which had a retention time of 9.51 minutes and the peaks of solvent which had a retention time of 1.73–3.21 minutes. And the supernatant of blank preparation had no peak that interfere the ibuprofen and internal standard peaks when was injected in the same condition. These results indicated that the peak of ibuprofen was not interfered with the peaks of internal standard and other components in the sample.

2 Precision

Tables b7-b8 show data of within run precision and between run precision of ibuprofen assayed by the HPLC method, respectively. The percentage of coefficient of variation (%CV) values of peak area ratios in both within run and between run precisions were low (0.14–2.20% and 0.25–0.90%, respectively) which indicated that the HPLC methods could be used to determine the amount of ibuprofen over a period of time studied.

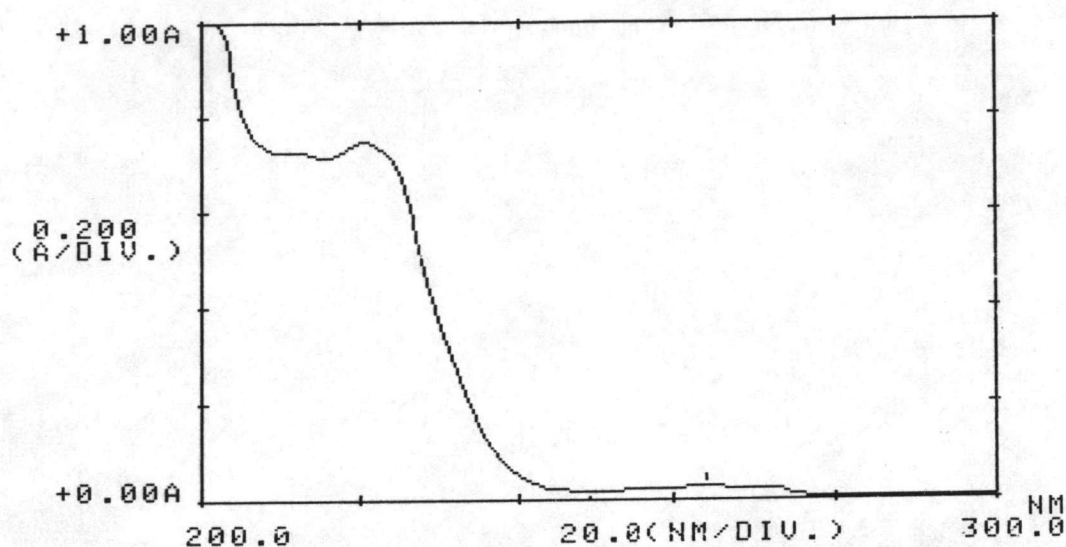


Figure b10. The UV spectrum of ibuprofen in mobile phase.

3 Accuracy

Table b9 shows the percentage of analytical recovery in each concentration of ibuprofen. The mean percent recovery was 100.08% and the %CV value of percent recovery was very low (0.77%) which indicated that the HPLC method could be used to accurately determine ibuprofen within the concentration range studied (0.5–25 $\mu\text{g/ml}$).

4 Linearity

The Chromatograms of standard solutions are shown in Figure b12. The retention times of ibuprofen and mefenamic acid were about 6.29 - 6.37 and 9.33 - 9.52 minutes, respectively. The calibration curve was plotted between the peak area ratios of ibuprofen to mefenamic acid and the concentrations of ibuprofen in $\mu\text{g/ml}$. The results are shown in Tables b10-b12 and Figures b13-b15. Linear regression analysis was performed with the coefficient of determination (R^2) of 0.99990-0.99999. These results indicated that the HPLC method was acceptable for quantitative analysis of ibuprofen.

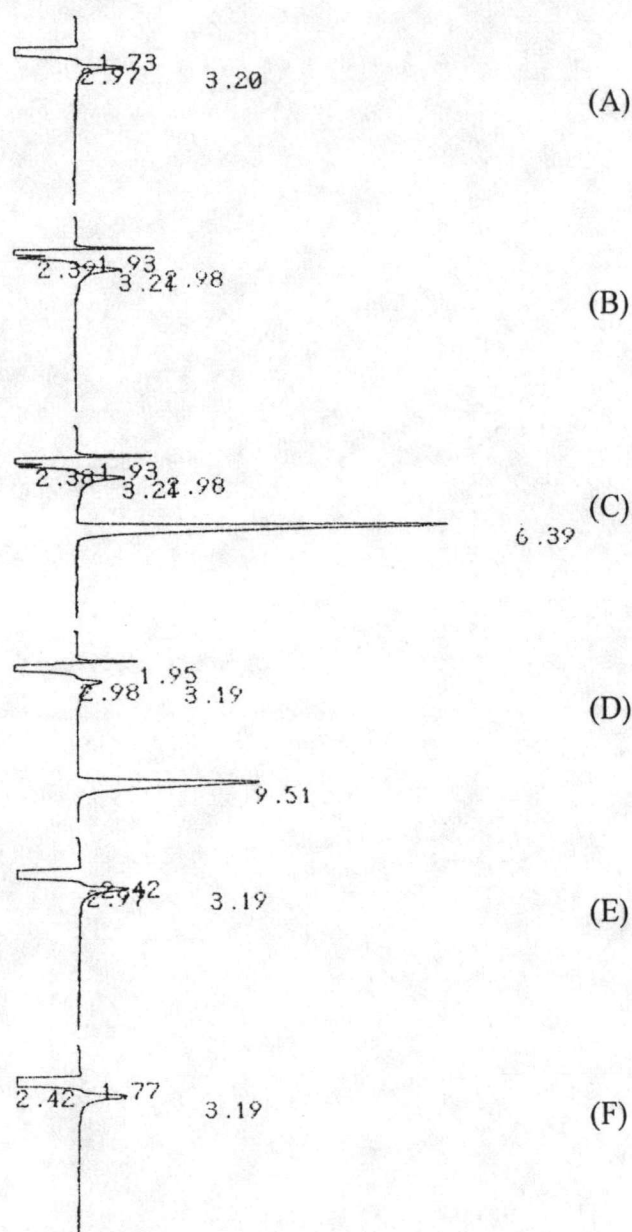


Figure b11. The HPLC chromatograms of (A) water; (B) 0.9% sodium chloride solution; (C) ibuprofen; (D) internal standard; and supernatant of blank preparation from (E) formulation 5%TP+3%P407; and (F) formulation 5%TP+2%EL.

Table b7. Data of within run precision of ibuprofen assayed by the HPLC method.

Ibuprofen concentration ($\mu\text{g/ml}$)	Peak area ratios of ibuprofen to mefenamic acid					
	n1	n2	n3	mean	SD	%CV
0.505	0.0485	0.0477	0.0498	0.0487	0.0011	2.20
1.010	0.1009	0.0986	0.1024	0.1006	0.0019	1.91
2.020	0.2033	0.2103	0.2035	0.2057	0.0040	1.94
5.050	0.5178	0.5233	0.5254	0.5222	0.0039	0.75
10.100	1.0266	1.0338	1.0200	1.0268	0.0069	0.67
15.150	1.5621	1.5776	1.5774	1.5723	0.0089	0.56
20.200	2.0897	2.0919	2.0863	2.0893	0.0028	0.14
25.2500	2.6177	2.6416	2.6592	2.6395	0.0208	0.79

Table b8. Data of between run precision of ibuprofen assayed by the HPLC method.

Ibuprofen concentration ($\mu\text{g/ml}$)	Peak area ratios of ibuprofen to mefenamic acid					
	day1	day2	day3	mean	SD	%CV
0.505	0.0487	0.0481	0.0490	0.0486	0.0004	0.90
1.010	0.1006	0.1009	0.1013	0.1009	0.0003	0.32
2.020	0.2057	0.2036	0.2050	0.2048	0.0011	0.53
5.050	0.5222	0.5191	0.5220	0.5211	0.0017	0.33
10.100	1.0268	1.0249	1.0216	1.0244	0.0026	0.26
15.150	1.5723	1.5683	1.5644	1.5683	0.0040	0.25
20.200	2.0893	2.0812	2.0727	2.0811	0.0083	0.40
25.250	2.6395	2.6259	2.6232	2.6295	0.0087	0.33

Table b9. Data of accuracy of ibuprofen assayed by the HPLC method.

Actual concentration ($\mu\text{g/ml}$)	Analytical concentration ($\mu\text{g/ml}$)			%Recovery		
	0.505	0.500	0.508	0.498	99.04	100.68
1.010	1.012	1.010	1.022	100.17	99.97	101.20
2.020	2.032	2.051	2.015	100.58	101.52	99.77
5.050	5.071	5.102	5.016	100.42	101.02	99.32
10.100	10.081	10.174	10.175	99.81	100.73	100.75
15.150	15.134	15.064	15.112	99.90	99.43	99.75
20.200	20.159	19.926	20.077	99.80	98.64	99.39
25.250	25.400	25.311	25.405	100.59	100.24	100.61
mean				100.08		
SD				0.77		
%CV				0.77		

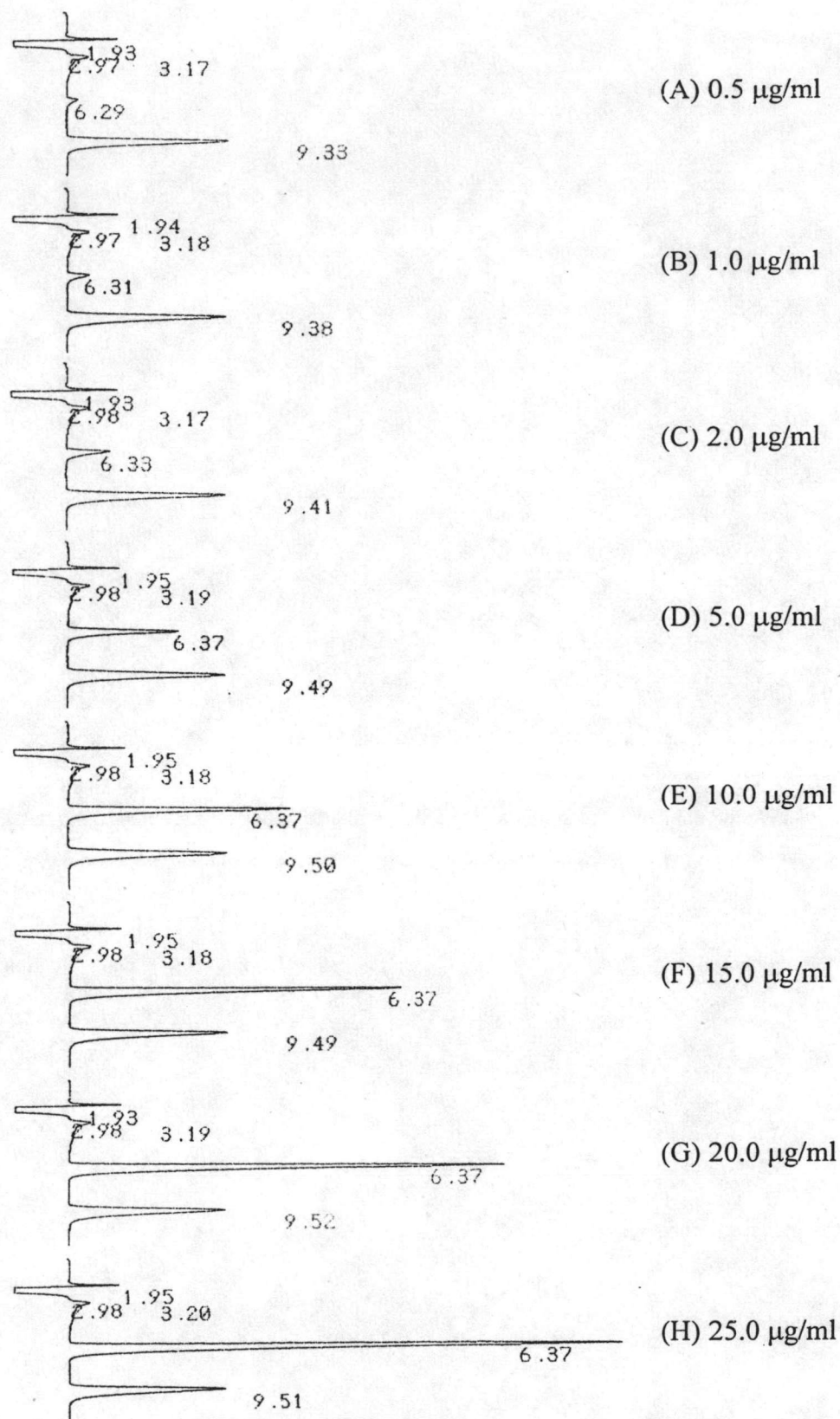


Figure b12. The HPLC chromatograms of the standard solutions of ibuprofen (RT = 6.29–6.37 minutes) and the internal standard (mefenamic acid; RT = 9.33–9.52 minutes).

Table b10. Data of calibration curve of standard solutions of ibuprofen (No.1).

Ibuprofen concentration ($\mu\text{g/ml}$)	Peak area ratios of ibuprofen to mefenamic acid					
	day1	day2	day3	mean	SD	%CV
0.505	0.0466	0.0462	0.0469	0.0466	0.0004	0.77
1.010	0.0984	0.0986	0.0992	0.0987	0.0004	0.43
2.020	0.2017	0.2023	0.2025	0.2022	0.0004	0.20
5.050	0.5071	0.5066	0.5060	0.5066	0.0005	0.11
10.100	1.0174	1.0249	1.0211	1.0211	0.0038	0.37
15.150	1.5281	1.5272	1.5216	1.5256	0.0035	0.23
20.200	2.0257	2.0511	2.0308	2.0359	0.0134	0.66

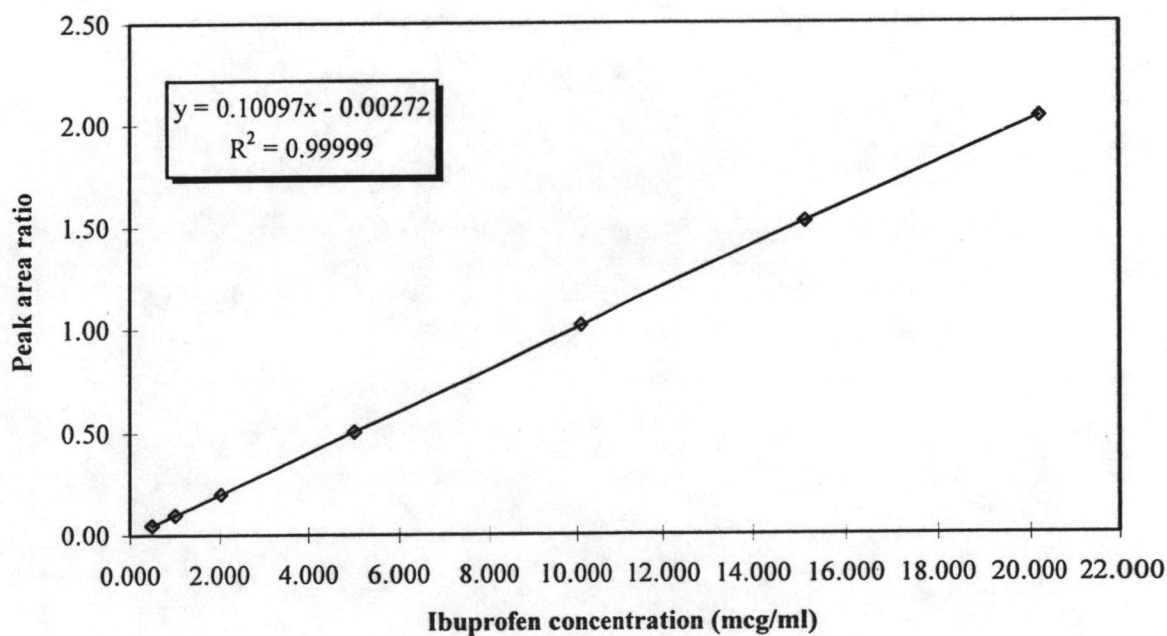
**Figure b13.** Calibration curve of ibuprofen assay by HPLC method (No.1).

Table b11. Data of calibration curve of standard solutions of ibuprofen (No.2).

Ibuprofen concentration ($\mu\text{g/ml}$)	Peak area ratios of ibuprofen to mefenamic acid					
	day1	day2	day3	mean	SD	%CV
0.505	0.0485	0.0477	0.0498	0.0487	0.0011	2.20
1.010	0.1009	0.0986	0.1024	0.1006	0.0019	1.91
2.020	0.2033	0.2103	0.2035	0.2057	0.0040	1.94
5.050	0.5178	0.5233	0.5254	0.5222	0.0039	0.75
10.100	1.0266	1.0338	1.0200	1.0268	0.0069	0.67
15.150	1.5621	1.5776	1.5774	1.5723	0.0089	0.56
20.200	2.0897	2.0919	2.0863	2.0893	0.0028	0.14
25.250	2.6177	2.6416	2.6592	2.6395	0.0208	0.79

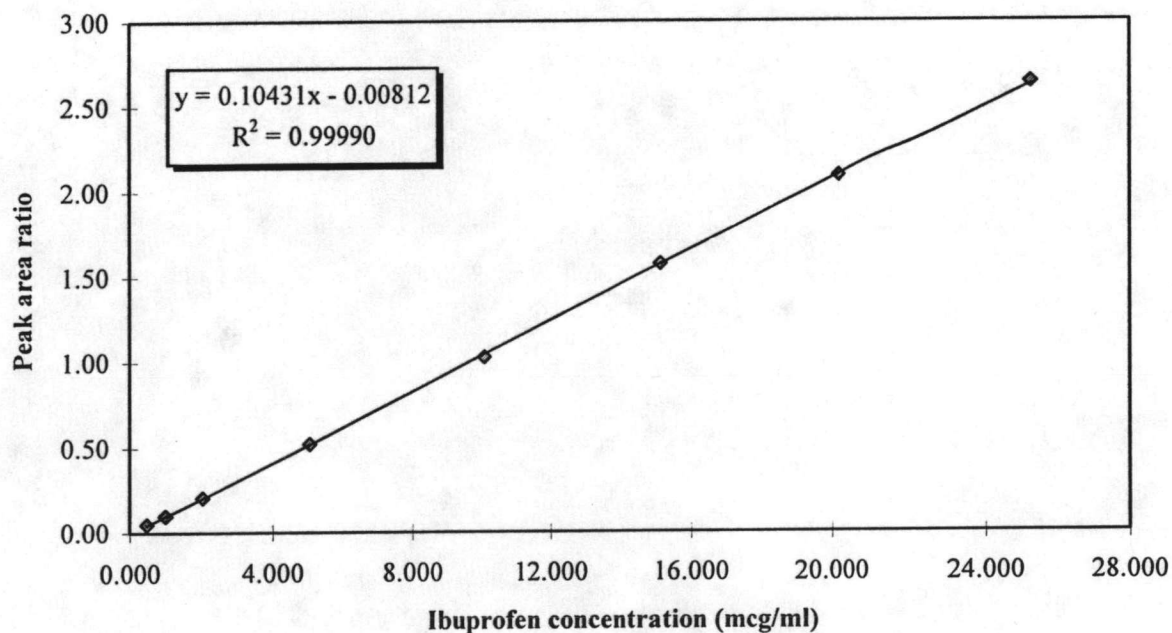
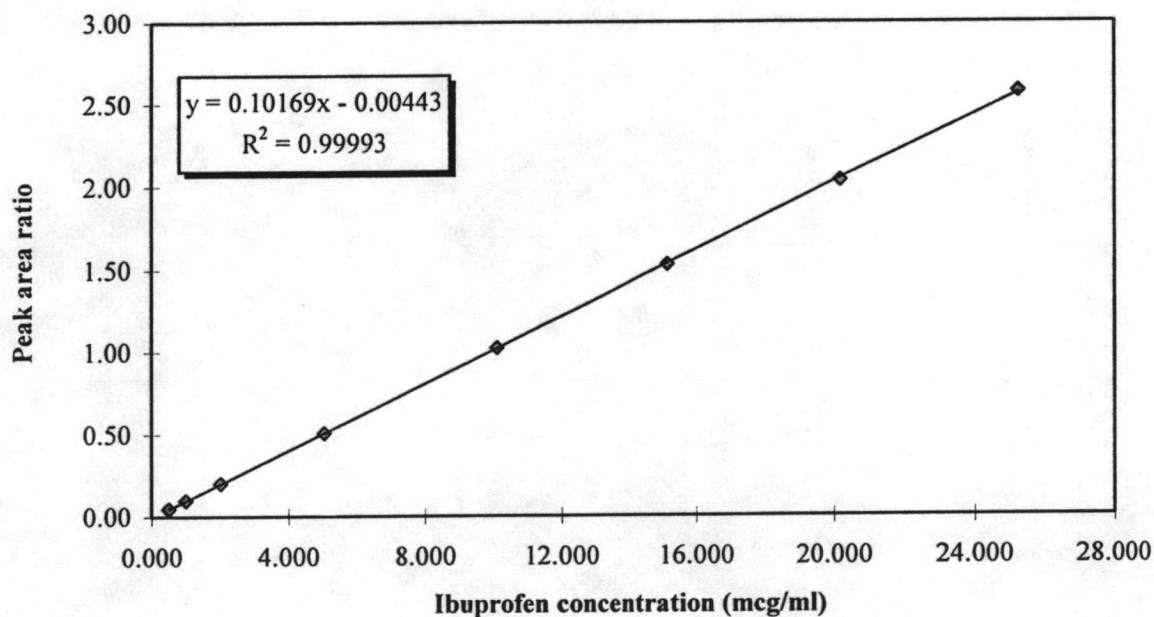
**Figure b14.** Calibration curve of ibuprofen assay by HPLC method (No.2).

Table b12. Data of calibration curve of standard solutions of ibuprofen (No.3).

Ibuprofen concentration ($\mu\text{g/ml}$)	Peak area ratios of ibuprofen to mefenamic acid					
	day1	day2	day3	mean	SD	%CV
0.505	0.0464	0.0472	0.0462	0.0466	0.0006	1.21
1.010	0.0984	0.0982	0.0995	0.0987	0.0007	0.68
2.020	0.2022	0.2041	0.2005	0.2022	0.0018	0.89
5.050	0.5113	0.5144	0.5056	0.5104	0.0044	0.87
10.100	1.0207	1.0302	1.0304	1.0271	0.0055	0.54
15.150	1.5347	1.5275	1.5325	1.5315	0.0037	0.24
20.200	2.0457	2.0220	2.0374	2.0350	0.0120	0.59
25.250	2.5787	2.5696	2.5792	2.5759	0.0054	0.21

**Figure b15.** Calibration curve of ibuprofen assay by HPLC method (No.3).

APPENDIX C

Solubility of drugs

The drugs solubility was experimentally determined since the type and temperature of medium can affect to solubility of them. The saturated solubility of diltiazem hydrochloride, theophylline, piroxicam, and ibuprofen in de-ionized water and 0.9% sodium chloride solution was determined by continuous shaking of excess amount of drugs in each vehicle at 37°C. The sample was removed at appropriate time intervals and was filtered to separate drug particles. The filtrate was appropriately diluted and analyzed by UV-visible spectrophotometric method for diltiazem hydrochloride, theophylline, and piroxicam, and by HPLC method for ibuprofen.

The results of the solubility of drugs are as follows:

Table c1. Solubility of diltiazem hydrochloride in water at 37°C.

times (hr)	concentration ($\mu\text{g/ml}$)					
	no.1	no.2	no.3	mean	SD	%CV
12	437743	426274	426274	430097	6621.8	1.54
24	456858	472151	472151	467053	8829.0	1.89
36	470239	477885	477885	475337	4414.5	0.93
48	510381	485531	491266	495726	13011.6	2.62
60	525674	506558	508470	513567	10527.9	2.05
72	527585	510381	502735	513567	12727.7	2.48

Table c2. Solubility of diltiazem hydrochloride in 0.9% sodium chloride solution at 37°C.

times (hr)	concentration ($\mu\text{g/ml}$)					
	no.1	no.2	no.3	mean	SD	%CV
12	379892	385648	381811	382450	2930.8	0.77
24	425939	416346	414428	418904	6167.6	1.47
36	425939	433614	437451	432335	5861.6	1.36
48	454719	460475	475824	463673	10909.9	2.35
60	485417	477743	473906	479022	5861.6	1.22
72	470068	485417	481580	479022	7988.0	1.67

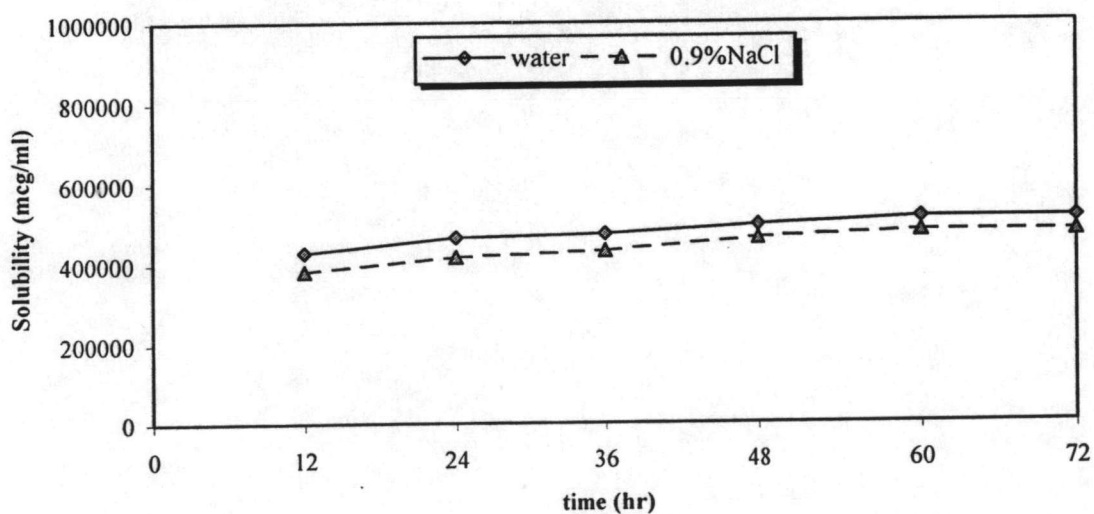
**Figure c1.** Solubility of diltiazem hydrochloride in water and 0.9% sodium chloride solution at 37°C.

Table c3. Solubility of theophylline in water at 37°C.

times (hr)	concentration ($\mu\text{g/ml}$)					
	no.1	no.2	no.3	mean	SD	%CV
12	11499.4	11499.4	11534.9	11511.3	20.5	0.18
24	11233.2	11268.7	11286.5	11262.8	27.1	0.24
36	11091.3	11162.2	11144.5	11132.7	36.9	0.33
48	11055.8	11144.5	11162.2	11120.8	57.0	0.51
60	10807.3	11091.3	11020.3	10973.0	147.8	1.35
72	10913.8	10913.8	10967.0	10931.5	30.7	0.28

Table c4. Solubility of theophylline in 0.9% sodium chloride solution at 37°C.

times (hr)	concentration ($\mu\text{g/ml}$)					
	no.1	no.2	no.3	mean	SD	%CV
12	10752.2	10948.7	10930.8	10877.2	108.6	1.00
24	10609.3	10645.0	11002.2	10752.2	217.3	2.02
36	10537.9	10680.7	10770.0	10662.9	117.1	1.10
48	10448.6	10680.7	10734.3	10621.2	151.9	1.43
60	10269.9	10520.0	10555.7	10448.6	155.7	1.49
72	10216.4	10484.3	10573.6	10424.7	185.9	1.78

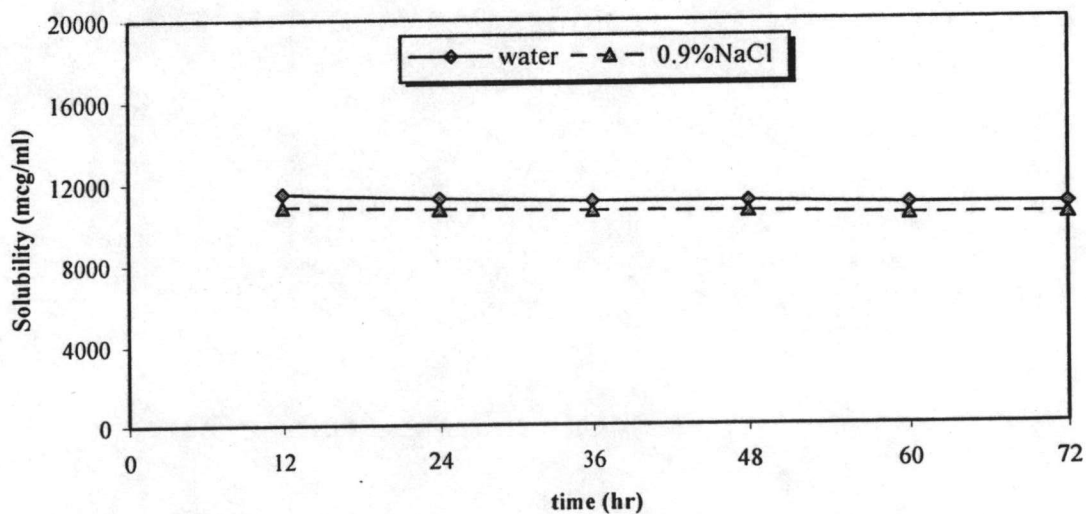
**Figure c2.** Solubility of theophylline in water and 0.9% sodium chloride solution at 37°C.

Table c5. Solubility of piroxicam in water at 37°C.

times (hr)	concentration ($\mu\text{g/ml}$)					
	no.1	no.2	no.3	mean	SD	%CV
12	27.491	28.125	27.914	27.843	0.32	1.16
24	24.319	24.531	25.799	24.883	0.80	3.22
36	25.165	24.953	24.742	24.953	0.21	0.85
48	23.262	22.839	25.165	23.755	1.24	5.22
60	23.685	23.473	23.685	23.614	0.12	0.52
72	25.165	23.685	25.376	24.742	0.92	3.73

Table c6. Solubility of piroxicam in 0.9% sodium chloride solution at 37°C.

times (hr)	concentration ($\mu\text{g/ml}$)					
	no.1	no.2	no.3	mean	SD	%CV
12	21.641	22.659	27.137	23.812	2.92	12.28
24	22.252	23.677	25.305	23.745	1.53	6.43
36	21.234	22.252	24.695	22.727	1.78	7.83
48	20.420	23.066	24.695	22.727	2.16	9.49
60	20.013	20.827	24.695	21.845	2.50	11.45
72	19.809	21.234	24.898	21.980	2.63	11.94

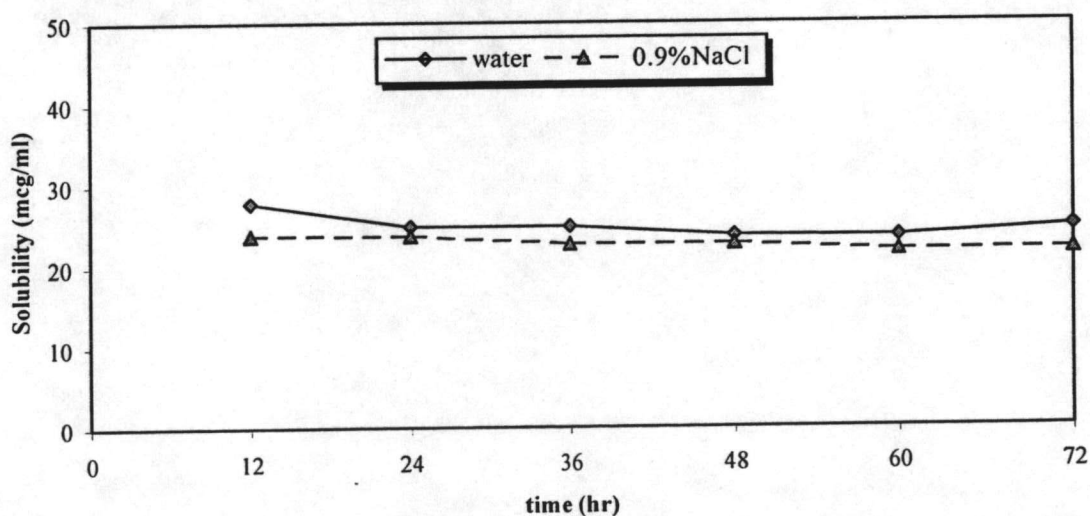
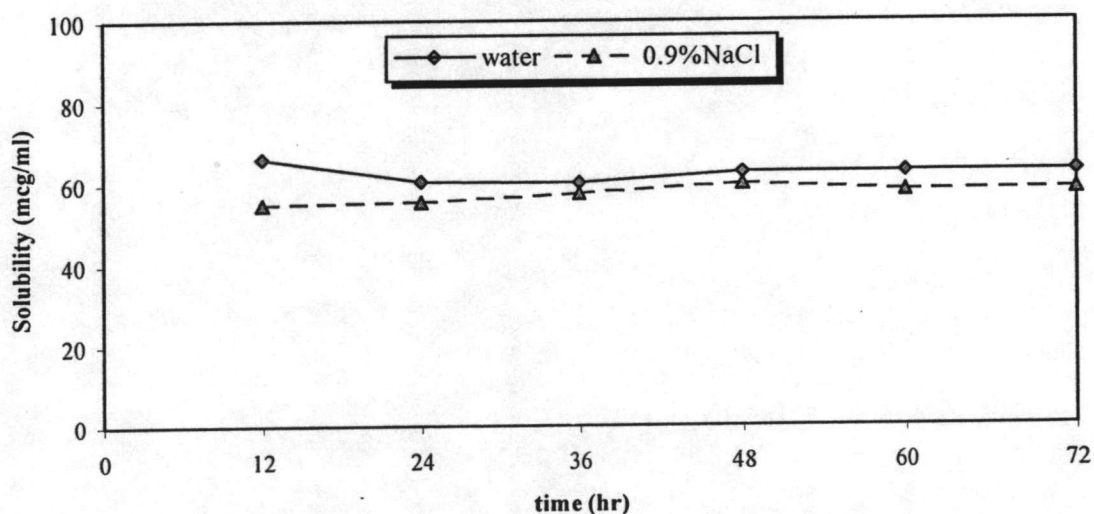
**Figure c3.** Solubility of piroxicam in water and 0.9% sodium chloride solution at 37°C.

Table c7. Solubility of ibuprofen in water at 37°C.

times (hr)	concentration ($\mu\text{g/ml}$)					
	no.1	no.2	no.3	mean	SD	%CV
12	70.590	69.310	58.875	66.258	6.43	9.70
24	66.690	58.185	57.095	60.657	5.25	8.66
36	61.809	60.230	59.141	60.393	1.34	2.22
48	64.671	62.312	61.380	62.787	1.70	2.70
60	64.898	63.991	60.177	63.022	2.50	3.97
72	65.769	62.166	61.572	63.169	2.27	3.60

Table c8. Solubility of ibuprofen in 0.9% sodium chloride solution at 37°C.

times (hr)	concentration ($\mu\text{g/ml}$)					
	no.1	no.2	no.3	mean	SD	%CV
12	57.382	54.279	53.264	54.975	2.15	3.90
24	55.077	56.300	55.682	55.686	0.61	1.10
36	57.571	57.449	58.253	57.758	0.43	0.75
48	59.116	60.083	60.781	59.993	0.84	1.39
60	57.821	58.066	58.807	58.231	0.51	0.88
72	58.830	60.464	56.699	58.664	1.89	3.22

**Figure c4.** Solubility of ibuprofen in water and 0.9% sodium chloride solution at 37°C.

APPENDIX D

Preliminary study and statistically evaluation

Table d1. The relationship between preparation parameter and %transmittance of 5% soybean oil in water emulsion.

Pressure (psi)	No.of cycle	%Transmittance at 480 nm					
		1	2	3	mean	SD	%CV
4000	1	23.4	22.6	22.9	22.97	0.40	1.76
	2	25.0	25.5	26.0	25.50	0.50	1.96
	3	28.9	28.1	29.0	28.67	0.49	1.72
	4	31.6	31.3	31.9	31.60	0.30	0.95
	5	33.6	33.9	33.9	33.80	0.17	0.51
	6	35.6	35.5	36.4	35.83	0.49	1.38
	7	37.5	37.0	37.6	37.37	0.32	0.86
	8	38.9	38.5	38.5	38.63	0.23	0.60
	9	39.8	38.9	39.8	39.50	0.52	1.32
	10	40.7	39.9	40.8	40.47	0.49	1.22
6000	1	30.5	30.7	30.0	30.40	0.36	1.19
	2	39.6	39.7	39.2	39.50	0.26	0.67
	3	45.5	46.1	46.4	46.00	0.46	1.00
	4	51.2	50.0	51.1	50.77	0.67	1.31
	5	53.1	53.3	53.2	53.20	0.10	0.19
	6	54.9	55.2	55.5	55.20	0.30	0.54
	7	56.8	57.2	57.4	57.13	0.31	0.53
	8	59.0	58.8	59.4	59.07	0.31	0.52
	9	59.3	59.6	59.3	59.40	0.17	0.29
	10	60.1	60.4	60.0	60.17	0.21	0.35

Table d1. (Continued).

Pressure (psi)	No. of cycle	%Transmittance at 480 nm					
		1	2	3	mean	SD	%CV
8000	1	36.4	35.8	36.2	36.13	0.31	0.85
	2	47.7	46.9	46.8	47.13	0.49	1.05
	3	55.5	55.3	55.1	55.30	0.20	0.36
	4	59.3	59.2	59.6	59.37	0.21	0.35
	5	62.5	62.1	62.3	62.30	0.20	0.32
	6	65.1	64.9	64.7	64.90	0.20	0.31
	7	66.1	66.0	65.9	66.00	0.10	0.15
	8	66.8	66.8	66.6	66.73	0.12	0.17
	9	67.7	66.9	67.3	67.30	0.40	0.59
	10	69.1	68.9	68.8	68.93	0.15	0.22
10000	1	45.6	45.8	45.9	45.77	0.15	0.33
	2	61.9	62.0	62.1	62.00	0.10	0.16
	3	68.5	68.5	68.7	68.57	0.12	0.17
	4	71.3	71.2	71.2	71.23	0.06	0.08
	5	73.0	73.0	73.0	73.00	0.00	0.00
	6	73.9	74.1	74.2	74.07	0.15	0.21
	7	75.0	75.1	75.1	75.07	0.06	0.08
	8	75.2	75.4	75.6	75.40	0.20	0.27
	9	75.7	75.6	76.1	75.80	0.26	0.35
	10	76.1	76.3	76.3	76.23	0.12	0.15
12000	1	49.3	49.4	49.4	49.37	0.06	0.12
	2	63.8	63.5	63.5	63.60	0.17	0.27
	3	69.7	70.2	69.8	69.90	0.26	0.38
	4	72.3	72.6	72.6	72.50	0.17	0.24
	5	74.5	74.7	74.7	74.63	0.12	0.15
	6	75.3	75.1	75.3	75.23	0.12	0.15
	7	76.3	76.1	76.8	76.40	0.36	0.47
	8	76.3	76.8	76.3	76.47	0.29	0.38
	9	76.5	77.0	76.4	76.63	0.32	0.42
	10	76.8	76.4	76.3	76.50	0.26	0.35

Table d2. p-Value from the analysis of variances between preparation parameters and %transmittance of 5%soybean oil in water emulsion determined by Scheffe method ($\alpha=0.05$).

No. of cycle	Pressure (psi)				
	4000	6000	8000	10000	12000
1	X	X	X	X	X
2	X	X	X	X	0.655
3	X	X	X	X	0.965
4	X	X	X	X	0.986
5	0.059	X	0.077	X	1.000
6	0.769	X	0.126	X	0.998
7	0.986	X	0.126	X	1.000
8	1.000	X	1.000	X	0.655
9	1.000	X	1.000	0.592	1.000
10		X	X	X	1.000

Note: X means the % transmittance of fat emulsion from two parameter levels is significant difference at 95% confidence level.

The numbers in the table are the p-values from the ANOVA that mean the % transmittance of fat emulsion from two parameter levels is not different at 95% confidence level.

APPENDIX E

Particle size determination of SLN

The particle size of SLN was determined by Mastersizer S. It is a range of laser light scattering based particle sizers (Mastersizer particle size analyzer, Instrumental manual). The results reported by them are a number of fundamental concepts follow as:

- The result is volume based.
- The result is expressed in terms of equivalent spheres.
- The analyzed distribution is a set of size classes which the representative diameter for each class is taken to be the geometric mean of the size band limits:

$$\bar{d} = \sqrt{d_{i-1}d_i} \quad (9)$$

The result from the analysis is the relative distribution of volume of particles in the range of size classes. From this basic result the statistics of the distribution are calculated. Moreover, the span and uniformity are calculated for describes the distribution of the particles. The span gives a description of the width of the distribution which is independent of the median size. The uniformity is a measure of the absolute deviations from the median.

The derived diameters are defined as:

$$D[m,n] = \left[\frac{\sum V_i d_i^{m-3}}{\sum V d_i^{n-3}} \right]^{\frac{1}{m-n}} \quad (10)$$

Where

V_i is the relative volume in class i with mean class diameter of d_i .

m and n are integer values which describe the type of derived diameter.

$D[4,3]$ is the volume weighted mean.

$D[3,2]$ is the surface weighted mean.

The span of the distribution is defined as:

$$Span = \frac{d(v,0.9) - d(v,0.1)}{d(v,0.5)} \quad (11)$$

The uniformity of the distribution is defined as:

$$Uniformity = \frac{\sum X_i [d(v,0.5) - d_i]}{d(v,0.5) \sum X_i} \quad (12)$$

Where

$d(v,0.5)$ is the median size of the distribution.

d_i and X_i are respectively the mean diameter of, and result in, size class i .

The examples of particle size determination of SLN are in Tables e1–e3 and Figures e1–e3. These data were average from three determinations.

Table e1. Particle size distribution of formulation 5TP+3P407 after autoclaving.

Distribution Type : Volume		D (v, 0.1) = 0.23	D (v, 0.5) = 0.40	D (v, 0.9) = 0.77			
Mean Diameters		D [4, 3] = 0.49	D [3, 2] = 0.37	Span = 1.34			
% >1 μm = 4.36		% >5 μm = 0.28	% >10 μm = 0.00	Uniformity = 0.49			
size low (μm)	size in %	size high (μm)	under %	size low (μm)	size in %	size high (μm)	under %
0.05	0.00	0.06	0.00	6.63	0.06	7.72	99.98
0.06	0.00	0.07	0.00	7.72	0.02	9.00	100.00
0.07	0.00	0.08	0.00	9.00	0.00	10.48	100.00
0.08	0.01	0.09	0.01	10.48	0.00	12.21	100.00
0.09	0.02	0.11	0.03	12.21	0.00	14.22	100.00
0.11	0.11	0.13	0.14	14.22	0.00	16.57	100.00
0.13	0.44	0.15	0.58	16.57	0.00	19.31	100.00
0.15	1.28	0.17	1.86	19.31	0.00	22.49	100.00
0.17	2.91	0.20	4.77	22.49	0.00	26.20	100.00
0.20	5.23	0.23	10.00	26.20	0.00	30.53	100.00
0.23	7.91	0.27	17.91	30.53	0.00	35.56	100.00
0.27	10.46	0.31	28.37	35.56	0.00	41.43	100.00
0.31	12.38	0.36	40.76	41.43	0.00	48.27	100.00
0.36	13.14	0.42	53.89	48.27	0.00	56.23	100.00
0.42	12.41	0.49	66.30	56.23	0.00	65.51	100.00
0.49	10.54	0.58	76.85	65.51	0.00	76.32	100.00
0.58	8.14	0.67	84.99	76.32	0.00	88.91	100.00
0.67	5.66	0.78	90.65	88.91	0.00	103.58	100.00
0.78	3.64	0.91	94.29	103.58	0.00	120.67	100.00
0.91	2.25	1.06	96.54	120.67	0.00	140.58	100.00
1.06	1.43	1.24	97.96	140.58	0.00	163.77	100.00
1.24	0.82	1.44	98.78	163.77	0.00	190.80	100.00
1.44	0.38	1.68	99.16	190.80	0.00	222.28	100.00
1.68	0.11	1.95	99.27	222.28	0.00	258.95	100.00
1.95	0.05	2.28	99.32	258.95	0.00	301.68	100.00
2.28	0.03	2.65	99.35	301.68	0.00	351.46	100.00
2.65	0.05	3.09	99.40	351.46	0.00	409.45	100.00
3.09	0.07	3.60	99.47	409.45	0.00	477.01	100.00
3.60	0.11	4.19	99.58	477.01	0.00	555.71	100.00
4.19	0.13	4.88	99.71	555.71	0.00	647.41	100.00
4.88	0.12	5.69	99.83	647.41	0.00	754.23	100.00
5.69	0.09	6.63	99.92	754.23	0.00	878.67	100.00

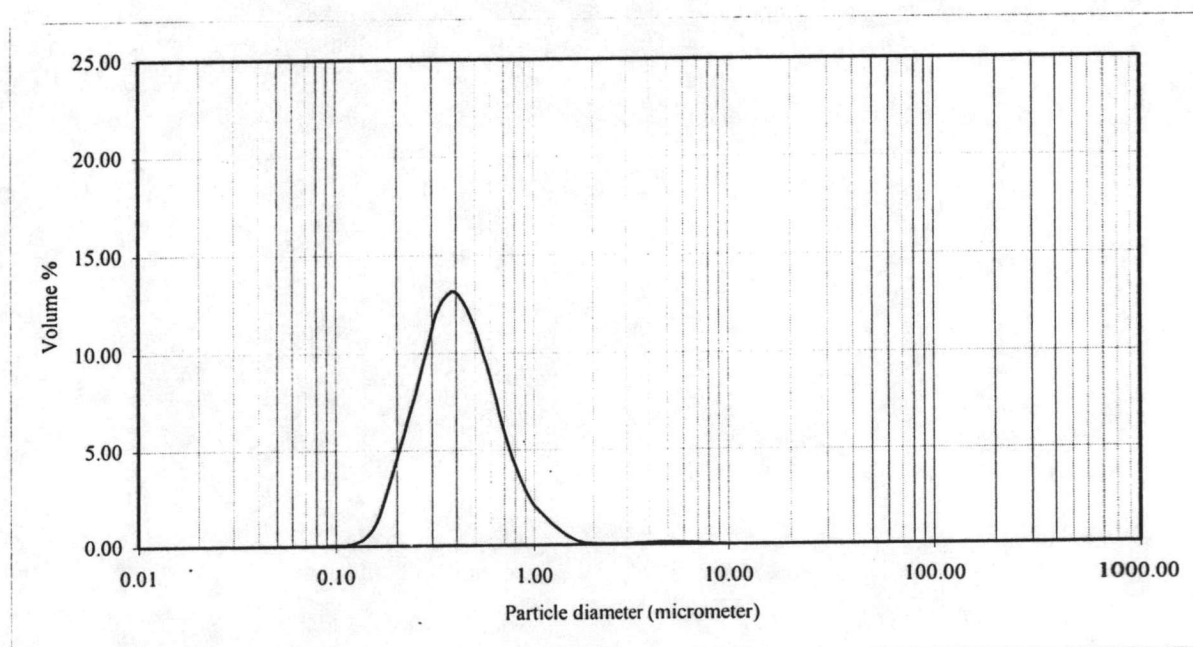
**Figure e1.** Particle size distribution of formulation 5TP+3P407 after autoclaving.

Table e2. Particle size distribution of formulation 0.5Dil+5TP+3P407 (pH7) after autoclaving (batch 3).

Distribution Type : Volume	D (v, 0.1) = 0.23	D (v, 0.5) = 0.31	D (v, 0.9) = 0.45
Mean Diameters	D [4 , 3] = 0.33	D [3 , 2] = 0.30	Span = 0.70
% >1 μm = 0.00	% >5 μm = 0.00	% >10 μm = 0.00	Uniformity = 0.21

size low (μm)	size in %	size high (μm)	under %	size low (μm)	size in %	size high (μm)	under %
0.05	0.00	0.06	0.00	6.63	0.00	7.72	100.00
0.06	0.00	0.07	0.00	7.72	0.00	9.00	100.00
0.07	0.00	0.08	0.00	9.00	0.00	10.48	100.00
0.08	0.01	0.09	0.01	10.48	0.00	12.21	100.00
0.09	0.02	0.11	0.03	12.21	0.00	14.22	100.00
0.11	0.08	0.13	0.11	14.22	0.00	16.57	100.00
0.13	0.25	0.15	0.36	16.57	0.00	19.31	100.00
0.15	0.82	0.17	1.18	19.31	0.00	22.49	100.00
0.17	2.48	0.20	3.66	22.49	0.00	26.20	100.00
0.20	6.86	0.23	10.51	26.20	0.00	30.53	100.00
0.23	15.22	0.27	25.73	30.53	0.00	35.56	100.00
0.27	22.99	0.31	48.72	35.56	0.00	41.43	100.00
0.31	22.16	0.36	70.88	41.43	0.00	48.27	100.00
0.36	15.60	0.42	86.48	48.27	0.00	56.23	100.00
0.42	9.09	0.49	95.57	56.23	0.00	65.51	100.00
0.49	3.77	0.58	99.34	65.51	0.00	76.32	100.00
0.58	0.66	0.67	100.00	76.32	0.00	88.91	100.00
0.67	0.00	0.78	100.00	88.91	0.00	103.58	100.00
0.78	0.00	0.91	100.00	103.58	0.00	120.67	100.00
0.91	0.00	1.06	100.00	120.67	0.00	140.58	100.00
1.06	0.00	1.24	100.00	140.58	0.00	163.77	100.00
1.24	0.00	1.44	100.00	163.77	0.00	190.80	100.00
1.44	0.00	1.68	100.00	190.80	0.00	222.28	100.00
1.68	0.00	1.95	100.00	222.28	0.00	258.95	100.00
1.95	0.00	2.28	100.00	258.95	0.00	301.68	100.00
2.28	0.00	2.65	100.00	301.68	0.00	351.46	100.00
2.65	0.00	3.09	100.00	351.46	0.00	409.45	100.00
3.09	0.00	3.60	100.00	409.45	0.00	477.01	100.00
3.60	0.00	4.19	100.00	477.01	0.00	555.71	100.00
4.19	0.00	4.88	100.00	555.71	0.00	647.41	100.00
4.88	0.00	5.69	100.00	647.41	0.00	754.23	100.00
5.69	0.00	6.63	100.00	754.23	0.00	878.67	100.00

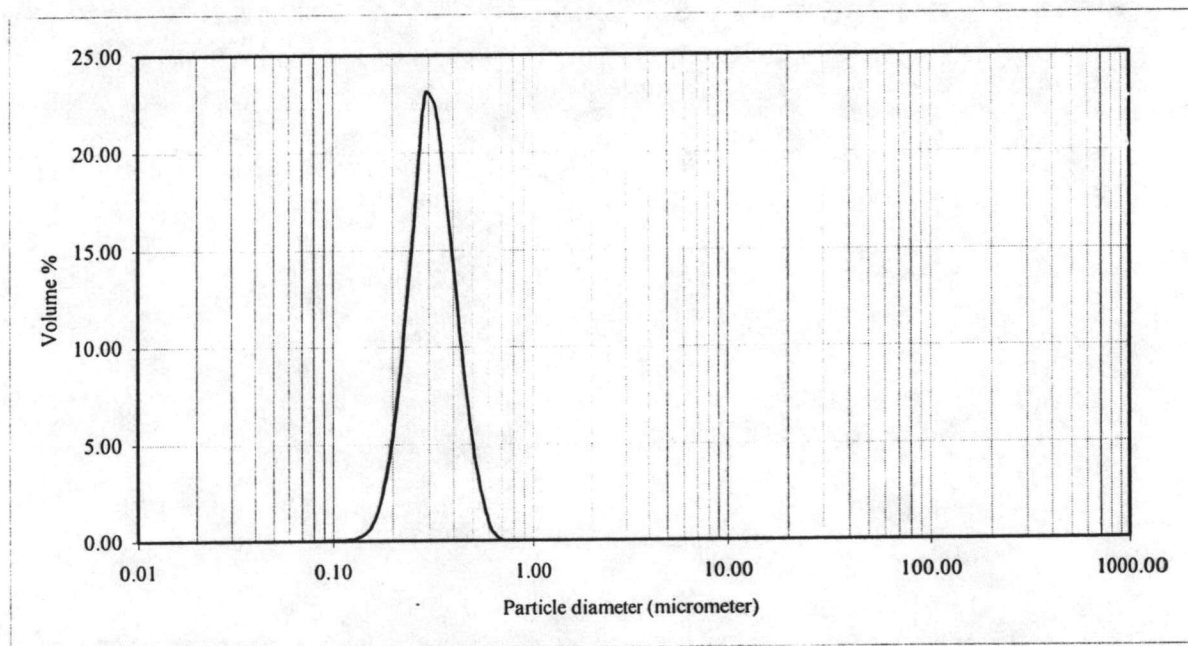


Figure e2. Particle size distribution of formulation 0.5Dil+5TP+3P407 (pH7) after autoclaving (batch 3).

Table e3. Particle size distribution of formulation 0.5Ibu+5TP+3P407 after autoclaving (batch 3).

Distribution Type : Volume		D (v, 0.1) = 0.22	D (v, 0.5) = 0.31	D (v, 0.9) = 0.43
Mean Diameters		D [4, 3] = 0.32	D [3, 2] = 0.30	Span = 0.68
% >1 μm = 0.00	% >5 μm = 0.00	% >10 μm = 0.00	Uniformity = 0.21	

size low (μm)	size in %	size high (μm)	under %	size low (μm)	size in %	size high (μm)	under %
0.05	0.00	0.06	0.00	6.63	0.00	7.72	100.00
0.06	0.00	0.07	0.00	7.72	0.00	9.00	100.00
0.07	0.00	0.08	0.00	9.00	0.00	10.48	100.00
0.08	0.01	0.09	0.01	10.48	0.00	12.21	100.00
0.09	0.03	0.11	0.04	12.21	0.00	14.22	100.00
0.11	0.09	0.13	0.13	14.22	0.00	16.57	100.00
0.13	0.29	0.15	0.42	16.57	0.00	19.31	100.00
0.15	0.91	0.17	1.33	19.31	0.00	22.49	100.00
0.17	2.73	0.20	4.06	22.49	0.00	26.20	100.00
0.20	7.61	0.23	11.67	26.20	0.00	30.53	100.00
0.23	16.80	0.27	28.47	30.53	0.00	35.56	100.00
0.27	24.51	0.31	52.99	35.56	0.00	41.43	100.00
0.31	21.97	0.36	74.95	41.43	0.00	48.27	100.00
0.36	14.01	0.42	88.97	48.27	0.00	56.23	100.00
0.42	7.61	0.49	96.58	56.23	0.00	65.51	100.00
0.49	2.94	0.58	99.52	65.51	0.00	76.32	100.00
0.58	0.47	0.67	99.99	76.32	0.00	88.91	100.00
0.67	0.01	0.78	100.00	88.91	0.00	103.58	100.00
0.78	0.00	0.91	100.00	103.58	0.00	120.67	100.00
0.91	0.00	1.06	100.00	120.67	0.00	140.58	100.00
1.06	0.00	1.24	100.00	140.58	0.00	163.77	100.00
1.24	0.00	1.44	100.00	163.77	0.00	190.80	100.00
1.44	0.00	1.68	100.00	190.80	0.00	222.28	100.00
1.68	0.00	1.95	100.00	222.28	0.00	258.95	100.00
1.95	0.00	2.28	100.00	258.95	0.00	301.68	100.00
2.28	0.00	2.65	100.00	301.68	0.00	351.46	100.00
2.65	0.00	3.09	100.00	351.46	0.00	409.45	100.00
3.09	0.00	3.60	100.00	409.45	0.00	477.01	100.00
3.60	0.00	4.19	100.00	477.01	0.00	555.71	100.00
4.19	0.00	4.88	100.00	555.71	0.00	647.41	100.00
4.88	0.00	5.69	100.00	647.41	0.00	754.23	100.00
5.69	0.00	6.63	100.00	754.23	0.00	878.67	100.00

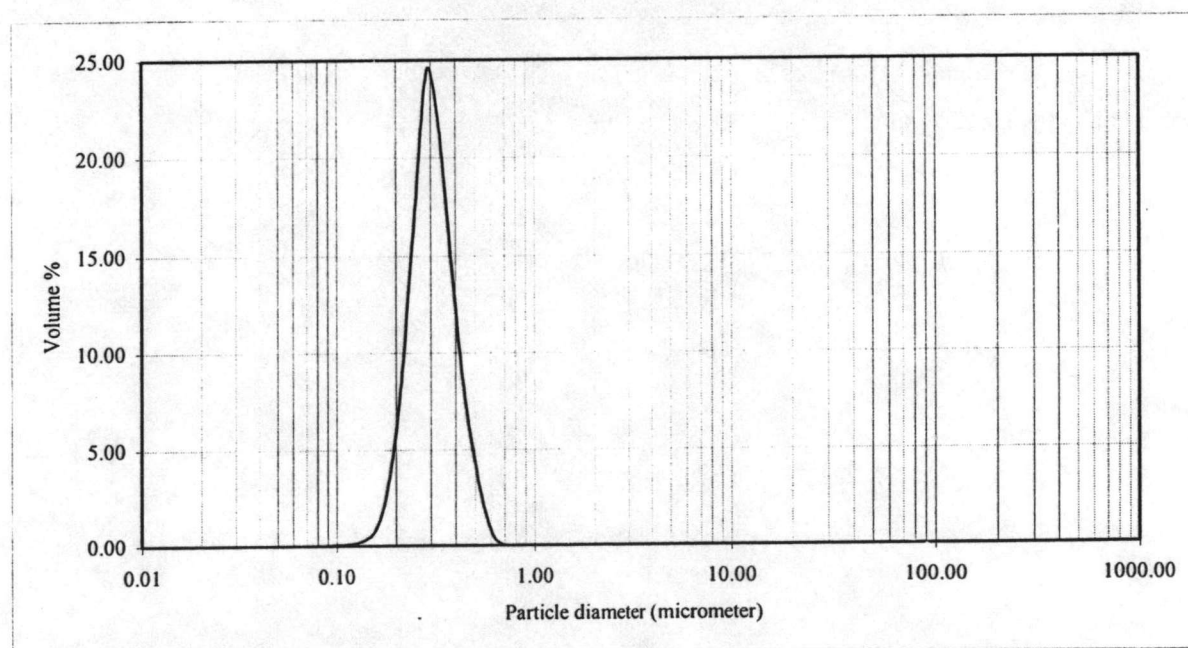


Figure e3. Particle size distribution of formulation 0.5Ibu+5TP+3P407 after autoclaving (batch 3).

APPENDIX F

Zeta potential of SLN

The surface forces effects in the controlling the behavior of colloidal systems. This force is much more important than the gravity effects. The Zeta-meter system 3.0 can measure the effect of electrostatic charge of the particle which causes the electrical repulsion between adjacent particles and the attractive force (called the van der Waals force). The net result depends on the relative magnitude of both forces. Numerous encounters occur between particles as they are moved about by mechanical agitation, convection currents and Brownian motions. The outcome of these collisions will depend in part on the net attractive or repulsive force between the colloids. This charge produces a difference in electrical potential, in millivolts, between the surface of each colloid and the bulk of the suspending liquid. This difference is called the zeta potential.

The Zeta meter system 3.0 is an instrument for zeta potential measurement. The concept of this instrument is the charged colloid will move when the suspension is placed between two electrodes that have a DC voltage across them, and its velocity (called electrophoresis mobility) will be proportional to the zeta potential. This phenomena is known as electrophoresis.

The Helmholtz-Smoluchowski equation is the most elementary expression for zeta potential. The basic formula shows a direct relation between zeta potential and electrophoresis mobility as follows: (Martin, 1993; Muslin Limpanasitthikul, 1991)

$$\zeta = \frac{v}{E} \times \frac{4\pi\eta}{\epsilon} \times (9 \times 10^4) \quad (13)$$

Where: ζ = Zeta potential of the suspended particle in volts

v = The velocity of migration in cm/sec

E = The potential gradient in volts/cm

η = The viscosity of the medium in poise (dyne sec/cm²) at temperature t

ϵ = The dielectric constant of the medium

The term v/E means the electrophoresis mobility (EM). This is determined by the Zeta meter system 3.0 in microns/sec per volts/cm. So it is preferable to calculate the zeta potential in practical millivolts, the formula then becomes: (Zeta meter system 3.0, Instrumental manual)

$$\zeta = 113,000 \times \frac{\eta}{\epsilon} \times EM \quad (14)$$

Where: ζ = Zeta potential of the suspended particle in millivolts

EM = The electrophoresis mobility at actual temperature in microns/sec per volts/cm

Table f1. describes the interaction between zeta potential determinations and the probable response of the suspension being tested.

Table f1. The interaction between zeta potential determinations and the probable response of the suspension being tested (from the Zeta meter system 3.0 manual)

Stability characteristics	Average ZP in millivolts
Maximum agglomeration and precipitation	+3 to 0
Excellent agglomeration and precipitation	-1 to -4
Fair agglomeration and precipitation	-5 to -10
Threshold of agglomeration (agglomerates of 2 to 10 colloids)	-11 to -20
Plateau of slight stability (few agglomerates)	-21 to -30
Moderate stability (no agglomerates)	-31 to -40
Good stability	-41 to -50
Very good stability	-51 to -60
Excellent stability	-61 to -80
Maximum stability	-81 to -125

Table f2. Zeta potential of standard Minusil® suspension (millivolts).

-50.335	-52.132	-48.281	-45.382	-46.015	-49.703	-52.710	-52.554	-49.914	-46.648
-48.804	-50.656	-50.757	-46.804	-46.906	-51.867	-52.812	-46.437	-52.499	-50.023
-49.601	-46.859	-49.492	-53.765	-45.749	-46.593	-53.343	-47.859	-50.390	-51.390
-48.492	-49.812	-51.124	-49.812	-54.039	-51.710	-46.906	-47.382	-50.601	-53.234
-51.656	-46.328	-47.960	-45.539	-51.546	-51.179	-53.445	-48.070	-45.593	-47.859
-49.179	-53.765	-45.171	-47.070	-49.648	-45.851	-50.914	-47.914	-46.437	-44.429
-48.804	-51.234	-45.804	-52.976	-53.609	-48.492	-51.757	-44.960	-50.601	-54.039
-46.437	-45.851	-50.492	-51.812	-47.914	-49.812	-48.070	-45.007	-49.546	-44.062
-47.226	-48.124	-50.492	-48.437	-47.328	-47.117	-49.492	-44.960	-50.601	-53.234
-50.070	-46.382	-52.921	-52.234	-52.710	-46.437	-45.804	-44.484	-47.382	-44.429
count	100			mean	-49.101			SD	2.772

Table f3. Zeta potential of formulation 5TP+1P407 after autoclaving (millivolts).

-20.843	-21.109	-20.742	-19.531	-24.171	-24.351	-20.843	-24.429	-20.132	-20.874
-23.929	-23.062	-18.023	-21.476	-23.085	-19.421	-26.328	-24.804	-18.210	-17.843
-24.640	-18.687	-24.007	-20.187	-25.015	-24.851	-18.367	-20.343	-22.273	-19.976
-25.117	-25.015	-22.320	-25.195	-22.796	-20.609	-25.015	-19.578	-23.195	-23.960
-25.304	-18.789	-23.796	-25.937	-18.656	-18.734	-25.773	-25.539	-27.124	-23.507
-25.960	-21.718	-24.062	-20.843	-19.023	-17.812	-24.539	-21.187	-24.804	-19.476
-19.445	-23.328	-21.453	-18.343	-21.820	-19.499	-21.109	-25.117	-17.921	-18.765
-21.769	-23.640	-24.640	-23.429	-20.874	-24.117	-24.296	-21.796	-22.140	-23.773
-24.851	-17.757	-25.273	-21.187	-24.039	-20.976	-25.671	-20.499	-25.406	-22.585
-24.218	-24.984	-25.648	-19.953	-23.874	-23.062	-20.374	-24.039	-25.460	-23.273
count	100			mean	-22.373			SD	2.514

Table f4. Zeta potential of formulation 5TP+2P407 after autoclaving (millivolts).

-20.953	-17.445	-25.804	-27.257	-25.460	-23.874	-23.562	-22.796	-19.265	-27.789
-18.765	-17.546	-20.710	-22.796	-25.562	-20.343	-21.429	-21.218	-28.367	-23.374
-23.164	-21.820	-22.429	-23.031	-18.734	-21.976	-23.929	-20.843	-23.296	-25.171
-20.710	-27.335	-23.695	-26.382	-20.796	-16.070	-24.484	-18.156	-24.382	-20.320
-24.171	-20.054	-25.015	-23.164	-23.874	-27.546	-26.515	-28.976	-26.515	-28.265
-26.437	-24.085	-17.632	-18.101	-23.960	-19.265	-24.539	-23.328	-21.765	-22.929
-24.328	-22.851	-23.429	-19.820	-24.851	-22.773	-27.632	-25.460	-22.585	-26.015
-23.796	-22.874	-26.281	-24.695	-23.617	-26.570	-24.960	-27.390	-22.585	-24.640
-24.249	-19.054	-20.499	-23.507	-24.273	-24.296	-23.296	-23.117	-23.195	-20.953
-18.445	-23.406	-21.031	-20.242	-24.085	-22.984	-22.140	-24.640	-28.343	-20.609
count	100			mean	-23.167			SD	2.832

Table f5. Zeta potential of formulation 5TP+3P407 after autoclaving (millivolts).

-26.992	-20.609	-20.398	-20.843	-24.218	-20.609	-19.109	-23.929	-28.445	-21.453
-25.882	-22.695	-21.718	-25.351	-23.242	-21.398	-27.578	-22.085	-23.695	-21.664
-18.921	-19.343	-20.632	-21.718	-25.195	-24.640	-28.390	-21.929	-29.132	-24.218
-22.398	-25.117	-25.484	-24.273	-24.804	-25.617	-21.265	-21.796	-29.843	-19.609
-21.851	-24.671	-22.796	-25.062	-27.890	-24.507	-26.328	-24.960	-28.921	-25.382
-24.171	-22.984	-25.484	-19.953	-22.742	-25.515	-23.664	-21.554	-23.929	-24.117
-23.140	-22.640	-25.671	-26.117	-28.023	-26.617	-28.578	-19.976	-25.960	-19.398
-26.617	-20.289	-28.132	-24.460	-23.874	-28.710	-23.640	-20.499	-20.710	-25.859
-24.296	-21.664	-18.945	-24.539	-28.601	-24.851	-22.007	-23.429	-25.882	-24.718
-20.609	-23.796	-24.171	-26.781	-23.929	-23.773	-25.749	-23.562	-24.640	-23.242
count	100			mean	-23.901			SD	2.607

Table f6. Zeta potential of formulation 5TP+4P407 after autoclaving (millivolts).

-26.617	-23.140	-30.242	-24.640	-29.023	-25.828	-22.429	-26.117	-23.164	-27.046
-21.898	-24.382	-22.874	-24.539	-24.882	-22.773	-26.570	-26.617	-27.101	-26.703
-25.171	-25.671	-20.499	-23.718	-23.242	-30.374	-23.031	-30.820	-28.898	-23.796
-22.851	-28.445	-23.062	-27.101	-22.609	-30.687	-26.382	-26.195	-24.007	-26.492
-23.828	-25.171	-25.328	-25.195	-26.195	-25.195	-23.796	-25.984	-26.570	-25.140
-23.429	-23.195	-26.171	-29.921	-22.085	-23.539	-23.695	-20.843	-28.789	-24.906
-22.351	-31.085	-25.695	-30.585	-30.031	-23.374	-23.749	-22.609	-19.867	-25.749
-22.273	-25.749	-20.632	-29.687	-24.882	-21.320	-21.429	-29.843	-21.476	-20.874
-24.539	-28.445	-25.773	-23.218	-23.960	-22.296	-21.265	-21.453	-21.265	-25.671
-25.984	-21.453	-23.218	-23.218	-21.085	-25.304	-25.773	-27.257	-21.687	-23.242
count	100			mean	-24.880			SD	2.699

Table f7. Zeta potential of formulation 5TP+5P407 after autoclaving (millivolts).

-23.874	-23.296	-22.351	-25.015	-25.695	-25.140	-30.398	-30.796	-29.210	-25.140
-29.609	-28.343	-23.164	-22.664	-22.796	-25.406	-24.749	-24.328	-25.515	-26.226
-27.499	-31.687	-26.070	-29.343	-28.812	-26.148	-25.437	-21.718	-22.609	-28.078
-29.320	-24.117	-25.773	-23.429	-32.453	-29.609	-30.585	-30.242	-22.507	-21.796
-23.507	-23.140	-22.984	-26.359	-26.281	-22.273	-30.554	-26.304	-31.343	-25.093
-23.140	-29.765	-23.874	-29.078	-24.273	-23.617	-24.749	-23.328	-26.539	-31.109
-23.328	-22.320	-28.523	-21.796	-25.406	-28.976	-22.851	-26.015	-24.039	-24.117
-25.828	-21.554	-23.406	-21.953	-22.164	-31.687	-21.218	-25.906	-23.429	-21.398
-25.117	-27.046	-21.874	-26.992	-24.406	-29.156	-28.687	-28.710	-21.007	-25.039
-23.328	-24.859	-25.882	-21.453	-26.671	-23.328	-26.304	-24.695	-31.218	-21.718
count	100			mean	-25.617			SD	3.035

Table f8. Zeta potential of formulation 5TP+1T80 after autoclaving (millivolts).

-32.929	-34.296	-35.671	-36.171	-36.960	-35.562	-38.124	-38.515	-33.749	-36.382
-32.484	-31.976	-38.835	-37.703	-36.617	-37.914	-32.640	-37.437	-37.648	-36.539
-37.070	-39.179	-39.890	-34.171	-38.179	-36.960	-37.914	-38.835	-35.984	-33.242
-31.507	-38.624	-38.281	-31.929	-33.507	-38.070	-40.765	-33.695	-33.085	-34.484
-33.242	-35.984	-35.882	-36.249	-35.484	-33.031	-31.874	-34.773	-32.874	-38.335
-33.585	-33.664	-35.617	-34.882	-31.640	-36.382	-39.703	-32.851	-37.859	-37.648
-32.031	-39.179	-35.039	-31.874	-36.882	-38.937	-31.531	-35.937	-39.812	-39.070
-32.796	-36.249	-38.992	-37.359	-31.531	-35.695	-38.992	-35.984	-38.624	-39.656
-38.679	-38.390	-32.851	-39.757	-36.914	-39.492	-39.757	-37.015	-35.749	-40.156
-37.648	-33.695	-35.515	-36.914	-31.531	-38.781	-34.882	-35.140	-31.929	-34.562
count	100			mean	-36.006			SD	2.606

Table f9. Zeta potential of formulation 5TP+2T80 after autoclaving (millivolts).

-29.554	-33.960	-27.789	-33.328	-33.085	-30.265	-31.976	-27.656	-34.429	-35.617
-26.437	-34.828	-31.453	-27.734	-28.265	-29.476	-31.296	-30.796	-29.000	-34.617
-30.632	-32.398	-26.937	-31.007	-29.343	-30.265	-34.195	-28.656	-30.453	-33.374
-26.304	-30.132	-32.109	-34.117	-27.179	-29.265	-35.984	-31.531	-34.039	-35.984
-36.117	-32.164	-29.000	-30.796	-33.195	-30.585	-29.367	-30.820	-27.257	-34.828
-30.976	-27.210	-28.523	-34.562	-32.851	-35.140	-27.124	-30.554	-28.265	-29.398
-31.343	-32.398	-31.242	-31.398	-26.859	-28.156	-30.476	-31.874	-33.453	-34.039
-30.476	-30.132	-30.453	-30.843	-30.265	-28.179	-33.796	-25.484	-28.523	-31.320
-30.843	-27.335	-28.390	-29.187	-29.578	-29.867	-31.874	-29.367	-26.570	-31.320
-30.000	-27.499	-30.874	-32.296	-26.515	-30.398	-26.992	-33.374	-32.398	-27.867
count	100			mean	-30.675			SD	2.577

Table f10. Zeta potential of formulation 5TP+3T80 after autoclaving (millivolts).

-29.585	-25.898	-24.054	-22.960	-22.062	-22.382	-23.421	-23.265	-22.023	-26.679
-27.609	-27.835	-23.265	-24.468	-25.898	-28.124	-24.804	-22.421	-25.312	-21.390
-29.914	-23.304	-26.101	-26.890	-24.679	-25.757	-29.031	-25.609	-26.296	-29.398
-23.726	-25.476	-27.000	-28.531	-28.179	-29.218	-23.460	-28.703	-22.960	-24.898
-25.812	-23.000	-21.843	-29.781	-28.414	-23.898	-25.812	-25.757	-25.429	-24.265
-24.953	-26.835	-24.953	-26.523	-25.476	-23.609	-24.632	-23.265	-26.195	-29.187
-25.031	-22.132	-24.015	-27.265	-27.164	-26.046	-24.414	-28.210	-25.429	-25.515
-24.304	-26.523	-28.179	-25.031	-22.382	-28.757	-27.781	-24.726	-21.773	-28.578
-23.460	-23.570	-28.531	-29.218	-28.640	-22.171	-24.765	-27.945	-23.976	-21.453
-24.546	-21.671	-24.632	-25.664	-22.960	-23.648	-24.804	-24.718	-21.460	-22.796
count	100			mean	-25.361			SD	2.288

Table f11. Zeta potential of formulation 5TP+4T80 after autoclaving (millivolts).

-19.265	-17.351	-15.874	-15.601	-19.749	-21.328	-18.882	-18.421	-19.195	-20.749
-18.882	-19.648	-17.718	-16.835	-23.265	-18.515	-19.789	-15.874	-22.421	-21.539
-21.304	-20.773	-22.695	-18.000	-18.000	-17.273	-19.617	-19.195	-19.499	-20.710
-24.546	-18.000	-16.906	-16.624	-18.000	-15.718	-22.000	-21.460	-22.343	-17.351
-18.851	-21.328	-18.218	-17.945	-19.789	-19.906	-20.679	-17.351	-20.367	-19.617
-16.320	-16.312	-17.101	-20.000	-17.968	-15.664	-18.304	-21.093	-17.601	-20.585
-23.898	-21.960	-20.617	-20.562	-17.578	-18.390	-24.593	-18.617	-19.953	-20.679
-19.859	-15.992	-20.296	-16.234	-16.953	-18.484	-16.296	-22.921	-21.601	-20.867
-20.656	-20.499	-20.796	-23.898	-16.234	-18.695	-23.304	-22.421	-16.445	-20.414
-20.710	-24.265	-20.679	-17.679	-17.421	-18.460	-19.671	-20.749	-17.718	-18.445
count	100			mean	-19.414			SD	2.255

Table f12. Zeta potential of formulation 5TP+5T80 after autoclaving (millivolts).

-16.273	-16.914	-14.804	-15.164	-12.570	-14.242	-18.218	-15.664	-15.679	-18.218
-17.156	-16.062	-13.203	-14.796	-14.703	-16.546	-17.179	-18.460	-14.992	-17.695
-14.203	-12.398	-16.507	-17.023	-18.460	-15.820	-14.796	-14.726	-15.187	-13.328
-14.992	-11.914	-21.843	-14.374	-17.523	-11.226	-16.296	-15.242	-13.882	-14.593
-14.968	-14.632	-14.679	-16.156	-16.296	-14.476	-16.523	-13.273	-17.906	-14.203
-14.476	-14.843	-15.601	-13.078	-16.234	-11.890	-16.031	-16.320	-16.234	-16.445
-15.242	-17.140	-14.679	-15.546	-17.507	-13.414	-18.539	-17.679	-15.007	-17.156
-14.374	-18.851	-13.453	-11.468	-14.609	-18.023	-15.468	-18.367	-16.835	-12.351
-13.960	-18.515	-14.593	-12.812	-17.218	-13.937	-16.070	-15.898	-14.171	-12.796
-15.320	-10.320	-12.445	-14.492	-14.000	-17.000	-16.507	-17.351	-13.273	-14.187
count	100			mean	-15.377			SD	1.955

Table f13. Zeta potential of formulation 5TP+1EL after autoclaving (millivolts).

-26.992	-27.023	-27.757	-25.328	-28.710	-29.765	-27.234	-29.023	-25.617	-28.898
-26.804	-25.695	-28.601	-25.171	-29.078	-27.023	-28.710	-25.117	-26.992	-28.179
-26.093	-25.593	-25.617	-27.921	-26.914	-27.046	-26.804	-26.406	-25.937	-28.312
-25.484	-29.078	-25.804	-25.273	-28.476	-27.757	-27.078	-25.695	-26.328	-28.078
-25.304	-25.749	-29.367	-29.554	-29.609	-27.499	-25.039	-27.179	-27.757	-26.249
-27.234	-25.906	-26.359	-25.093	-29.742	-28.945	-25.593	-30.210	-27.078	-30.320
-25.171	-25.562	-29.609	-26.093	-27.390	-28.898	-27.499	-29.898	-26.148	-30.132
-29.000	-26.039	-25.937	-28.367	-28.343	-28.000	-25.726	-26.148	-25.062	-30.242
-29.132	-28.789	-26.195	-28.898	-28.656	-28.789	-29.898	-27.757	-29.898	-30.210
-26.570	-28.843	-27.710	-26.539	-27.312	-30.000	-29.187	-25.695	-27.046	-30.031
count	100			mean	-27.496			SD	1.625

Table f14. Zeta potential of formulation 5TP+2EL after autoclaving (millivolts).

-30.499	-32.031	-30.976	-28.000	-30.687	-30.078	-29.789	-28.390	-30.476	-31.132
-32.164	-28.445	-32.242	-32.851	-31.687	-29.554	-29.210	-31.851	-32.531	-29.210
-29.109	-27.468	-31.609	-31.218	-32.929	-28.000	-32.062	-31.640	-30.499	-33.007
-29.710	-29.265	-28.578	-27.890	-29.343	-32.374	-31.031	-28.023	-28.898	-27.921
-28.789	-31.765	-28.343	-27.710	-28.578	-31.398	-29.632	-30.210	-28.179	-31.429
-31.398	-30.921	-31.976	-29.976	-28.156	-31.187	-30.796	-28.812	-29.187	-30.476
-32.531	-28.656	-32.062	-28.632	-29.898	-33.085	-29.289	-32.773	-30.499	-32.484
-32.531	-31.218	-29.531	-29.531	-30.210	-32.218	-29.343	-32.374	-28.023	-29.187
-29.710	-27.757	-29.476	-30.164	-33.374	-29.187	-32.773	-31.765	-31.953	-30.585
-28.523	-29.109	-33.085	-31.218	-30.000	-28.476	-29.742	-30.374	-30.398	-32.218
count	100			mean	-30.353			SD	1.625

Table f15. Zeta potential of formulation 5TP+3EL after autoclaving (millivolts).

-30.796	-35.984	-31.398	-33.984	-31.953	-31.609	-32.398	-31.320	-30.343	-31.398
-32.242	-32.140	-35.195	-33.828	-32.953	-30.742	-34.085	-36.039	-34.539	-32.242
-31.187	-30.031	-36.171	-31.531	-30.000	-32.609	-29.531	-32.929	-30.343	-31.765
-33.874	-33.007	-29.445	-32.929	-34.085	-32.218	-31.742	-31.007	-32.374	-33.164
-32.851	-31.343	-35.617	-33.664	-31.531	-31.242	-34.671	-31.953	-35.882	-34.882
-34.039	-30.796	-33.617	-30.453	-35.140	-31.796	-33.164	-30.453	-34.039	-31.585
-30.054	-30.843	-31.507	-32.109	-30.554	-33.429	-34.617	-32.640	-31.929	-29.976
-32.453	-32.031	-33.374	-30.031	-31.031	-30.710	-31.453	-31.398	-35.437	-32.453
-31.453	-31.609	-33.328	-31.640	-31.531	-35.437	-30.476	-34.749	-33.117	-30.976
-30.742	-29.697	-30.632	-30.000	-32.609	-30.742	-35.351	-32.062	-31.320	-32.398
count	100			mean	-32.317			SD	1.709

Table f16. Zeta potential of formulation 5TP+4EL after autoclaving (millivolts).

-36.882	-33.273	-36.093	-34.960	-37.593	-33.664	-34.773	-33.796	-36.249	-37.304
-35.437	-35.304	-33.429	-36.914	-37.757	-32.695	-37.593	-37.437	-34.484	-35.015
-35.882	-35.859	-32.773	-35.859	-35.093	-35.140	-34.351	-34.882	-34.296	-34.671
-32.874	-32.062	-34.773	-37.492	-32.164	-36.437	-33.906	-32.374	-35.515	-35.859
-32.773	-32.320	-36.828	-36.726	-36.539	-36.039	-32.296	-34.960	-34.085	-32.484
-36.328	-32.796	-36.117	-33.273	-33.695	-36.093	-35.515	-37.437	-32.695	-33.429
-34.429	-36.828	-33.960	-34.117	-32.953	-33.617	-35.382	-34.562	-33.828	-35.484
-37.304	-34.117	-34.562	-35.804	-35.562	-36.593	-37.804	-32.164	-35.937	-34.195
-34.085	-36.117	-34.039	-33.960	-36.671	-35.382	-32.929	-34.351	-34.828	-33.585
-33.195	-34.882	-33.085	-32.031	-34.906	-36.960	-35.195	-36.249	-33.960	-34.117
count	100			mean	-34.851			SD	1.557

Table f17. Zeta potential of formulation 5TP+5EL after autoclaving (millivolts).

-38.781	-35.382	-36.492	-37.171	-38.179	-34.749	-35.882	-39.757	-35.859	-37.171
-34.484	-35.351	-36.117	-34.484	-35.093	-36.617	-39.812	-36.093	-35.515	-38.515
-36.617	-34.960	-35.749	-35.351	-37.546	-35.195	-34.484	-39.992	-37.648	-39.234
-34.484	-37.226	-37.546	-38.335	-37.124	-37.968	-34.171	-35.039	-37.171	-34.171
-34.773	-39.570	-35.437	-36.960	-36.960	-39.492	-35.984	-36.882	-37.492	-38.781
-35.671	-35.140	-35.249	-37.804	-39.757	-35.804	-35.515	-34.406	-35.671	-36.914
-38.624	-36.882	-34.351	-37.968	-38.226	-39.890	-34.562	-36.304	-36.539	-35.859
-37.304	-40.156	-34.671	-38.835	-36.617	-38.281	-36.171	-39.124	-35.195	-40.156
-39.812	-37.648	-38.015	-36.882	-39.890	-36.492	-34.773	-36.437	-39.070	-38.781
-38.890	-38.468	-35.804	-40.046	-36.781	-34.429	-38.937	-34.695	-36.492	-35.984
count	100			mean	-36.898			SD	1.745

Table f18. Zeta potential of formulation 3TP+3P407 after autoclaving (millivolts).

-22.085	-21.796	-21.664	-21.398	-20.554	-29.687	-18.789	-22.984	-23.484	-24.593
-22.085	-19.976	-23.773	-23.296	-27.632	-22.320	-18.843	-25.539	-29.109	-24.007
-22.140	-22.140	-19.398	-26.281	-23.929	-29.156	-24.671	-22.031	-24.140	-21.054
-22.742	-20.554	-23.664	-22.742	-24.007	-22.109	-18.289	-19.867	-19.109	-19.265
-21.265	-27.921	-24.882	-20.187	-21.585	-18.945	-22.398	-21.218	-25.328	-26.039
-21.851	-18.421	-24.617	-23.828	-28.289	-20.664	-21.531	-19.499	-24.640	-24.406
-22.296	-27.445	-27.867	-25.593	-22.742	-25.406	-24.273	-26.749	-27.656	-21.976
-22.718	-22.398	-20.765	-23.273	-27.023	-25.226	-19.132	-23.640	-23.749	-19.820
-25.351	-25.437	-23.929	-24.171	-20.265	-24.960	-20.820	-24.882	-25.937	-23.195
-26.648	-25.906	-18.976	-27.445	-19.054	-23.328	-28.945	-28.132	-24.804	-24.406
count	100			mean	-23.348			SD	2.828

Table f19. Zeta potential of formulation 4TP+3P407 after autoclaving (millivolts).

-25.382	-24.007	-25.460	-19.710	-28.710	-24.218	-26.515	-21.851	-21.796	-23.796
-21.609	-21.132	-20.898	-28.289	-20.078	-20.664	-21.265	-20.374	-25.226	-24.382
-25.039	-21.664	-19.609	-22.718	-18.710	-26.781	-26.914	-26.992	-25.593	-20.664
-23.617	-23.164	-20.632	-28.289	-25.140	-24.507	-25.726	-24.406	-25.617	-24.617
-24.406	-26.570	-19.632	-25.695	-20.874	-25.015	-21.687	-29.632	-28.265	-20.320
-21.898	-26.515	-20.874	-21.265	-23.117	-20.585	-19.554	-23.562	-27.921	-22.164
-22.953	-23.507	-23.296	-25.671	-25.593	-23.539	-24.773	-28.156	-20.796	-27.390
-20.609	-24.171	-22.562	-20.609	-21.132	-19.632	-21.609	-25.695	-24.539	-24.804
-20.664	-20.187	-20.031	-27.210	-27.843	-26.195	-23.773	-23.296	-23.429	-20.031
-28.632	-28.312	-23.406	-28.601	-28.578	-28.632	-20.796	-19.132	-19.132	-27.945
count	100			mean	-23.722			SD	2.900

Table f20. Zeta potential of formulation 6TP+3P407 after autoclaving (millivolts).

-22.453	-22.195	-24.406	-25.039	-21.070	-23.656	-25.499	-21.281	-23.874	-23.726
-26.148	-23.695	-26.749	-21.304	-23.851	-25.976	-21.796	-24.382	-24.429	-21.828
-24.937	-24.671	-24.617	-23.796	-26.171	-23.968	-24.335	-23.781	-22.109	-21.984
-26.648	-22.374	-26.406	-26.015	-25.304	-19.984	-23.335	-20.718	-21.476	-22.062
-25.804	-25.593	-26.539	-25.226	-21.515	-25.226	-22.007	-25.570	-26.859	-24.570
-22.218	-26.781	-21.085	-21.070	-22.937	-22.195	-21.703	-22.757	-23.164	-25.945
-26.382	-26.515	-26.539	-24.007	-20.703	-20.406	-25.804	-26.171	-26.992	-23.851
-24.656	-25.015	-26.148	-22.109	-24.007	-23.335	-21.828	-25.906	-26.828	-20.882
-23.328	-25.078	-26.749	-26.226	-22.093	-24.304	-20.648	-24.062	-24.617	-26.132
-23.749	-24.406	-26.359	-24.851	-25.734	-24.429	-20.039	-24.593	-26.749	-24.335
count	100			mean	-24.034			SD	1.939

Table f21. Zeta potential of formulation 7TP+3P407 after autoclaving (millivolts).

-23.812	-26.492	-22.671	-24.335	-26.492	-22.109	-24.757	-26.195	-22.640	-23.234
-25.226	-21.773	-23.640	-21.054	-23.515	-25.390	-24.570	-23.195	-22.226	-25.539
-25.117	-24.804	-21.773	-25.734	-24.273	-23.546	-19.898	-24.671	-27.000	-21.226
-23.601	-26.749	-21.460	-23.515	-23.812	-23.757	-20.796	-26.249	-23.726	-23.929
-20.039	-23.484	-24.046	-24.304	-25.835	-21.515	-25.062	-26.617	-26.070	-24.937
-23.249	-22.007	-24.335	-23.546	-25.140	-22.968	-25.382	-25.773	-24.804	-24.249
-24.890	-23.484	-22.429	-20.406	-21.851	-24.726	-25.304	-25.117	-19.906	-22.664
-25.734	-26.726	-22.671	-26.523	-23.117	-21.054	-25.882	-26.304	-24.804	-25.617
-23.906	-24.640	-25.328	-21.851	-22.937	-25.624	-26.804	-26.570	-21.796	-21.664
-25.765	-26.304	-22.757	-23.328	-18.851	-21.726	-26.195	-22.507	-26.171	-22.718
count	100			mean	-23.945			SD	1.903

Table f22. Zeta potential of formulation 5TM+3P407 after autoclaving (millivolts).

-25.828	-22.031	-24.960	-19.609	-22.929	-19.289	-22.062	-22.640	-19.820	-25.226
-22.929	-20.289	-21.796	-20.421	-18.054	-22.484	-25.882	-25.804	-25.382	-20.554
-24.718	-23.695	-22.562	-18.023	-18.156	-19.000	-23.242	-19.234	-20.609	-24.085
-18.390	-19.210	-21.398	-25.406	-25.195	-20.132	-22.562	-21.320	-20.953	-22.164
-18.656	-19.398	-22.507	-21.929	-18.023	-23.828	-18.687	-18.765	-21.874	-22.984
-22.609	-19.578	-20.921	-22.531	-22.031	-24.007	-22.242	-21.398	-19.445	-22.398
-27.312	-24.593	-20.476	-18.367	-25.515	-24.429	-20.742	-23.218	-20.289	-19.054
-20.164	-19.976	-18.812	-22.984	-23.242	-19.476	-21.664	-20.664	-19.078	-18.078
-22.320	-19.398	-19.156	-24.406	-20.898	-18.867	-18.156	-25.593	-23.828	-20.187
-25.859	-24.273	-20.164	-18.687	-21.664	-19.898	-20.453	-21.929	-18.265	-19.265
count	100			mean	-21.533			SD	2.352

Table f23. Zeta potential of formulation 5TS+3P407 after autoclaving (millivolts).

-20.453	-25.039	-23.796	-22.929	-23.851	-19.054	-20.710	-19.656	-20.742	-19.843
-25.726	-22.609	-22.296	-19.687	-21.664	-22.374	-23.031	-19.867	-21.132	-22.320
-23.695	-18.601	-19.109	-22.351	-21.531	-20.554	-22.718	-18.210	-24.984	-20.632
-24.039	-22.429	-22.851	-18.632	-21.820	-22.851	-23.749	-19.078	-20.164	-22.851
-24.562	-18.789	-19.976	-19.710	-22.320	-21.296	-23.374	-23.406	-19.765	-21.398
-23.351	-20.054	-21.007	-19.632	-25.015	-24.804	-23.242	-22.429	-19.132	-19.765
-21.242	-24.218	-22.374	-23.539	-22.351	-20.742	-23.664	-18.921	-20.453	-18.132
-18.578	-23.164	-24.640	-20.742	-19.210	-18.632	-19.789	-20.054	-21.054	-19.976
-22.085	-22.140	-19.656	-21.554	-23.484	-23.296	-19.531	-20.343	-19.078	-21.531
-23.617	-18.101	-21.929	-22.609	-22.007	-24.593	-22.187	-23.749	-22.351	-20.320
count	100			mean	-21.563			SD	1.934

Table f24. Zeta potential of formulation 5SA+3P407 after autoclaving (millivolts).

-34.617	-30.320	-35.749	-31.398	-30.132	-34.085	-32.031	-33.328	-31.132	-32.109
-31.085	-29.023	-31.398	-29.531	-30.476	-31.687	-35.382	-31.851	-31.874	-34.296
-30.132	-32.929	-31.953	-32.140	-33.453	-32.773	-34.960	-33.539	-30.710	-34.085
-33.828	-31.187	-31.296	-31.031	-35.515	-33.585	-31.429	-30.499	-31.609	-29.156
-32.929	-35.437	-32.062	-29.789	-32.609	-34.273	-35.195	-31.585	-30.976	-29.476
-29.867	-33.007	-31.640	-33.085	-31.609	-30.710	-34.117	-31.640	-34.960	-35.671
-35.382	-31.585	-30.476	-32.062	-29.578	-33.749	-32.718	-30.000	-30.210	-34.039
-29.531	-35.749	-32.640	-31.953	-33.242	-32.874	-32.640	-30.710	-32.851	-35.351
-33.085	-34.296	-32.953	-29.289	-31.320	-34.296	-32.140	-30.132	-31.765	-33.453
-30.921	-33.960	-31.320	-32.640	-34.039	-33.960	-34.117	-35.382	-32.031	-32.929
count	100			mean	-32.393			SD	1.763

Table f25. Zeta potential of formulation 0.5Dil+5TP+3P407 after autoclaving (millivolts).

-6.070	-8.234	-8.71	-6.664	-4.781	-7.039	-7.171	-5.292	-8.281	-5.820
-4.718	-6.656	-4.945	-7.289	-6.484	-7.671	-9.523	-5.007	-5.351	-4.890
-5.539	-7.085	-4.726	-6.703	-5.742	-6.695	-9.749	-6.374	-4.914	-6.203
-8.781	-7.382	-9.289	-4.468	-5.796	-7.554	-6.453	-9.906	-5.226	-5.414
-6.914	-8.414	-7.335	-5.773	-6.546	-8.070	-7.226	-7.570	-6.874	-5.484
-6.601	-4.195	-7.085	-8.351	-8.179	-9.539	-7.984	-4.562	-5.351	-7.101
-9.562	-5.953	-8.960	-6.273	-7.148	-4.039	-7.757	-8.695	-4.882	-7.031
-9.882	-5.046	-6.156	-6.484	-6.148	-7.335	-7.046	-4.992	-5.054	-6.937
-6.031	-6.468	-9.132	-4.664	-6.257	-4.789	-5.679	-5.335	-4.609	-5.484
-4.593	-6.851	-6.820	-4.640	-7.914	-5.773	-6.515	-5.343	-7.046	-5.695
count	100			mean	-6.588			SD	1.449

Table f26. Zeta potential of formulation 1.0Dil+5TP+3P407 after autoclaving (millivolts).

-6.070	-5.000	-8.742	-6.851	-7.820	-7.179	-7.648	-4.460	-5.929	-6.468
-4.031	-4.328	-6.945	-6.312	-5.921	-7.984	-3.874	-6.476	-6.914	-6.523
-4.531	-6.171	-4.046	-6.453	-6.781	-4.914	-7.609	-3.960	-5.984	-8.351
-8.453	-6.898	-4.257	-7.898	-7.585	-3.812	-5.992	-6.781	-6.515	-8.023
-3.765	-6.296	-3.859	-4.984	-3.921	-4.289	-4.984	-5.624	-6.679	-4.664
-6.781	-3.734	-4.359	-4.820	-7.437	-4.367	-5.257	-4.984	-6.843	-6.742
-8.070	-3.937	-5.781	-8.835	-5.421	-6.335	-4.765	-8.390	-6.398	-8.164
-5.187	-8.343	-4.890	-7.226	-8.562	-7.382	-4.359	-7.000	-8.664	-6.226
-5.859	-5.156	-4.578	-6.273	-7.476	-6.789	-4.046	-6.789	-4.289	-5.601
-5.515	-7.406	-4.726	-5.757	-5.124	-8.507	-7.203	-5.085	-8.203	-5.617
count	100			mean	-6.088			SD	1.421

Table f27. Zeta potential of formulation 1.5Dil+5TP+3P407 after autoclaving (millivolts).

-6.578	-4.296	-8.070	-4.546	-5.718	-6.453	-7.492	-4.757	-7.203	-6.718
-8.515	-8.515	-4.632	-6.257	-6.429	-5.632	-4.289	-7.804	-5.460	-7.101
-3.101	-5.351	-4.507	-5.437	-6.109	-4.085	-5.343	-7.085	-6.523	-4.195
-4.937	-7.000	-3.828	-5.601	-4.226	-6.031	-6.421	-7.453	-5.382	-7.359
-7.476	-5.085	-5.851	-5.437	-6.031	-6.749	-6.796	-5.351	-3.289	-5.804
-5.312	-3.796	-5.726	-7.406	-5.226	-5.445	-4.351	-3.874	-4.976	-6.085
-4.226	-7.882	-4.249	-7.390	-3.648	-6.921	-4.937	-6.820	-6.328	-4.140
-6.453	-5.164	-5.140	-4.960	-5.859	-5.484	-5.312	-5.632	-6.429	-4.773
-4.328	-4.328	-5.703	-3.804	-4.398	-7.507	-4.507	-3.968	-5.624	-8.164
-4.085	-5.189	-3.656	-4.382	-4.531	-4.468	-3.359	-5.742	-5.789	-4.093
count	100			mean	-5.559			SD	1.281

Table f28. Zeta potential of formulation 0.5Dil+5TP+3P407(pH7) after autoclaving (batch 1) (millivolts).

-17.078	-17.523	-18.812	-19.265	-23.796	-20.742	-17.734	-23.085	-21.664	-19.054
-17.523	-16.890	-16.601	-22.531	-19.789	-16.257	-18.578	-20.078	-19.421	-20.453
-20.187	-17.234	-22.031	-18.476	-20.453	-15.945	-19.898	-21.664	-20.710	-21.007
-22.164	-17.046	-20.398	-22.796	-18.023	-23.242	-18.390	-21.007	-20.453	-22.695
-17.445	-22.820	-17.632	-18.265	-23.773	-20.953	-20.398	-24.039	-21.609	-22.562
-21.640	-15.703	-17.445	-20.187	-18.289	-19.421	-21.476	-19.320	-16.703	-19.398
-21.976	-18.734	-24.085	-19.078	-19.898	-20.710	-16.390	-20.187	-23.539	-22.562
-16.789	-18.632	-19.820	-19.499	-18.265	-20.078	-18.000	-20.421	-18.687	-18.390
-16.523	-21.007	-16.492	-19.234	-23.007	-17.421	-19.656	-22.453	-23.164	-22.031
-23.164	-21.429	-20.031	-19.867	-21.218	-23.273	-23.296	-16.835	-20.953	-23.242
count	100			mean	-19.998			SD	2.208

Table f29. Zeta potential of formulation 0.5Dil+5TP+3P407(pH7) after autoclaving
(batch 2) (millivolts).

-18.054	-21.554	-19.632	-21.820	-18.734	-23.718	-20.109	-16.070	-21.429	-17.312
-19.078	-22.062	-15.914	-19.921	-19.000	-22.484	-16.679	-22.453	-21.929	-20.320
-17.835	-22.453	-15.968	-19.054	-19.367	-24.273	-15.734	-21.851	-21.374	-24.195
-17.499	-18.054	-19.843	-21.874	-22.273	-18.343	-18.812	-16.734	-21.976	-20.164
-17.468	-20.953	-18.601	-19.867	-21.820	-17.679	-19.976	-21.609	-18.445	-19.765
-21.718	-19.789	-21.796	-21.187	-20.765	-19.578	-21.609	-21.242	-18.867	-23.218
-17.954	-21.242	-18.265	-18.054	-17.523	-17.734	-21.132	-19.789	-22.640	-23.273
-17.601	-17.710	-18.765	-19.398	-16.679	-22.320	-19.421	-18.734	-17.867	-20.374
-21.929	-21.664	-24.382	-21.453	-18.976	-19.023	-16.234	-19.742	-21.531	-18.499
-23.328	-22.085	-17.867	-19.054	-20.000	-20.421	-18.632	-18.843	-20.843	-17.578
count	100			mean	-19.905			SD	2.071

Table f30. Zeta potential of formulation 0.5Dil+5TP+3P407(pH7) after autoclaving
(batch 3) (millivolts).

-22.609	-22.851	-21.507	-19.499	-22.453	-20.374	-17.499	-17.578	-17.234	-17.312
-24.039	-19.367	-22.609	-19.445	-19.265	-17.078	-17.179	-18.734	-24.984	-18.343
-18.289	-17.124	-17.421	-22.031	-21.796	-19.656	-23.960	-17.679	-19.953	-23.507
-17.546	-16.734	-23.406	-18.578	-18.000	-20.109	-17.179	-21.718	-20.476	-19.156
-21.929	-18.265	-21.132	-17.523	-16.835	-20.242	-18.101	-23.773	-22.640	-23.695
-19.921	-22.820	-20.289	-19.078	-19.234	-17.468	-16.601	-18.476	-18.765	-19.953
-16.703	-19.421	-25.695	-20.609	-18.312	-21.343	-19.953	-16.101	-21.320	-19.000
-21.585	-16.281	-21.242	-16.812	-23.195	-18.545	-17.210	-16.523	-18.445	-17.812
-17.578	-23.296	-22.531	-22.664	-23.062	-22.851	-23.828	-15.101	-17.632	-22.695
-16.312	-21.031	-23.539	-18.078	-21.609	-17.632	-15.070	-18.367	-24.273	-17.656
count	100			mean	-19.819			SD	2.564

Table f31. Zeta potential of formulation 1.0Dil+5TP+3P407 (pH7) after autoclaving
(millivolts).

-13.539	-14.515	-15.812	-14.281	-15.203	-17.656	-16.101	-13.195	-16.734	-16.023
-17.289	-17.390	-13.624	-15.359	-13.937	-16.124	-16.789	-13.570	-13.117	-13.859
-16.367	-14.437	-16.023	-16.335	-13.374	-15.523	-15.523	-16.124	-13.374	-16.046
-17.367	-14.835	-16.968	-14.093	-14.914	-15.546	-14.968	-13.406	-15.390	-13.781
-15.015	-15.914	-14.093	-18.812	-16.312	-13.062	-14.093	-17.210	-14.046	-14.046
-13.726	-19.109	-14.757	-14.648	-14.335	-14.226	-17.789	-16.124	-13.007	-16.812
-15.781	-14.648	-17.257	-14.890	-17.710	-13.031	-13.804	-18.421	-13.218	-13.117
-16.945	-13.749	-13.570	-15.945	-14.382	-13.671	-13.406	-18.710	-17.710	-14.015
-13.648	-16.414	-14.203	-13.726	-14.070	-16.679	-17.101	-13.593	-16.234	-13.031
-17.789	-14.992	-13.242	-16.601	-16.101	-15.781	-14.437	-15.734	-15.070	-13.406
count	100			mean	-15.215			SD	1.600

Table f32. Zeta potential of formulation 1.5DiI+5TP+3P407 (pH7) after autoclaving
(millivolts).

-14.624	-12.296	-13.515	-13.882	-13.781	-13.023	-11.374	-13.093	-11.812	-10.109
-15.601	-13.914	-12.429	-14.273	-13.546	-14.093	-13.695	-11.617	-12.781	-14.093
-10.765	-11.218	-13.218	-13.078	-13.546	-13.749	-14.484	-13.812	-11.179	-11.984
-13.937	-10.859	-13.906	-15.062	-11.726	-14.484	-14.851	-13.179	-13.289	-11.953
-11.585	-15.062	-11.882	-12.484	-14.499	-14.539	-12.249	-12.906	-13.749	-13.726
-13.960	-13.117	-12.867	-13.328	-10.226	-11.546	-14.906	-14.640	-13.851	-15.257
-12.695	-13.601	-10.796	-11.882	-12.812	-12.742	-12.570	-13.515	-12.093	-12.273
-10.976	-12.234	-10.773	-14.093	-11.617	-13.062	-12.007	-15.437	-12.124	-11.015
-13.062	-15.023	-14.539	-13.812	-14.648	-11.796	-14.749	-10.195	-15.437	-15.359
-14.546	-11.179	-11.476	-10.109	-12.406	-13.585	-12.460	-14.257	-14.390	-11.460
count	100			mean	-13.030			SD	1.434

Table f33. Zeta potential of formulation 0.25Theo+5TP+3P407 after autoclaving
(millivolts).

-27.023	-22.718	-24.773	-23.007	-27.468	-21.476	-20.054	-22.874	-24.171	-27.234
-25.828	-23.429	-25.140	-20.843	-27.156	-25.328	-24.539	-25.984	-24.749	-23.328
-24.039	-26.460	-24.960	-21.242	-23.406	-24.695	-20.632	-25.749	-24.460	-23.273
-27.312	-21.820	-25.273	-21.796	-23.617	-21.320	-24.718	-23.874	-26.281	-23.874
-22.031	-26.093	-25.671	-22.273	-21.687	-23.085	-22.273	-23.507	-22.562	-26.617
-23.085	-22.906	-25.382	-26.570	-26.726	-24.507	-25.804	-26.148	-27.445	-24.960
-24.406	-21.054	-27.210	-25.273	-24.296	-21.664	-20.921	-22.031	-25.726	-21.320
-26.460	-27.101	-24.140	-23.406	-24.039	-24.039	-23.164	-25.726	-26.492	-22.984
-26.648	-22.631	-22.398	-21.187	-23.960	-21.765	-25.648	-20.554	-21.242	-22.398
-26.382	-22.562	-22.031	-23.617	-24.171	-24.249	-27.890	-20.031	-25.437	-24.882
count	100			mean	-24.064			SD	1.949

Table f34. Zeta potential of formulation 0.50Theo+5TP+3P407 after autoclaving
(millivolts).

-24.906	-26.781	-23.718	-24.539	-24.039	-26.570	-24.718	-22.695	-25.828	-26.726
-24.382	-25.406	-21.554	-22.320	-24.406	-21.054	-23.539	-22.164	-26.492	-22.031
-27.421	-21.476	-22.984	-22.742	-22.718	-23.085	-21.687	-22.218	-21.765	-22.187
-27.578	-20.742	-22.164	-20.843	-27.867	-24.140	-26.593	-21.796	-21.398	-23.718
-20.210	-22.398	-21.242	-24.484	-26.015	-20.210	-20.820	-22.695	-20.265	-26.593
-26.882	-22.085	-24.828	-22.484	-25.062	-21.664	-20.164	-20.289	-21.554	-22.796
-26.992	-24.640	-21.265	-21.718	-22.609	-22.242	-27.156	-26.304	-20.187	-25.937
-21.218	-23.718	-27.499	-22.585	-20.554	-26.171	-26.382	-27.390	-23.328	-26.671
-22.640	-23.749	-26.171	-27.078	-20.632	-23.218	-23.484	-22.007	-26.171	-25.726
-25.726	-27.046	-20.609	-20.796	-20.289	-21.796	-22.695	-27.421	-20.609	-20.742
count	100			mean	-23.549			SD	2.396

Table f35. Zeta potential of formulation 0.75Theo+5TP+3P407 after autoclaving
(millivolts).

-22.296	-25.062	-26.382	-22.031	-20.898	-24.507	-26.937	-21.976	-20.476	-20.000
-22.906	-21.976	-21.874	-25.539	-22.851	-21.585	-20.874	-20.054	-24.406	-20.898
-25.828	-24.984	-25.539	-20.476	-22.031	-24.539	-23.328	-27.578	-26.359	-20.742
-24.085	-27.046	-21.398	-26.804	-21.164	-27.546	-25.015	-23.328	-22.374	-23.851
-25.515	-24.562	-20.187	-23.296	-20.078	-23.273	-22.374	-22.398	-22.984	-21.164
-24.882	-24.249	-22.164	-23.328	-23.749	-22.609	-20.585	-23.796	-20.664	-21.976
-26.437	-25.382	-20.242	-24.328	-23.539	-20.843	-21.398	-24.960	-24.007	-24.218
-21.320	-26.648	-25.328	-21.296	-22.531	-20.796	-25.504	-24.140	-20.710	-22.609
-24.062	-23.296	-20.499	-22.796	-23.328	-21.851	-21.374	-26.914	-20.499	-24.593
-25.195	-24.804	-23.273	-20.796	-23.640	-21.031	-21.820	-22.695	-23.328	-23.164
count	100			mean	-23.166			SD	1.995

Table f36. Zeta potential of formulation 0.25Theo+5TP+2T80 after autoclaving
(millivolts).

-25.976	-26.359	-26.859	-25.328	-27.101	-25.828	-25.226	-21.874	-22.031	-27.156
-22.437	-24.671	-27.710	-26.648	-23.695	-23.718	-22.429	-25.460	-21.898	-26.171
-24.593	-25.226	-25.171	-27.734	-23.796	-22.664	-23.406	-23.539	-24.695	-23.851
-26.703	-24.882	-21.507	-25.062	-21.374	-26.617	-26.406	-27.523	-23.085	-24.140
-25.078	-25.593	-25.437	-24.117	-27.789	-22.085	-23.640	-25.484	-25.617	-22.218
-27.257	-25.593	-23.406	-24.062	-21.874	-22.906	-21.398	-25.937	-23.796	-24.718
-24.406	-24.249	-24.804	-23.085	-27.679	-22.062	-22.507	-25.515	-24.484	-21.820
-24.828	-23.695	-21.687	-23.453	-22.273	-24.773	-26.882	-24.195	-21.609	-23.031
-26.914	-25.015	-24.539	-24.085	-25.304	-26.359	-22.453	-23.273	-28.078	-22.562
-22.562	-27.156	-21.531	-24.593	-22.007	-25.695	-27.578	-26.249	-24.171	-22.820
count	100			mean	-24.485			SD	1.770

Table f37. Zeta potential of formulation 0.50Theo+5TP+2T80 after autoclaving
(millivolts).

-22.984	-24.085	-27.710	-24.460	-24.484	-23.796	-22.664	-24.640	-25.406	-27.210
-24.671	-23.874	-24.882	-22.562	-24.117	-23.507	-23.374	-20.632	-20.632	-25.351
-25.117	-22.929	-25.906	-24.218	-21.640	-25.515	-26.937	-20.820	-25.304	-21.765
-26.249	-20.421	-21.531	-20.078	-26.171	-23.140	-25.749	-25.062	-24.562	-25.937
-25.671	-23.296	-22.429	-24.828	-25.437	-24.804	-25.859	-23.296	-24.218	-24.773
-24.328	-22.062	-25.406	-22.398	-25.273	-22.773	-23.773	-24.484	-23.796	-21.374
-24.773	-25.406	-26.749	-26.382	-24.273	-26.406	-22.742	-26.492	-22.062	-25.773
-23.874	-23.351	-24.640	-23.406	-25.960	-25.382	-25.351	-23.296	-23.960	-22.320
-25.648	-25.859	-24.171	-24.195	-22.351	-22.984	-22.273	-23.117	-21.109	-25.515
-23.007	-23.695	-23.484	-23.539	-24.039	-24.195	-22.085	-21.374	-25.960	-25.015
count	100			mean	-24.066			SD	1.657

Table f38. Zeta potential of formulation 0.75Theo+5TP+2T80 after autoclaving
(millivolts).

-21.609	-25.515	-21.976	-24.484	-23.218	-20.054	-25.906	-22.742	-23.585	-20.078
-24.539	-20.343	-23.242	-22.796	-20.343	-25.984	-21.398	-22.695	-20.453	-21.187
-22.742	-26.304	-24.507	-22.187	-23.031	-24.273	-22.796	-23.273	-23.406	-20.499
-24.062	-22.773	-25.859	-21.242	-25.117	-22.585	-26.515	-20.398	-23.242	-25.984
-23.117	-22.609	-22.484	-20.531	-25.562	-24.062	-21.507	-23.585	-25.648	-23.453
-26.937	-25.171	-24.140	-23.406	-26.648	-23.374	-24.195	-24.382	-21.609	-25.960
-24.640	-24.773	-24.984	-22.874	-26.828	-24.351	-26.671	-22.164	-20.898	-23.117
-22.140	-22.742	-21.265	-26.856	-24.617	-21.374	-26.382	-23.796	-21.664	-24.429
-26.171	-26.117	-23.617	-26.992	-23.585	-21.718	-25.273	-26.093	-22.273	-20.874
-21.874	-24.695	-24.273	-20.796	-25.249	-25.351	-26.015	-21.554	-25.695	-24.539
count	100			mean	-23.606			SD	1.914

Table f39. Zeta potential of formulation 0.50Theo+5TP+3T80 after autoclaving
(millivolts).

-20.843	-21.109	-20.742	-19.531	-24.171	-24.351	-20.843	-24.429	-20.132	-20.874
-23.929	-23.062	-18.023	-21.476	-23.085	-19.421	-26.328	-24.804	-18.210	-17.843
-24.640	-18.687	-24.007	-20.187	-25.015	-24.851	-18.367	-20.343	-22.273	-19.976
-25.117	-25.015	-22.320	-25.195	-22.796	-20.609	-25.015	-19.578	-23.195	-23.960
-25.304	-18.789	-23.796	-25.937	-18.656	-18.734	-25.773	-25.539	-27.124	-23.507
-25.960	-21.718	-24.062	-20.843	-19.023	-17.812	-24.539	-21.187	-24.804	-19.476
-19.445	-23.328	-21.453	-18.343	-21.820	-19.499	-21.109	-25.117	-17.921	-18.765
-21.769	-23.640	-24.640	-23.429	-20.874	-24.117	-24.296	-21.796	-22.140	-23.773
-24.851	-17.757	-25.273	-21.187	-24.039	-20.976	-25.671	-20.499	-25.406	-22.585
-24.218	-24.984	-25.648	-19.953	-23.874	-23.062	-20.374	-24.039	-25.460	-23.273
count	100			mean	-22.373			SD	2.514

Table f40. Zeta potential of formulation 0.25Theo+5TP+1EL after autoclaving
(millivolts).

-28.632	-30.687	-27.945	-29.687	-26.226	-27.367	-26.703	-28.000	-26.093	-28.843
-26.992	-26.171	-29.531	-30.742	-32.031	-27.632	-26.039	-27.312	-30.843	-28.445
-31.796	-31.765	-28.945	-27.101	-27.210	-29.132	-31.585	-28.078	-29.921	-26.703
-30.874	-31.007	-28.101	-26.195	-29.867	-28.421	-27.968	-28.132	-26.828	-29.609
-26.015	-26.015	-26.070	-31.007	-27.734	-32.773	-27.023	-27.023	-32.164	-26.171
-27.499	-28.976	-29.609	-26.593	-30.210	-31.640	-26.406	-28.789	-25.749	-30.031
-27.367	-27.679	-31.609	-30.265	-27.312	-27.499	-29.187	-29.156	-28.132	-28.789
-31.187	-27.078	-30.078	-25.937	-31.609	-26.570	-29.156	-27.289	-26.359	-31.429
-30.453	-29.289	-28.578	-30.398	-30.976	-26.539	-29.265	-30.499	-29.531	-27.257
-30.632	-29.210	-27.546	-28.023	-30.054	-28.578	-29.531	-30.796	-30.554	-31.929
count	100			mean	-28.760			SD	1.877

Table f41. Zeta potential of formulation 0.25Theo+5TP+2EL after autoclaving (millivolts).

-28.632	-32.585	-34.296	-28.445	-26.804	-30.476	-27.124	-29.078	-32.453	-31.429
-27.210	-29.742	-31.953	-30.453	-32.320	-27.078	-31.851	-30.164	-30.078	-31.031
-29.632	-33.007	-27.921	-27.421	-29.687	-29.921	-29.445	-27.546	-29.687	-28.789
-34.195	-26.249	-32.398	-30.320	-31.132	-28.132	-33.874	-32.640	-32.453	-27.890
-28.656	-33.007	-26.726	-27.921	-26.460	-29.445	-29.921	-31.320	-34.351	-30.374
-29.789	-29.843	-29.789	-32.640	-27.546	-28.843	-32.374	-34.617	-32.031	-33.031
-29.843	-31.187	-26.195	-26.226	-30.796	-31.874	-30.078	-28.656	-32.374	-27.023
-29.632	-33.374	-33.749	-30.632	-31.242	-32.484	-27.257	-30.742	-32.398	-31.453
-34.484	-31.109	-34.085	-26.515	-32.320	-27.312	-26.914	-29.445	-30.820	-29.710
-28.390	-33.007	-26.460	-29.109	-30.843	-34.960	-27.023	-27.312	-30.976	-30.132
count	100			mean	-30.216			SD	2.283

Table f42. Zeta potential of formulation 0.50Theo+5TP+2EL after autoclaving (millivolts).

-31.320	-31.296	-28.132	-32.374	-29.343	-27.023	-29.867	-32.531	-32.242	-27.101
-30.000	-33.031	-27.445	-29.320	-27.468	-32.718	-30.320	-26.648	-27.421	-32.164
-28.734	-29.078	-28.445	-30.054	-30.476	-30.609	-27.812	-28.445	-28.000	-27.234
-28.156	-31.609	-29.554	-30.000	-28.687	-27.078	-31.429	-31.109	-31.640	-28.812
-27.101	-27.679	-31.007	-27.578	-30.164	-26.749	-31.085	-29.742	-30.031	-29.320
-28.734	-26.937	-26.914	-27.890	-33.796	-26.828	-29.710	-31.429	-30.843	-27.921
-28.523	-32.929	-30.398	-32.218	-30.796	-28.101	-32.773	-27.078	-30.710	-29.156
-28.179	-30.320	-30.374	-27.921	-33.117	-29.742	-32.851	-28.476	-26.070	-27.367
-28.000	-27.023	-27.124	-30.554	-27.468	-27.335	-28.000	-27.812	-31.132	-28.554
-27.289	-28.265	-29.898	-30.554	-28.601	-28.078	-29.976	-28.921	-27.789	-27.023
count	100			mean	-29.342			SD	1.913

Table f43. Zeta potential of formulation 0.75Theo+5TP+2EL after autoclaving (millivolts).

-28.523	-29.132	-27.968	-27.757	-30.632	-29.976	-27.179	-30.843	-29.398	-26.617
-27.312	-29.156	-29.398	-29.742	-28.476	-29.789	-29.531	-30.843	-30.320	-30.132
-27.789	-26.249	-27.468	-30.820	-28.898	-26.703	-28.023	-28.367	-31.531	-27.679
-30.374	-28.789	-28.921	-26.460	-27.078	-28.523	-31.218	-29.367	-31.031	-27.101
-30.453	-29.156	-31.429	-28.265	-28.578	-27.468	-26.749	-28.023	-29.609	-27.578
-31.851	-30.242	-29.687	-27.632	-29.156	-26.593	-28.343	-28.632	-27.867	-26.320
-28.421	-26.539	-30.609	-31.398	-31.398	-27.046	-27.945	-28.421	-29.210	-28.554
-28.445	-27.812	-30.820	-29.109	-30.242	-27.968	-27.656	-26.671	-27.078	-31.132
-31.453	-31.796	-31.507	-30.976	-27.046	-31.242	-31.765	-30.078	-26.617	-30.710
-29.921	-30.374	-31.742	-31.218	-28.812	-27.124	-26.648	-30.164	-28.421	-26.226
count	100			mean	-28.996			SD	1.667

Table f44. Zeta potential of formulation 0.5Ibu+5TP+3P407 after autoclaving (batch 1) (millivolts).

-10.476	-14.749	-14.117	-14.046	-15.695	-14.203	-15.234	-10.351	-12.335	-15.695
-14.179	-14.937	-11.898	-12.281	-15.101	-10.914	-11.648	-12.851	-10.796	-15.398
-15.257	-11.164	-13.164	-14.203	-16.578	-12.671	-14.468	-12.953	-15.976	-14.960
-12.281	-12.070	-11.757	-13.585	-16.539	-15.960	-13.749	-14.976	-15.273	-14.679
-14.429	-14.078	-14.515	-15.484	-11.703	-13.710	-16.539	-12.570	-11.265	-10.953
-11.179	-12.320	-15.734	-14.765	-11.968	-14.046	-12.757	-10.171	-14.992	-13.335
-14.851	-15.781	-14.234	-14.992	-11.437	-13.992	-13.726	-10.882	-13.539	-12.781
-14.539	-15.148	-13.039	-13.304	-11.390	-14.499	-14.515	-15.398	-15.237	-14.624
-15.554	-15.656	-13.249	-14.679	-13.374	-11.898	-11.406	-16.156	-14.343	-10.632
-13.062	-12.093	-13.757	-15.867	-10.804	-15.312	-12.429	-10.882	-13.757	-12.492
count	100			mean	-13.610			SD	1.659

Table f45. Zeta potential of formulation 0.5Ibu+5TP+3P407 after autoclaving (batch 2) (millivolts).

-15.312	-11.796	-11.140	-13.164	-12.796	-16.820	-14.921	-13.039	-11.546	-13.374
-14.554	-10.109	-14.570	-14.414	-11.351	-12.546	-9.507	-12.546	-13.992	-12.445
-16.343	-13.445	-15.312	-9.789	-12.062	-12.039	-11.265	-13.671	-16.874	-15.906
-15.781	-9.406	-13.781	-14.515	-12.585	-13.039	-14.429	-13.234	-12.914	-16.171
-10.585	-14.148	-14.624	-13.023	-15.203	-13.374	-11.742	-15.804	-16.070	-16.734
-14.992	-14.992	-8.859	-16.593	-16.257	-10.773	-14.570	-15.273	-10.742	-10.070
-15.171	-15.695	-9.351	-10.617	-11.648	-12.281	-12.867	-15.859	-13.539	-11.812
-10.757	-16.414	-12.234	-10.109	-16.539	-10.281	-12.742	-16.398	-16.101	-11.562
-15.648	-14.640	-14.812	-11.898	-12.656	-14.257	-10.648	-16.046	-14.781	-12.937
-15.593	-14.468	-14.515	-11.054	-13.960	-12.195	-12.124	-14.812	-12.671	-14.898
count	100			mean	-13.435			SD	2.109

Table f46. Zeta potential of formulation 0.5Ibu+5TP+3P407 after autoclaving (batch 3) (millivolts).

-10.929	-14.390	-12.937	-16.468	-12.914	-11.968	-12.093	-15.132	-14.515	-14.390
-15.945	-15.499	-16.171	-14.359	-15.906	-10.648	-14.343	-15.484	-13.992	-12.585
-13.203	-11.648	-10.039	-15.890	-12.148	-13.796	-11.914	-14.960	-13.273	-14.515
-15.312	-11.226	-14.062	-11.562	-15.078	-12.601	-16.132	-10.281	-14.390	-13.671
-16.710	-13.484	-13.749	-15.187	-13.867	-11.859	-14.624	-13.656	-14.570	-12.546
-13.515	-16.820	-14.812	-13.039	-13.359	-13.992	-12.640	-10.335	-16.749	-12.374
-13.695	-14.679	-10.828	-11.601	-13.374	-12.726	-10.171	-10.531	-12.234	-15.148
-14.468	-16.679	-13.039	-14.429	-11.320	-14.468	-14.171	-15.171	-15.835	-13.148
-13.445	-15.749	-10.015	-14.234	-15.867	-15.976	-11.812	-16.046	-10.195	-13.124
-10.195	-16.328	-11.054	-11.476	-13.484	-11.773	-13.023	-10.796	-10.210	-12.304
count	100			mean	-13.491			SD	1.872

Table f47. Zeta potential of formulation 0.5Ibu+5TP+3P407 after autoclaving (batch 4) (millivolts).

-10.000	-13.203	-17.296	-12.281	-14.468	-12.726	-11.953	-9.828	-13.445	-11.726
-15.710	-11.406	-14.046	-13.289	-16.117	-13.499	-14.382	-11.796	-12.531	-10.804
-15.906	-10.562	-11.687	-13.179	-12.585	-14.624	-14.960	-11.546	-12.695	-10.351
-16.765	-11.968	-16.539	-14.343	-16.046	-10.632	-16.328	-12.195	-10.593	-12.335
-14.835	-15.781	-14.679	-16.226	-11.429	-14.273	-11.585	-13.640	-13.921	-13.062
-14.273	-15.398	-16.578	-12.359	-15.187	-11.374	-15.609	-12.359	-17.132	-11.898
-16.070	-11.851	-12.703	-14.601	-11.546	-11.320	-15.056	-12.742	-12.195	-11.914
-13.359	-11.374	-12.406	-16.765	-11.140	-12.906	-16.156	-14.289	-13.374	-9.749
-16.132	-10.843	-10.984	-16.367	-11.437	-10.296	-13.968	-16.835	-15.749	-12.851
-12.570	-10.828	-13.414	-12.023	-13.249	-16.523	-13.781	-13.374	-14.554	-15.273
count	100			mean	-13.405			SD	1.964

Table f48. Zeta potential of formulation 1.0Ibu+5TP+3P407 after autoclaving (batch 1) (millivolts).

-13.781	-13.835	-13.546	-12.851	-16.710	-14.148	-12.937	-16.804	-13.796	-13.710
-15.273	-17.124	-14.234	-15.328	-12.937	-14.710	-13.671	-13.289	-14.921	-16.312
-12.039	-14.601	-13.445	-16.257	-17.874	-14.257	-17.554	-15.046	-13.374	-13.882
-14.289	-13.968	-13.007	-17.609	-15.656	-16.070	-14.890	-14.749	-12.726	-13.812
-16.078	-12.570	-14.445	-14.960	-14.062	-14.257	-15.484	-14.937	-12.953	-15.656
-17.187	-13.539	-15.570	-15.992	-14.570	-15.499	-15.132	-15.749	-12.906	-14.062
-12.968	-15.273	-16.281	-12.062	-14.273	-17.171	-15.015	-14.499	-12.179	-18.749
-16.070	-12.023	-12.906	-13.992	-17.124	-15.648	-17.578	-17.632	-15.765	-15.976
-14.835	-15.187	-15.609	-15.398	-16.523	-11.546	-13.445	-16.117	-14.656	-13.289
-12.304	-12.703	-12.359	-12.218	-14.148	-12.882	-15.437	-15.328	-14.218	-14.445
count	100			mean	-14.665			SD	1.566

Table f49. Zeta potential of formulation 1.0Ibu+5TP+3P407 after autoclaving (batch 2) (millivolts).

-13.726	-12.906	-16.414	-14.515	-14.749	-15.171	-14.570	-14.992	-16.070	-14.171
-15.734	-13.374	-17.000	-14.781	-15.132	-15.945	-13.023	-14.867	-13.515	-12.281
-15.960	-13.039	-15.656	-11.742	-17.156	-15.734	-15.960	-14.679	-14.921	-16.257
-13.078	-14.062	-15.273	-16.257	-14.570	-11.828	-16.398	-13.812	-12.124	-13.812
-16.921	-11.070	-11.546	-11.281	-14.710	-11.984	-15.382	-15.437	-15.906	-16.070
-15.539	-13.867	-15.859	-15.273	-11.265	-14.835	-14.117	-12.796	-13.624	-14.867
-15.437	-12.335	-14.640	-13.992	-16.523	-16.343	-16.257	-16.414	-14.179	-15.859
-14.992	-12.906	-16.398	-11.531	-14.148	-14.710	-15.062	-13.671	-16.523	-12.429
-12.906	-15.820	-13.710	-12.070	-12.695	-12.070	-17.210	-13.304	-15.062	-17.015
-16.523	-13.124	-16.624	-13.695	-16.343	-14.218	-13.851	-17.031	-13.515	-16.101
count	100			mean	-14.548			SD	1.621

Table f50. Zeta potential of formulation 0.5Ibu+5TP+1EL after autoclaving (millivolts).

-24.203	-26.367	-22.335	-21.671	-27.187	-24.968	-25.835	-26.960	-27.156	-21.039
-25.437	-28.054	-20.671	-26.101	-22.109	-25.945	-28.054	-22.726	-25.390	-20.796
-25.179	-23.445	-22.109	-28.687	-28.765	-25.078	-25.570	-22.531	-25.148	-23.570
-26.609	-25.468	-26.867	-24.273	-24.203	-22.570	-25.624	-27.289	-21.335	-23.093
-23.640	-22.585	-24.148	-24.906	-22.109	-23.695	-24.937	-24.335	-24.046	-23.601
-25.624	-26.132	-27.374	-27.820	-25.359	-22.515	-22.914	-22.757	-24.757	-24.007
-23.757	-24.203	-21.773	-24.757	-27.187	-24.851	-26.578	-26.023	-26.367	-24.429
-25.656	-23.726	-21.671	-20.164	-20.632	-25.148	-24.046	-20.984	-24.937	-21.585
-25.289	-23.164	-27.960	-22.374	-27.749	-23.515	-25.078	-25.867	-23.007	-23.546
-25.867	-24.695	-21.335	-25.226	-27.749	-24.804	-20.914	-22.320	-28.054	-25.734
count	100			mean	-24.504			SD	2.069

Table f51. Zeta potential of formulation 1.0Ibu+5TP+1EL after autoclaving (millivolts).

-32.242	-31.453	-32.609	-32.757	-29.476	-30.054	-29.765	-29.078	-31.132	-26.671
-25.484	-24.218	-29.976	-30.476	-24.640	-28.312	-28.078	-28.367	-28.476	-32.374
-29.687	-31.453	-30.796	-31.757	-30.843	-30.210	-31.398	-30.820	-30.164	-31.976
-31.343	-31.531	-27.539	-29.859	-31.640	-31.398	-25.539	-27.367	-29.265	-25.015
-30.242	-25.695	-29.804	-29.187	-26.171	-30.820	-32.484	-28.843	-28.976	-31.687
-33.507	-30.132	-24.695	-29.867	-29.531	-32.585	-26.437	-28.554	-26.671	-26.937
-29.132	-25.515	-26.414	-28.078	-29.609	-31.507	-27.890	-32.695	-25.406	-27.710
-27.578	-27.945	-28.687	-26.992	-27.445	-28.476	-32.609	-28.578	-27.523	-32.695
-32.398	-31.453	-27.874	-27.843	-27.335	-28.023	-27.421	-28.023	-28.312	-30.710
-29.976	-31.085	-25.179	-29.898	-32.453	-32.296	-29.265	-25.539	-28.710	-31.609
count	100			mean	-29.259			SD	2.270

Table f52. Zeta potential of formulation 1.5Ibu+5TP+1EL after autoclaving (millivolts).

-27.257	-28.289	-26.359	-30.796	-25.460	-27.421	-29.156	-25.773	-23.406	-22.640
-21.507	-30.164	-25.437	-25.617	-28.476	-29.632	-28.265	-26.328	-30.585	-28.789
-27.390	-28.390	-30.398	-24.828	-25.273	-30.499	-27.945	-29.289	-28.289	-29.265
-25.617	-30.031	-22.718	-30.585	-23.695	-28.554	-28.578	-25.593	-28.710	-30.031
-27.234	-28.523	-27.921	-25.648	-30.031	-23.851	-27.656	-29.343	-25.328	-26.437
-25.648	-29.789	-24.484	-27.257	-26.703	-25.249	-30.265	-28.710	-22.742	-23.796
-29.898	-26.539	-28.101	-23.218	-32.109	-27.523	-30.164	-28.554	-32.718	-25.726
-29.000	-22.484	-23.929	-29.210	-22.187	-28.523	-26.882	-29.289	-26.195	-29.156
-26.804	-25.484	-27.968	-26.382	-28.601	-25.648	-26.726	-28.476	-29.742	-25.195
-26.593	-28.687	-27.124	-29.398	-25.460	-21.796	-22.062	-26.171	-23.796	-25.593
count	100			mean	-27.128			SD	2.533

Table f53. Zeta potential of formulation 0.5Ibu+5TP+2EL after autoclaving
(millivolts).

-26.367	-26.203	-29.328	-27.453	-27.578	-27.749	-23.062	-26.203	-26.835	-29.804
-27.664	-27.874	-24.968	-28.484	-25.257	-26.023	-27.257	-27.820	-27.289	-27.062
-26.804	-27.062	-26.804	-28.765	-23.484	-25.046	-29.609	-24.390	-26.492	-25.289
-30.828	-25.078	-25.906	-23.007	-24.468	-27.578	-27.257	-28.578	-25.695	-26.835
-29.382	-30.742	-25.945	-29.476	-26.867	-24.726	-25.835	-29.718	-23.882	-23.640
-27.156	-26.101	-25.867	-26.203	-24.335	-23.117	-27.664	-27.187	-24.695	-28.804
-28.085	-27.421	-28.632	-26.445	-27.695	-28.578	-24.007	-29.437	-23.484	-26.804
-27.789	-28.765	-24.148	-29.156	-23.234	-27.789	-24.304	-26.234	-25.734	-30.531
-24.468	-24.851	-28.687	-26.523	-23.484	-28.117	-25.328	-28.898	-28.273	-30.374
-28.273	-29.437	-25.499	-25.390	-26.867	-24.062	-25.656	-25.015	-27.374	-30.476
count	100			mean	-26.759			SD	1.978

Table f54. Zeta potential of formulation 1.0Ibu+5TP+2EL after autoclaving
(millivolts).

-25.351	-25.406	-29.156	-27.757	-29.921	-25.906	-28.656	-26.749	-31.851	-31.085
-30.164	-31.242	-30.554	-26.359	-27.921	-29.710	-30.554	-30.054	-26.882	-30.710
-26.117	-25.882	-28.656	-29.445	-27.945	-24.640	-28.601	-30.078	-27.234	-29.265
-26.281	-30.242	-27.921	-31.109	-29.710	-27.734	-26.539	-30.820	-23.539	-28.789
-26.359	-25.195	-23.484	-28.132	-26.539	-27.710	-27.656	-23.406	-28.265	-30.164
-30.585	-29.265	-29.632	-28.312	-23.695	-32.398	-23.328	-26.937	-28.843	-31.765
-27.312	-23.640	-26.195	-31.187	-29.187	-25.695	-27.421	-29.531	-27.156	-24.617
-25.093	-26.015	-29.109	-32.374	-29.156	-27.890	-29.156	-31.320	-29.187	-30.398
-24.593	-29.265	-30.398	-28.023	-25.859	-30.921	-25.304	-31.218	-27.445	-24.695
-26.617	-24.617	-29.843	-30.499	-25.937	-28.789	-26.492	-31.851	-23.828	-27.078
count	100			mean	-28.031			SD	2.399

Table f55. Zeta potential of formulation 1.5Ibu+5TP+2EL after autoclaving
(millivolts).

-23.328	-27.289	-25.289	-22.726	-24.179	-22.671	-23.249	-22.851	-20.289	-26.070
-25.624	-22.273	-23.695	-22.570	-27.421	-21.007	-23.601	-25.468	-24.851	-21.617
-27.749	-22.109	-26.023	-24.093	-28.367	-21.265	-26.804	-21.937	-26.617	-26.835
-23.249	-28.054	-22.007	-23.726	-24.304	-27.374	-22.281	-23.484	-24.234	-22.226
-21.937	-22.882	-27.664	-23.249	-21.937	-25.539	-23.249	-29.718	-25.835	-25.359
-28.632	-22.882	-25.117	-24.046	-28.632	-24.335	-28.085	-24.234	-22.640	-25.328
-27.820	-28.945	-25.117	-23.062	-25.078	-21.476	-25.539	-22.515	-24.062	-23.203
-28.718	-24.695	-21.898	-23.882	-21.742	-25.804	-28.632	-21.898	-26.960	-23.882
-22.757	-25.148	-28.367	-25.624	-22.109	-20.773	-25.226	-28.187	-29.242	-29.187
-23.328	-21.874	-21.406	-23.117	-25.179	-28.687	-27.820	-26.234	-26.492	-28.898
count	100			mean	-24.747			SD	2.478

APPENDIX G

Viscosity of SLN

Viscosity and flow behavior are important properties of a material and can be measured by various techniques with a variety of instruments. Haake Rotovisco RV20 is one of the rotational viscometers with coaxial cylinder sensor systems. The inner cylinder (called rotor) rotates at a defined speed, and the outer cylinder (called cup) is held at rest. The rotating inner cylinder forces the liquid in the annular gap to flow. The resistance of the liquid being sheared between the stationary and rotating boundaries results in a viscosity related torque working on the inner cylinder which counteracts the torque provided by the drive motor. This measured torque is proportional to shear stress (Haake Rotovisco RV20, Instrument manual; Schramm, 1981).

The definition of the viscosity is proportional to shear stress or resistance to flow at a defined speed or shear rate.

$$\eta = \frac{\tau}{D} \quad (15)$$

Where: η = Viscosity in Pascal-second

τ = Shear stress in Pascal (newton/m²)

D = Shear rate in per second

In this study, NV sensor was used to measure in all preparations. This sensor measures the low viscosity sample in the range 1-10,000 mPa.s. The volume of sample used to measure is 9 ml, and the gap between the stationary and rotating boundaries is 0.35 mm.

Table g1. Viscosity data of formulation 5TP+1P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.850	0.194	4.237	2.096	999.800	1.604	1.605	3.096	954.667	3.125	3.273
0.195	95.837	0.254	2.646	2.200	1000.000	1.715	1.715	3.200	903.100	3.334	3.692
0.298	147.833	0.296	2.001	2.298	1000.000	1.757	1.757	3.298	854.433	3.363	3.936
0.396	196.933	0.344	1.747	2.395	1000.000	1.775	1.775	3.395	805.133	3.258	4.047
0.494	246.200	0.424	1.720	2.499	1000.000	1.890	1.890	3.500	752.767	3.223	4.281
0.594	295.733	0.458	1.550	2.597	1000.000	1.996	1.996	3.597	704.300	3.051	4.332
0.699	347.633	0.523	1.504	2.694	999.967	2.134	2.134	3.695	654.833	2.941	4.49i
0.796	395.900	0.557	1.406	2.799	1000.000	2.379	2.379	3.797	603.967	2.810	4.653
0.894	445.333	0.643	1.444	2.896	999.967	2.617	2.617	3.897	553.967	2.564	4.628
0.999	497.067	0.706	1.420	2.994	1000.000	2.953	2.953	3.995	505.000	2.385	4.723
1.096	545.500	0.814	1.492	viscosity at 1000 1/s (mPa s)				4.097	453.800	2.216	4.882
1.194	594.267	0.913	1.537					4.197	404.133	1.996	4.939
1.298	647.767	0.961	1.483	mean	2.082	4.295	355.000	1.857	5.231		
1.396	696.033	1.038	1.492	SD	0.475	4.398	304.100	1.608	5.288		
1.494	745.167	1.131	1.518					4.498	254.267	1.452	5.712
1.598	797.767	1.254	1.572					4.597	204.600	1.302	6.366
1.696	846.333	1.352	1.598					4.695	155.400	1.100	7.076
1.794	895.467	1.431	1.598					4.796	104.567	0.806	7.704
1.899	947.500	1.601	1.689					4.899	53.123	0.692	13.025
1.997	996.167	1.669	1.676					4.997	3.724	0.011	2.836

Table g2. Viscosity data of formulation 5TP+2P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.700	0.091	1.988	2.096	1000.000	2.133	2.133	3.096	954.500	1.930	2.022
0.198	96.977	0.231	2.380	2.200	1000.000	2.060	2.060	3.200	902.767	1.760	1.950
0.298	147.867	0.277	1.876	2.297	1000.000	2.028	2.028	3.297	854.300	1.676	1.962
0.396	197.067	0.379	1.923	2.395	1000.000	2.102	2.102	3.395	805.267	1.513	1.878
0.494	246.300	0.432	1.754	2.499	1000.000	2.117	2.117	3.500	753.367	1.386	1.840
0.594	295.600	0.523	1.769	2.597	1000.000	2.101	2.101	3.597	704.567	1.209	1.715
0.699	347.900	0.586	1.684	2.695	1000.333	2.050	2.049	3.695	654.833	1.186	1.811
0.796	396.333	0.689	1.739	2.799	1000.333	2.089	2.088	3.797	603.633	1.035	1.715
0.894	445.333	0.824	1.850	2.896	1000.000	2.146	2.146	3.897	553.667	0.851	1.536
0.999	496.933	0.962	1.936	2.994	1000.000	2.070	2.070	3.995	504.667	0.781	1.547
1.097	546.300	0.958	1.753	viscosity at 1000 1/s (mPa s)				4.097	454.100	0.692	1.524
1.194	594.867	1.161	1.951					4.197	404.267	0.625	1.547
1.299	647.767	1.283	1.980	mean	2.089	4.295	355.133	0.439	1.236		
1.397	696.467	1.395	2.003	SD	0.092	4.400	302.600	0.304	1.006		
1.494	745.600	1.519	2.037					4.498	254.267	0.175	0.689
1.599	797.767	1.605	2.012					4.597	204.433	0.042	0.203
1.696	846.500	1.750	2.067					4.695	155.333	0.003	0.019
1.794	895.467	1.826	2.039					4.796	104.467	0.000	0.000
1.899	947.500	1.979	2.088					4.899	53.210	0.000	0.000
1.997	996.300	2.145	2.153					4.997	3.812	0.000	0.000

Table g3. Viscosity data of formulation 5TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.096	45.953	0.120	2.617	2.097	1000.000	2.308	2.308	3.097	954.367	2.074	2.174
0.198	97.037	0.285	2.934	2.200	1000.000	2.262	2.262	3.200	903.067	1.956	2.166
0.298	147.933	0.338	2.287	2.298	1000.000	2.320	2.320	3.297	854.133	1.853	2.169
0.396	196.967	0.403	2.046	2.395	1000.000	2.271	2.271	3.395	805.000	1.679	2.086
0.494	246.267	0.502	2.038	2.500	1000.000	2.254	2.254	3.500	753.067	1.508	2.002
0.594	295.467	0.538	1.819	2.597	1000.000	2.339	2.339	3.598	704.267	1.400	1.988
0.699	347.767	0.667	1.918	2.695	1000.000	2.291	2.291	3.696	655.000	1.360	2.077
0.796	396.200	0.762	1.922	2.799	1000.000	2.284	2.284	3.794	605.867	1.174	1.937
0.894	445.200	0.877	1.969	2.896	1000.000	2.339	2.339	3.898	553.367	0.985	1.780
0.999	497.100	1.043	2.098	2.994	1000.000	2.280	2.280	3.996	504.833	0.904	1.790
1.097	545.767	1.136	2.081	viscosity at 1000 1/s (mPa s)				4.095	454.867	0.704	1.549
1.195	594.733	1.269	2.134					mean	2.295	4.198	403.967
1.299	647.633	1.414	2.183	SD	0.096	4.295	355.133	0.591	1.663		
1.397	696.633	1.515	2.175								
1.494	745.600	1.630	2.186								
1.599	797.767	1.788	2.241								
1.697	847.200	1.948	2.299								
1.794	895.467	2.052	2.292								
1.900	947.500	2.217	2.340								
1.997	996.933	2.329	2.336								
								4.395	305.400	0.424	1.388
								4.498	253.833	0.267	1.051
								4.597	204.200	0.113	0.554
								4.696	155.067	0.067	0.430
								4.794	105.433	0.025	0.239
								4.899	52.830	0.000	0.000
								4.997	3.448	0.000	0.000

Table g4. Viscosity data of formulation 5TP+4P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.098	46.157	0.105	2.267	2.096	1000.000	2.506	2.506	3.097	954.667	2.379	2.492
0.194	95.247	0.247	2.596	2.200	1000.000	2.536	2.536	3.198	904.100	2.178	2.409
0.297	147.000	0.314	2.139	2.297	1000.000	2.591	2.591	3.298	854.267	2.088	2.444
0.395	196.467	0.354	1.802	2.395	999.967	2.533	2.533	3.395	804.833	1.967	2.444
0.496	247.033	0.487	1.973	2.497	1000.333	2.531	2.530	3.498	754.100	1.800	2.387
0.596	296.333	0.544	1.835	2.598	1000.000	2.581	2.581	3.598	703.967	1.643	2.334
0.698	347.467	0.705	2.028	2.695	999.967	2.615	2.615	3.696	655.000	1.405	2.146
0.796	395.900	0.747	1.887	2.797	1000.000	2.609	2.609	3.797	604.700	1.320	2.183
0.896	446.167	1.007	2.258	2.897	1000.000	2.548	2.548	3.898	553.367	1.175	2.123
0.998	497.200	1.131	2.275	2.995	1000.000	2.572	2.572	3.996	504.533	1.014	2.010
1.096	546.167	1.234	2.260	viscosity at 1000 1/s (mPa s)				4.096	454.867	0.911	2.002
1.194	595.200	1.414	2.376					mean	2.562	4.196	405.133
1.299	647.767	1.612	2.489	SD	0.154	4.296	354.700	0.547	1.543		
1.396	696.633	1.678	2.409								
1.494	745.600	1.848	2.479								
1.598	797.900	2.008	2.516								
1.696	847.067	2.153	2.542								
1.794	895.733	2.273	2.538								
1.899	947.800	2.445	2.580								
1.997	996.900	2.609	2.617								
								4.397	304.833	0.480	1.576
								4.497	254.967	0.266	1.042
								4.596	205.000	0.099	0.485
								4.697	154.500	0.075	0.488
								4.796	104.633	0.000	0.000
								4.899	53.183	0.000	0.000
								4.997	3.900	0.000	0.000

Table g5. Viscosity data of formulation 5TP+5P407 after autoclaving.

t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)
0.097	45.820	0.098	2.133	2.096	1000.000	3.178	3.178	3.097	954.800	2.919	3.057
0.196	95.880	0.197	2.057	2.200	1000.000	3.201	3.201	3.198	904.233	2.759	3.051
0.298	147.967	0.283	1.914	2.297	1000.000	3.147	3.147	3.298	854.400	2.595	3.038
0.397	197.300	0.449	2.273	2.395	1000.333	3.141	3.140	3.395	805.000	2.363	2.935
0.496	246.633	0.589	2.387	2.500	1000.000	3.176	3.176	3.498	753.800	2.211	2.933
0.595	296.300	0.665	2.245	2.597	1000.333	3.204	3.203	3.599	703.833	2.069	2.939
0.698	347.500	0.894	2.573	2.695	1000.000	3.185	3.185	3.697	654.833	1.823	2.784
0.797	397.500	1.035	2.605	2.799	1000.000	3.186	3.186	3.795	605.867	1.687	2.784
0.895	446.300	1.093	2.449	2.897	1000.000	3.215	3.215	3.899	553.233	1.519	2.745
0.998	497.033	1.322	2.661	2.994	1000.000	3.166	3.166	3.997	504.367	1.283	2.543
1.098	547.067	1.558	2.848					4.095	455.433	1.085	2.382
1.196	596.300	1.659	2.782					4.197	404.833	0.970	2.397
1.298	648.100	1.827	2.819					4.297	354.700	0.754	2.125
1.396	697.067	2.111	3.029					4.395	305.433	0.613	2.006
1.497	746.467	2.292	3.070					4.493	256.333	0.387	1.508
1.595	796.167	2.501	3.141					4.598	204.467	0.196	0.958
1.697	846.933	2.694	3.181					4.698	154.100	0.048	0.313
1.797	897.067	2.821	3.144					4.797	104.533	0.000	0.000
1.895	945.600	3.054	3.229					4.895	54.897	0.000	0.000
1.997	996.800	3.165	3.175					4.998	3.548	0.000	0.000
				viscosity	at 1000	1/s	(mPa s)				
					mean	3.180					
					SD	0.069					

Table g6. Viscosity data of formulation 5TP+1T80 after autoclaving.

t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)
0.097	46.087	0.060	1.293	2.096	993.833	1.548	1.557	3.097	943.533	1.378	1.460
0.198	97.157	0.179	1.846	2.199	990.900	1.517	1.531	3.200	888.700	1.244	1.400
0.299	147.467	0.186	1.259	2.297	990.900	1.500	1.514	3.298	837.233	1.162	1.388
0.397	196.667	0.244	1.238	2.395	993.533	1.542	1.552	3.395	801.033	1.341	1.675
0.495	245.367	0.341	1.390	2.499	993.433	1.553	1.563	3.500	742.500	1.249	1.682
0.594	294.133	0.429	1.460	2.596	993.100	1.546	1.556	3.598	695.033	0.860	1.237
0.699	346.933	0.350	1.009	2.694	993.667	1.541	1.550	3.696	641.467	0.760	1.185
0.796	395.600	0.656	1.657	2.798	994.133	1.499	1.508	3.794	595.633	0.574	0.963
0.894	441.067	0.666	1.511	2.896	993.833	1.515	1.524	3.898	546.200	0.494	0.905
0.999	493.833	1.228	2.487	2.994	994.000	1.452	1.461	3.996	497.200	0.374	0.753
1.097	542.533	0.821	1.514					4.094	448.933	0.681	1.517
1.194	590.633	0.780	1.321					4.198	397.367	0.281	0.708
1.299	639.867	0.915	1.430					4.296	350.867	0.268	0.764
1.397	688.000	1.014	1.474					4.394	300.300	0.239	0.794
1.494	736.500	1.204	1.635					4.497	252.100	0.033	0.131
1.596	788.700	1.346	1.706					4.598	201.900	0.323	1.598
1.697	828.467	1.414	1.706					4.696	153.667	0.032	0.208
1.794	881.500	1.365	1.548					4.794	104.633	0.000	0.000
1.897	937.133	1.479	1.579					4.900	52.797	0.000	0.000
1.997	989.033	1.658	1.676					4.998	3.386	0.000	0.000
				viscosity	at 1000	1/s	(mPa s)				
					mean	1.532					
					SD	0.095					

Table g7. Viscosity data of formulation 5TP+2T80 after autoclaving.

t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)
0.096	45.730	0.089	1.945	2.096	991.933	2.872	2.896	3.096	940.033	2.705	2.877
0.195	95.837	0.179	1.869	2.200	991.633	2.869	2.894	3.199	884.267	2.434	2.752
0.298	147.800	0.280	1.897	2.297	992.100	2.846	2.869	3.297	833.567	2.280	2.735
0.396	196.733	1.311	6.663	2.395	992.400	2.894	2.916	3.395	795.033	2.223	2.796
0.495	245.367	0.632	2.577	2.499	991.800	2.790	2.813	3.499	741.667	2.029	2.735
0.594	294.433	0.772	2.621	2.596	991.367	2.825	2.849	3.597	695.167	1.708	2.457
0.699	347.067	0.717	2.066	2.694	990.633	2.856	2.883	3.695	639.867	1.636	2.557
0.796	394.867	1.417	3.588	2.798	990.500	2.834	2.861	3.797	596.333	1.492	2.503
0.896	441.033	1.535	3.479	2.896	989.767	2.884	2.914	3.897	546.067	1.278	2.340
0.999	491.900	2.098	4.265	2.994	989.733	2.844	2.874	3.995	496.900	1.123	2.261
1.096	540.467	1.777	3.288	viscosity at 1000 1/s (mPa s)				4.097	444.733	1.318	2.963
1.194	588.267	1.694	2.880					4.197	399.433	0.821	2.054
1.298	636.800	1.698	2.667	mean	2.877	4.295	351.300	0.620	1.765		
1.396	689.300	1.956	2.837	SD	0.073	4.397	299.267	0.677	2.261		
1.494	735.333	2.162	2.941					4.499	251.267	0.618	2.461
1.598	788.867	2.325	2.947					4.597	202.500	0.570	2.817
1.696	819.800	2.424	2.956					4.695	154.233	0.067	0.432
1.794	879.600	2.535	2.882					4.796	104.167	0.000	0.000
1.899	933.733	2.679	2.869					4.899	53.063	0.000	0.000
1.997	987.833	2.880	2.915					4.997	3.900	0.000	0.000

Table g8. Viscosity data of formulation 5TP+3T80 after autoclaving.

t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)
0.098	47.127	37.331	792.133	2.096	999.800	24.528	24.533	3.096	954.367	20.764	21.757
0.194	95.630	34.583	361.633	2.199	999.967	24.009	24.010	3.200	902.600	20.230	22.413
0.299	147.967	40.572	274.200	2.296	999.967	23.659	23.660	3.297	853.533	19.711	23.093
0.397	197.433	47.391	240.033	2.393	1000.000	23.327	23.327	3.394	805.133	19.122	23.750
0.495	247.033	41.773	169.100	2.497	999.967	22.976	22.977	3.498	752.333	18.537	24.640
0.579	295.600	37.393	126.500	2.595	1000.000	22.610	22.610	3.596	703.400	18.127	25.770
0.699	347.767	33.891	97.453	2.698	1000.000	22.247	22.247	3.697	653.633	17.674	27.040
0.796	396.200	32.124	81.080	2.796	999.967	21.969	21.970	3.796	603.533	17.118	28.363
0.898	446.067	30.547	68.480	2.896	999.967	21.743	21.743	3.894	554.433	16.574	29.893
0.998	495.567	29.385	59.297	2.998	999.933	21.539	21.540	3.999	501.633	16.156	32.207
1.095	544.133	28.438	52.263	viscosity at 1000 1/s (mPa s)				4.097	453.067	15.570	34.367
1.199	596.333	27.656	46.377					4.196	404.700	15.134	37.397
1.297	646.167	27.210	42.110	mean	22.862	4.299	353.833	14.728	41.623		
1.394	694.100	26.811	38.627	SD	1.813	4.397	304.267	14.308	47.023		
1.499	746.333	26.343	35.297					4.495	255.567	13.881	54.313
1.596	795.567	26.020	32.707					4.595	205.633	13.153	63.963
1.700	846.767	25.781	30.447					4.696	155.033	12.675	81.757
1.798	896.933	25.581	28.520					4.797	104.133	12.038	115.600
1.895	945.167	25.337	26.807					4.898	53.270	9.585	179.933
1.999	997.833	25.119	25.173					4.996	3.930	4.995	1271.000

Table g9. Viscosity data of formulation 5TP+4T80 after autoclaving.

t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)
0.096	45.793	0.125	2.724	2.096	968.933	5.891	6.080	3.096	912.467	6.468	7.089
0.201	97.977	0.142	1.450	2.200	968.333	5.851	6.042	3.200	863.333	6.337	7.340
0.298	147.467	0.413	2.799	2.297	966.567	6.139	6.351	3.298	809.100	6.601	8.158
0.396	196.733	0.715	3.633	2.395	965.567	6.327	6.552	3.395	755.133	6.130	8.117
0.494	245.300	0.751	3.061	2.499	963.333	6.239	6.477	3.500	720.367	7.796	10.822
0.596	295.333	0.901	3.051	2.597	962.467	6.236	6.480	3.598	672.000	7.366	10.961
0.699	347.333	0.980	2.821	2.694	961.467	6.284	6.536	3.695	618.467	7.161	11.578
0.796	395.167	1.285	3.253	2.798	959.833	6.451	6.721	3.795	578.000	5.980	10.346
0.896	439.467	1.630	3.708	2.896	957.933	6.526	6.813	3.897	529.333	6.478	12.238
0.999	491.333	1.916	3.899	2.994	955.867	6.607	6.912	3.995	483.867	7.126	14.727
1.096	540.767	2.288	4.231					4.099	435.167	5.424	12.463
1.194	585.633	2.580	4.405					4.197	392.700	4.034	10.273
1.298	628.733	4.628	7.361	viscosity at 1000 1/s (mPa s)				4.295	346.767	3.921	11.307
1.396	685.467	4.230	6.172	mean	6.496			4.398	293.533	3.392	11.557
1.496	730.333	5.350	7.325	SD	0.305			4.499	249.367	4.278	17.157
1.598	773.133	6.006	7.768					4.597	202.667	2.764	13.637
1.696	820.100	4.847	5.911					4.695	153.733	2.032	13.220
1.796	870.800	5.130	5.891					4.796	104.167	1.378	13.227
1.899	920.833	5.574	6.053					4.899	53.063	0.836	15.763
1.997	966.300	5.865	6.069					4.997	4.062	0.059	14.420

Table g10. Viscosity data of formulation 5TP+5T80 after autoclaving.

t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (l/s)	Tau (Pa)	Eta (mPa s)
0.097	45.837	0.249	5.438	2.096	982.967	6.680	6.796	3.096	924.967	7.252	7.840
0.195	96.013	0.517	5.387	2.200	980.367	6.764	6.899	3.200	875.067	7.053	8.060
0.298	147.833	0.573	3.877	2.297	979.767	6.917	7.060	3.298	821.700	6.838	8.322
0.396	196.767	0.617	3.134	2.395	976.533	6.946	7.113	3.395	771.400	6.608	8.566
0.494	245.333	0.877	3.574	2.499	975.500	7.077	7.255	3.500	728.600	6.545	8.984
0.594	295.167	1.298	4.399	2.597	973.467	7.160	7.355	3.597	681.233	6.483	9.516
0.699	347.800	1.553	4.466	2.695	973.033	7.232	7.432	3.695	625.633	6.342	10.136
0.796	396.200	1.894	4.779	2.799	968.033	7.330	7.572	3.800	587.067	5.610	9.557
0.894	442.400	2.280	5.153	2.897	967.733	7.358	7.604	3.897	536.967	7.426	13.830
0.999	494.300	2.742	5.548	2.994	965.400	7.484	7.752	3.995	489.700	5.486	11.203
1.097	544.433	3.061	5.622					4.099	437.533	4.932	11.273
1.194	592.800	3.514	5.927	viscosity at 1000 1/s (mPa s)				4.197	396.333	4.588	11.577
1.299	631.800	3.936	6.230	mean	7.284			4.295	350.133	4.314	12.320
1.396	691.033	4.226	6.116	SD	0.323			4.400	291.500	5.742	19.697
1.494	737.233	4.733	6.420					4.497	251.000	5.272	21.003
1.598	784.867	5.203	6.629					4.596	203.133	3.445	16.960
1.696	831.400	5.433	6.535					4.696	153.733	2.380	15.480
1.794	880.500	5.771	6.554					4.795	104.367	2.103	20.147
1.899	932.700	6.211	6.659					4.898	53.607	1.419	26.473
1.996	982.400	6.581	6.699					4.996	4.296	0.477	111.077

Table g11. Viscosity data of formulation 5TP+1EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.096	45.703	0.894	19.557	2.096	995.900	4.872	4.892	3.097	947.933	4.171	4.400
0.201	98.183	1.019	10.378	2.200	996.033	4.795	4.814	3.200	895.633	3.924	4.382
0.298	147.867	0.986	6.668	2.297	995.733	4.791	4.811	3.298	845.333	3.687	4.362
0.396	196.900	0.964	4.895	2.395	996.167	4.728	4.747	3.395	800.000	3.431	4.288
0.494	245.967	1.083	4.401	2.500	996.200	4.647	4.664	3.500	751.600	3.083	4.101
0.594	295.600	1.260	4.261	2.597	996.067	4.633	4.652	3.598	703.100	2.845	4.047
0.699	347.633	1.498	4.310	2.695	995.900	4.604	4.623	3.696	649.533	2.615	4.027
0.796	396.200	1.720	4.340	2.799	995.900	4.530	4.549	3.795	602.933	2.289	3.796
0.893	444.700	1.971	4.432	2.897	996.067	4.492	4.510	3.898	552.067	2.146	3.887
0.999	496.633	2.160	4.350	2.994	995.900	4.471	4.489	3.995	500.900	1.803	3.600
1.096	546.033	2.424	4.440					4.095	452.200	1.616	3.574
1.194	594.733	2.624	4.413	viscosity	at 1000	1/s	(mPa s)	4.197	402.767	1.375	3.413
1.298	644.733	2.941	4.562					4.295	353.967	1.173	3.313
1.396	695.933	3.091	4.441	mean		4.675		4.398	301.733	0.847	2.807
1.494	744.700	3.442	4.622	SD		0.356		4.499	253.200	0.649	2.563
1.598	795.767	3.688	4.634					4.597	203.900	0.496	2.433
1.696	869.133	4.132	4.754					4.695	154.900	0.312	2.015
1.794	886.067	4.285	4.836					4.794	105.367	0.094	0.889
1.899	940.633	4.599	4.889					4.900	52.830	0.000	0.000
1.997	992.267	4.923	4.961					4.997	3.475	0.000	0.000

Table g12. Viscosity data of formulation 5TP+2EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.096	45.750	0.488	10.672	2.096	984.167	9.519	9.672	3.096	935.633	8.253	8.821
0.200	98.257	0.509	5.184	2.200	985.633	9.462	9.600	3.199	882.533	7.804	8.843
0.298	147.900	0.629	4.254	2.297	984.733	9.311	9.456	3.297	834.300	7.418	8.891
0.396	197.033	0.812	4.121	2.395	984.467	9.278	9.424	3.395	786.067	6.922	8.806
0.494	246.233	1.142	4.636	2.499	984.033	9.058	9.205	3.500	743.967	6.508	8.748
0.594	295.733	1.650	5.580	2.597	982.567	9.005	9.164	3.597	694.000	6.044	8.709
0.699	347.900	2.550	7.329	2.694	983.000	8.977	9.133	3.695	639.300	5.711	8.933
0.796	396.200	3.345	8.443	2.799	981.967	8.909	9.072	3.799	593.567	5.357	9.025
0.894	441.200	4.083	9.253	2.896	979.467	8.835	9.021	3.897	548.833	5.029	9.163
0.999	494.300	4.737	9.583	2.994	978.733	8.810	9.002	3.995	499.267	4.429	8.871
1.096	542.800	5.405	9.958					4.099	445.167	4.060	9.121
1.194	591.200	5.742	9.712	viscosity	at 1000	1/s	(mPa s)	4.197	401.333	3.568	8.891
1.298	635.600	6.322	9.946					4.295	353.367	3.223	9.122
1.396	684.733	6.944	10.141	mean		9.275		4.400	300.167	3.081	10.266
1.494	735.600	7.528	10.233	SD		0.512		4.498	253.800	2.480	9.770
1.598	781.967	7.930	10.141					4.597	204.467	2.110	10.319
1.696	828.900	8.389	10.121					4.695	155.267	1.590	10.243
1.794	880.633	8.801	9.994					4.798	103.633	1.195	11.527
1.899	932.700	9.287	9.957					4.899	53.373	0.804	15.060
1.997	981.967	9.610	9.787					4.997	3.827	0.288	75.373

Table g13. Viscosity data of formulation 5TP+3EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.098	46.980	23.302	496.000	2.096	1001.667	57.562	57.467	3.096	955.267	51.225	53.623
0.195	95.910	31.708	330.600	2.199	1001.333	56.856	56.780	3.199	904.133	50.065	55.373
0.297	147.467	40.140	272.200	2.296	1001.000	56.346	56.290	3.297	855.400	49.359	57.703
0.398	198.500	50.439	254.100	2.397	1001.333	55.784	55.710	3.394	806.733	48.434	60.037
0.496	247.533	58.954	238.167	2.496	1001.333	55.193	55.120	3.499	754.100	47.413	62.873
0.595	296.800	62.061	209.100	2.595	1001.667	54.698	54.607	3.597	704.833	46.491	65.960
0.697	347.800	61.908	178.000	2.696	1001.667	54.177	54.087	3.694	655.867	45.760	69.770
0.796	397.800	60.930	153.167	2.795	1001.667	53.810	53.720	3.796	622.167	45.980	73.903
0.896	446.933	60.217	134.733	2.896	1001.333	53.258	53.187	3.896	571.133	45.118	78.997
0.999	497.233	59.121	118.900	2.995	1001.333	52.523	52.453	3.999	520.833	44.587	85.607
1.096	545.867	58.499	107.167					4.096	471.100	43.625	92.603
1.196	596.500	58.340	97.803					4.194	422.867	42.805	101.227
1.298	647.800	58.110	89.703					4.299	371.833	41.819	112.467
1.395	696.167	58.077	83.423					4.396	322.133	40.879	126.900
1.497	747.633	58.153	77.783					4.494	273.033	40.354	147.800
1.597	797.067	58.218	73.040					4.595	223.400	40.152	179.733
1.694	845.900	58.268	68.883					4.699	171.433	39.727	231.733
1.799	898.667	58.300	64.873					4.797	120.867	40.136	332.067
1.897	947.367	58.295	61.533					4.895	71.543	41.032	573.533
1.994	996.300	58.410	58.627					4.994	22.142	56.587	2555.667
				viscosity at 1000 1/s (mPa s)							
				mean 54.942							
				SD 1.730							

Table g14. Viscosity data of formulation 5TP+4EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.099	47.947	32.375	675.233	2.096	1001.333	45.060	45.000	3.096	955.867	39.175	40.983
0.196	96.537	39.403	408.167	2.199	1001.000	44.177	44.133	3.200	904.000	38.357	42.430
0.297	147.500	38.207	259.033	2.295	1001.333	43.505	43.447	3.297	855.100	37.584	43.953
0.397	197.733	38.334	193.867	2.397	1001.333	42.884	42.827	3.395	806.433	36.749	45.570
0.495	246.900	39.430	159.700	2.496	1001.667	42.277	42.207	3.499	753.667	35.955	47.707
0.594	296.800	40.474	136.367	2.599	1001.333	41.686	41.630	3.596	705.133	35.196	49.913
0.699	348.100	42.097	120.933	2.696	1000.667	41.288	41.260	3.694	656.567	34.516	52.570
0.796	397.367	43.141	108.567	2.795	1001.000	40.854	40.813	3.798	604.400	33.709	55.773
0.896	446.600	44.852	100.430	2.897	1001.667	40.474	40.407	3.895	554.833	32.621	58.793
0.998	496.767	45.871	92.340	2.995	1001.000	40.057	40.017	4.000	502.933	31.765	63.160
1.096	545.633	46.848	85.860					4.098	454.700	30.532	67.147
1.197	596.933	47.540	79.640					4.197	405.600	29.209	72.013
1.297	647.200	47.826	73.897					4.299	354.833	27.252	76.803
1.395	695.767	47.822	68.733					4.396	305.900	24.979	81.657
1.497	747.500	47.588	63.663					4.494	256.767	22.600	88.017
1.597	797.100	47.257	59.287					4.594	206.633	20.106	97.303
1.696	846.767	46.874	55.357					4.699	153.733	16.429	106.867
1.799	898.267	46.560	51.833					4.799	103.967	13.568	130.500
1.896	946.933	46.248	48.840					4.898	54.003	8.401	155.567
1.996	997.067	46.015	46.150					4.997	4.706	5.135	1091.000
				viscosity at 1000 1/s (mPa s)							
				mean 42.174							
				SD 1.653							

Table g15. Viscosity data of formulation 5TP+5EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.098	47.390	28.562	602.700	2.096	1000.667	45.240	45.210	3.096	955.867	41.653	43.577
0.194	95.983	30.910	322.033	2.199	1000.667	44.760	44.730	3.199	904.433	40.778	45.087
0.299	148.400	37.629	253.567	2.297	1001.000	44.334	44.290	3.297	855.267	40.018	46.790
0.397	198.267	39.885	201.167	2.395	1001.333	44.039	43.980	3.394	806.733	39.371	48.803
0.495	247.267	41.236	166.767	2.498	1000.667	43.739	43.710	3.498	754.667	38.652	51.217
0.594	296.633	42.013	141.633	2.595	1001.333	43.428	43.370	3.596	705.433	37.922	53.757
0.699	348.533	42.591	122.200	2.697	1001.333	43.188	43.130	3.695	655.700	37.342	56.950
0.796	397.067	42.751	107.667	2.796	1001.000	42.910	42.867	3.797	604.533	36.752	60.793
0.898	447.933	43.211	96.467	2.897	1000.667	42.672	42.643	3.894	555.433	36.192	65.160
0.998	497.367	43.530	87.520	2.996	1001.333	42.533	42.477	4.000	502.933	35.698	70.980
1.095	545.867	43.642	79.950					4.097	454.267	35.071	77.203
1.197	596.633	44.041	73.817					4.195	406.500	34.573	85.050
1.297	647.500	44.360	68.510	viscosity at 1000 1/s (mPa s)				4.299	354.533	33.996	95.890
1.395	695.900	44.584	64.067	mean	43.641			4.396	305.733	33.437	109.367
1.499	748.233	44.804	59.880	SD	1.614			4.494	256.900	32.661	127.133
1.597	796.933	45.045	56.523					4.593	207.000	31.361	151.500
1.694	845.767	45.280	53.537					4.698	154.200	28.496	184.800
1.799	898.267	45.482	50.633					4.796	104.867	25.234	240.633
1.896	946.933	45.611	48.167					4.895	55.487	19.896	358.567
1.993	995.733	45.780	45.977					4.995	5.382	14.792	2748.667

Table g16. Viscosity data of formulation 3TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.997	0.001	0.021	2.097	1000.000	1.496	1.496	3.097	955.000	1.446	1.514
0.194	95.307	0.062	0.648	2.198	1000.000	1.578	1.578	3.195	905.433	1.313	1.450
0.299	148.000	0.164	1.110	2.298	1000.000	1.569	1.569	3.298	853.967	1.178	1.380
0.398	197.800	0.234	1.183	2.395	1000.000	1.563	1.563	3.396	805.300	1.102	1.368
0.497	247.500	0.351	1.417	2.493	1000.000	1.548	1.548	3.494	755.733	0.964	1.275
0.597	296.900	0.380	1.279	2.599	1000.000	1.524	1.524	3.600	703.533	0.838	1.192
0.695	346.033	0.460	1.330	2.697	1000.000	1.620	1.620	3.698	654.233	0.756	1.155
0.799	398.500	0.485	1.218	2.795	1000.333	1.551	1.551	3.796	605.267	0.616	1.017
0.897	447.067	0.556	1.243	2.899	1000.333	1.582	1.581	3.895	554.833	0.578	1.042
0.995	496.033	0.573	1.156	2.997	1000.000	1.587	1.587	3.999	503.667	0.447	0.887
1.093	545.000	0.721	1.323					4.097	454.833	0.379	0.833
1.198	597.800	0.777	1.300	viscosity at 1000 1/s (mPa s)				4.195	406.200	0.278	0.685
1.296	646.767	0.829	1.281	mean	1.562			4.300	353.833	0.184	0.519
1.394	695.767	0.883	1.270	SD	0.070			4.398	304.800	0.099	0.324
1.499	748.367	1.119	1.496					4.496	256.000	0.000	0.000
1.597	797.067	1.182	1.482					4.596	205.400	0.000	0.000
1.695	846.333	1.274	1.506					4.694	155.833	0.000	0.000
1.793	895.867	1.372	1.531					4.800	102.767	0.000	0.000
1.899	947.633	1.507	1.590					4.899	53.633	0.000	0.000
1.997	996.767	1.560	1.565					4.997	3.578	0.000	0.000

Table g17. Viscosity data of formulation 4TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.098	46.527	0.000	0.000	2.096	1000.000	1.807	1.807	3.096	955.133	1.648	1.726
0.195	95.587	0.082	0.860	2.200	1000.000	1.788	1.788	3.198	904.867	1.491	1.647
0.298	147.133	0.203	1.379	2.298	1000.000	1.851	1.851	3.298	854.567	1.405	1.644
0.397	197.300	0.214	1.087	2.395	1000.000	1.803	1.803	3.395	805.000	1.283	1.594
0.497	247.767	0.257	1.039	2.498	1000.000	1.856	1.856	3.496	755.133	1.179	1.562
0.597	297.667	0.343	1.154	2.598	1000.000	1.815	1.815	3.598	703.667	1.055	1.499
0.695	346.467	0.448	1.292	2.696	1000.333	1.775	1.774	3.697	654.667	0.864	1.320
0.798	397.767	0.520	1.307	2.794	1000.000	1.870	1.870	3.795	605.700	0.745	1.231
0.898	447.633	0.631	1.410	2.899	1000.000	1.837	1.837	3.899	553.067	0.703	1.271
0.996	496.333	0.673	1.356	2.996	1000.000	1.768	1.768	3.998	503.967	0.606	1.202
1.096	546.333	0.834	1.527	viscosity at 1000 1/s (mPa s)				4.096	455.300	0.455	1.000
1.196	596.633	0.941	1.578					4.194	406.200	0.355	0.874
1.297	646.900	0.997	1.541	mean	1.817	4.298	354.100	0.236	0.666		
1.395	695.933	1.062	1.525	SD	0.103	4.396	304.800	0.153	0.501		
1.498	747.367	1.220	1.632					4.494	256.300	0.016	0.064
1.598	797.667	1.347	1.688					4.595	206.267	0.000	0.000
1.696	846.600	1.483	1.752					4.700	153.333	0.000	0.000
1.798	897.633	1.635	1.821					4.799	103.700	0.000	0.000
1.896	946.900	1.745	1.843					4.897	53.570	0.000	0.000
1.996	996.767	1.845	1.851					4.996	4.868	0.000	0.000

Table g18. Viscosity data of formulation 6TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	46.043	0.035	0.754	2.096	999.967	2.726	2.726	3.097	954.967	2.567	2.688
0.196	96.157	0.221	2.302	2.200	1000.000	2.683	2.683	3.195	906.000	2.389	2.636
0.298	147.933	0.324	2.189	2.298	1000.333	2.745	2.744	3.298	854.100	2.260	2.646
0.397	197.333	0.372	1.886	2.395	1000.000	2.800	2.800	3.396	805.133	2.063	2.562
0.495	246.900	0.451	1.829	2.499	1000.000	2.774	2.774	3.496	755.000	1.928	2.553
0.595	296.200	0.580	1.958	2.597	1000.000	2.741	2.741	3.599	703.967	1.714	2.435
0.697	347.633	0.703	2.021	2.695	1000.333	2.742	2.741	3.697	654.667	1.643	2.509
0.798	397.967	0.823	2.067	2.797	1000.333	2.779	2.778	3.795	605.867	1.411	2.330
0.895	446.033	1.079	2.419	2.897	1000.000	2.791	2.791	3.899	553.067	1.281	2.316
0.998	497.500	1.235	2.483	2.994	1000.333	2.805	2.804	3.997	504.233	1.102	2.185
1.099	547.833	1.347	2.460	viscosity at 1000 1/s (mPa s)				4.095	455.300	0.983	2.159
1.197	596.767	1.450	2.430					4.195	405.733	0.734	1.808
1.296	647.500	1.680	2.595	mean	2.758	4.298	354.533	0.623	1.758		
1.397	697.233	1.839	2.637	SD	0.079	4.396	305.567	0.490	1.604		
1.497	747.200	1.973	2.640					4.496	255.000	0.287	1.126
1.595	795.900	2.122	2.666					4.596	205.433	0.184	0.895
1.697	847.500	2.317	2.734					4.699	153.833	0.001	0.006
1.798	897.967	2.472	2.753					4.797	104.000	0.000	0.000
1.896	946.767	2.659	2.808					4.896	54.547	0.000	0.000
1.996	996.467	2.781	2.791					4.997	4.590	0.000	0.000

Table g19. Viscosity data of formulation 7TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	46.087	0.134	2.910	2.097	1000.667	2.922	2.920	3.097	955.400	2.764	2.893
0.194	94.913	0.306	3.228	2.200	1000.333	2.929	2.928	3.195	905.433	2.590	2.861
0.299	148.000	0.372	2.515	2.298	1000.333	2.946	2.945	3.298	853.967	2.379	2.785
0.398	197.800	0.455	2.302	2.395	1000.333	2.936	2.935	3.396	805.000	2.241	2.784
0.497	247.633	0.619	2.498	2.497	1000.667	2.934	2.932	3.494	756.033	2.118	2.802
0.596	297.233	0.766	2.576	2.598	1000.000	2.940	2.940	3.600	703.533	1.957	2.781
0.695	345.867	0.808	2.336	2.696	1000.667	2.925	2.923	3.698	654.367	1.767	2.700
0.799	398.500	1.071	2.688	2.796	1000.333	2.913	2.912	3.796	605.267	1.665	2.752
0.897	447.067	1.125	2.517	2.898	1000.000	2.945	2.945	3.895	555.133	1.417	2.553
0.995	496.200	1.382	2.786	2.996	1000.667	2.974	2.972	3.999	503.667	1.299	2.580
1.095	546.167	1.418	2.596	viscosity at 1000 1/s (mPa s)				4.097	454.833	1.050	2.308
1.198	597.800	1.670	2.794					4.195	406.333	0.933	2.296
1.296	646.767	1.882	2.910	mean	2.935	4.300	353.967	0.802	2.267		
1.394	696.033	2.013	2.893	SD	0.069	4.398	304.800	0.637	2.089		
1.499	748.067	2.112	2.823					4.496	256.000	0.556	2.171
1.597	797.500	2.310	2.897					4.596	205.600	0.349	1.697
1.695	846.300	2.482	2.933					4.694	155.867	0.073	0.471
1.798	897.933	2.650	2.951					4.800	102.700	0.005	0.047
1.899	948.067	2.778	2.930					4.899	53.387	0.000	0.000
1.997	996.633	2.975	2.985					4.997	3.504	0.000	0.000

Table g20. Viscosity data of formulation 5TM+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.098	46.467	0.102	2.187	2.096	1000.333	1.294	1.294	3.097	955.400	1.178	1.233
0.195	95.527	0.135	1.410	2.200	1000.667	1.340	1.339	3.195	905.733	1.020	1.126
0.298	147.100	0.188	1.279	2.297	1000.667	1.350	1.349	3.298	854.233	1.005	1.177
0.398	198.133	0.243	1.224	2.395	1000.667	1.382	1.381	3.396	805.133	0.869	1.079
0.497	247.567	0.286	1.156	2.496	1000.667	1.359	1.358	3.496	755.133	0.821	1.087
0.596	296.900	0.369	1.244	2.597	1000.333	1.284	1.283	3.599	704.133	0.715	1.016
0.694	345.867	0.363	1.051	2.695	1000.667	1.317	1.316	3.698	654.967	0.640	0.977
0.799	398.967	0.389	0.974	2.797	1000.333	1.300	1.299	3.796	605.400	0.543	0.897
0.897	447.233	0.430	0.962	2.897	1000.667	1.293	1.292	3.897	554.233	0.398	0.719
0.995	495.767	0.544	1.098	2.997	1000.667	1.300	1.299	3.998	503.933	0.404	0.802
1.097	547.200	0.592	1.083	viscosity at 1000 1/s (mPa s)				4.096	455.000	0.267	0.586
1.197	597.233	0.604	1.012					4.194	406.767	0.173	0.425
1.295	646.500	0.740	1.145	mean	1.321	4.299	354.100	0.100	0.281		
1.395	696.633	0.788	1.131	SD	0.059	4.397	304.967	0.050	0.165		
1.498	747.933	0.920	1.230					4.495	256.333	0.037	0.143
1.596	796.767	1.006	1.262					4.595	205.867	0.000	0.000
1.696	846.900	1.110	1.310					4.698	154.167	0.000	0.000
1.796	897.067	1.135	1.265					4.799	103.067	0.000	0.000
1.899	947.933	1.272	1.342					4.898	53.753	0.000	0.000
1.997	997.067	1.342	1.346					4.996	4.384	0.000	0.000

Table g21. Viscosity data of formulation 5TS+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	
0.097	46.073	0.070	1.530	2.097	1000.333	2.526	2.525	3.097	955.267	2.562	2.682	
0.194	94.880	0.162	1.711	2.200	1000.667	2.557	2.555	3.200	903.667	2.322	2.570	
0.299	148.000	0.310	2.096	2.298	1000.333	2.502	2.501	3.298	854.700	2.182	2.553	
0.397	197.533	0.375	1.899	2.394	1000.667	2.549	2.548	3.395	805.700	2.056	2.552	
0.496	247.033	0.415	1.678	2.499	1000.667	2.626	2.624	3.495	755.300	1.931	2.557	
0.595	296.900	0.492	1.656	2.597	1000.667	2.667	2.665	3.599	704.400	1.789	2.540	
0.695	346.600	0.652	1.881	2.694	1000.333	2.608	2.607	3.697	655.133	1.636	2.498	
0.798	398.233	0.806	2.024	2.796	1000.667	2.610	2.609	3.794	606.033	1.541	2.542	
0.895	446.467	0.916	2.052	2.896	1001.000	2.561	2.558	3.899	553.533	1.351	2.440	
0.996	496.467	1.032	2.080	2.995	1001.333	2.654	2.650	3.997	504.833	1.280	2.535	
1.099	547.533	1.163	2.124					4.095	455.300	1.001	2.198	
1.196	596.333	1.367	2.292					4.197	405.467	0.964	2.376	
1.296	646.900	1.476	2.281					4.297	354.700	0.844	2.379	
1.399	698.400	1.629	2.332					4.395	305.900	0.665	2.174	
1.497	747.333	1.780	2.382					4.493	257.300	0.536	2.085	
1.595	796.333	1.945	2.442					4.593	206.767	0.313	1.515	
1.699	848.367	2.127	2.507					4.698	153.833	0.200	1.301	
1.797	897.633	2.283	2.544					4.797	104.000	0.017	0.167	
1.895	946.333	2.406	2.542					4.895	54.710	0.000	0.000	
1.995	996.200	2.559	2.569					4.994	5.836	0.000	0.000	
				viscosity at 1000 1/s (mPa s)								
						mean	2.584					
						SD	0.135					

Table g22. Viscosity data of formulation 5SA+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	
0.097	46.127	0.409	8.858	2.097	1001.000	1.505	1.503	3.096	955.267	1.388	1.453	
0.194	95.103	0.614	6.453	2.200	1000.667	1.513	1.512	3.200	904.000	1.304	1.442	
0.299	148.000	0.392	2.647	2.298	1001.000	1.471	1.470	3.298	854.967	1.085	1.269	
0.398	197.600	0.277	1.400	2.395	1000.667	1.458	1.457	3.395	805.567	0.986	1.224	
0.496	247.433	0.847	3.424	2.500	1001.000	1.523	1.522	3.493	756.900	0.899	1.187	
0.596	297.200	0.357	1.200	2.598	1001.333	1.455	1.453	3.599	704.300	0.775	1.101	
0.696	346.767	0.488	1.406	2.695	1000.333	1.494	1.494	3.697	654.967	0.742	1.133	
0.799	398.400	0.765	1.921	2.799	1001.000	1.478	1.477	3.795	605.867	0.577	0.953	
0.897	447.233	1.405	3.142	2.896	1000.333	1.564	1.564	3.900	552.900	0.475	0.860	
0.995	495.767	0.485	0.978	2.996	1001.000	1.513	1.511	3.998	504.400	0.302	0.598	
1.097	547.067	0.541	0.988					4.096	455.300	0.255	0.561	
1.197	597.367	2.103	3.520					4.194	407.033	0.174	0.428	
1.295	646.167	0.883	1.367					4.298	354.233	0.130	0.366	
1.396	696.900	1.450	2.080					4.396	305.267	0.015	0.048	
1.498	747.933	0.961	1.285					4.494	256.633	0.238	0.929	
1.596	797.200	1.111	1.393					4.595	206.333	0.000	0.000	
1.696	847.233	1.218	1.438					4.698	154.400	0.000	0.000	
1.796	897.533	1.358	1.513					4.799	103.667	0.000	0.000	
1.897	947.367	1.464	1.546					4.897	54.017	0.000	0.000	
1.997	997.333	1.680	1.684					4.996	4.678	0.237	50.733	
				viscosity at 1000 1/s (mPa s)								
						mean	1.496					
						SD	0.146					

Table g23. Viscosity data of formulation 0.5Dil+5TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.096	45.703	0.025	0.550	2.096	1000.000	2.337	2.337	3.096	954.800	2.132	2.253
0.198	96.917	0.139	1.435	2.200	1000.000	2.344	2.344	3.200	902.900	1.977	2.189
0.298	147.700	0.185	1.250	2.298	1000.000	2.297	2.297	3.297	853.800	1.887	2.210
0.396	196.867	0.304	1.542	2.395	1000.000	2.335	2.335	3.395	805.133	1.669	2.072
0.495	246.100	0.388	1.575	2.499	1000.000	2.348	2.348	3.500	752.633	1.500	1.993
0.594	295.467	0.469	1.587	2.597	1000.000	2.347	2.347	3.598	703.833	1.432	2.034
0.699	347.367	0.665	1.915	2.695	1000.000	2.379	2.379	3.695	655.000	1.309	1.998
0.796	396.500	0.713	1.799	2.799	1000.000	2.358	2.358	3.797	603.667	1.163	1.927
0.894	444.867	0.858	1.930	2.897	1000.000	2.341	2.341	3.897	553.233	0.990	1.789
0.999	496.333	0.961	1.936	2.994	1000.000	2.310	2.310	3.995	504.233	0.901	1.787
1.097	545.167	1.165	2.136	viscosity at 1000 1/s (mPa s)				4.097	453.233	0.721	1.591
1.194	594.133	1.283	2.159					4.197	404.133	0.608	1.505
1.298	646.933	1.493	2.307	mean	2.340	4.295	355.133	0.517	1.456		
1.396	695.900	1.507	2.166	SD	0.139	4.398	304.100	0.327	1.075		
1.494	744.700	1.690	2.269								
1.598	797.233	1.788	2.243								
1.696	846.200	1.956	2.312								
1.794	894.700	2.106	2.354								
1.899	947.500	2.247	2.372								
1.997	996.900	2.401	2.409								
								4.498	253.833	0.148	0.583
								4.597	204.333	0.084	0.412
								4.695	155.300	0.035	0.224
								4.796	104.300	0.000	0.000
								4.899	52.903	0.000	0.000
								4.997	3.680	0.000	0.000

Table g24. Viscosity data of formulation 1.0Dil+5TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.777	0.040	0.866	2.096	1000.000	2.456	2.456	3.096	954.500	2.304	2.414
0.198	96.980	0.203	2.097	2.199	999.967	2.434	2.434	3.200	902.900	2.104	2.331
0.298	147.833	0.330	2.230	2.297	1000.000	2.485	2.485	3.297	854.133	1.972	2.309
0.396	196.933	0.397	2.018	2.395	1000.000	2.426	2.426	3.395	805.000	1.834	2.278
0.495	246.067	0.520	2.114	2.499	1000.000	2.423	2.423	3.499	752.500	1.645	2.186
0.594	295.600	0.672	2.273	2.597	1000.000	2.472	2.472	3.597	703.533	1.519	2.159
0.698	347.633	0.699	2.010	2.694	1000.000	2.529	2.529	3.695	654.967	1.424	2.174
0.796	396.633	0.866	2.184	2.799	1000.000	2.469	2.469	3.799	602.200	1.218	2.023
0.894	444.867	0.944	2.123	2.896	999.967	2.463	2.463	3.897	552.900	1.042	1.885
0.999	496.033	0.999	2.013	2.994	999.967	2.439	2.439	3.995	504.367	0.996	1.974
1.097	545.900	1.205	2.207	viscosity at 1000 1/s (mPa s)				4.099	452.067	0.760	1.681
1.195	594.267	1.311	2.206					4.197	404.267	0.705	1.743
1.299	647.100	1.462	2.259	mean	2.459	4.295	355.433	0.505	1.420		
1.397	696.167	1.603	2.302	SD	0.169	4.400	303.200	0.382	1.259		
1.495	745.300	1.730	2.322								
1.599	797.500	1.913	2.399								
1.697	847.200	2.038	2.405								
1.795	895.433	2.233	2.494								
1.899	947.767	2.361	2.491								
1.997	996.933	2.457	2.465								
								4.498	254.400	0.165	0.650
								4.597	204.633	0.094	0.459
								4.695	155.267	0.007	0.044
								4.796	104.533	0.000	0.000
								4.899	52.977	0.000	0.000
								4.997	3.842	0.000	0.000

Table g25. Viscosity data of formulation 1.5Dil+5TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	46.177	0.010	0.211	2.096	1000.000	2.376	2.376	3.097	954.367	2.228	2.335
0.198	97.200	0.119	1.225	2.200	1000.000	2.359	2.359	3.200	902.467	2.038	2.258
0.296	146.767	0.228	1.557	2.297	1000.000	2.356	2.356	3.298	853.967	1.910	2.237
0.397	197.200	0.338	1.712	2.395	1000.000	2.336	2.336	3.395	805.133	1.742	2.164
0.495	246.500	0.426	1.727	2.499	1000.000	2.376	2.376	3.500	752.467	1.593	2.117
0.594	295.733	0.460	1.556	2.597	1000.333	2.369	2.368	3.598	702.933	1.420	2.020
0.697	346.633	0.552	1.591	2.695	1000.000	2.364	2.364	3.696	653.967	1.254	1.917
0.797	396.500	0.730	1.841	2.799	999.967	2.380	2.380	3.796	604.533	1.190	1.969
0.895	445.000	0.741	1.666	2.897	999.967	2.375	2.375	3.898	552.500	1.044	1.889
0.997	495.133	0.901	1.821	2.994	1000.000	2.382	2.382	3.996	503.500	0.854	1.697
1.098	545.933	1.124	2.058					4.096	454.133	0.712	1.568
1.195	594.400	1.178	1.982					4.198	403.967	0.534	1.321
1.297	646.633	1.321	2.043	viscosity at 1000 1/s (mPa s)				4.296	355.000	0.397	1.119
1.397	696.767	1.493	2.143	mean	2.367			4.396	304.400	0.287	0.944
1.495	745.467	1.637	2.196	SD	0.220			4.496	254.567	0.180	0.707
1.597	796.900	1.787	2.243					4.598	203.800	0.118	0.578
1.697	847.067	1.916	2.262					4.697	154.633	0.000	0.000
1.795	895.433	2.077	2.320					4.795	105.233	0.000	0.000
1.898	946.633	2.256	2.383					4.895	54.630	0.000	0.000
1.998	996.900	2.389	2.396					4.998	3.314	0.000	0.000

Table g26. Viscosity data of formulation 0.5Dil+5TP+3P407 (pH7) after autoclaving (batch 1).

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.098	46.173	0.000	0.000	2.097	999.767	1.175	1.175	3.096	954.100	1.086	1.139
0.195	95.230	0.045	0.474	2.200	999.433	1.206	1.206	3.198	903.667	0.986	1.091
0.295	145.800	0.105	0.719	2.298	999.767	1.212	1.212	3.298	853.533	0.897	1.051
0.396	196.833	0.133	0.674	2.395	1000.133	1.183	1.183	3.396	804.367	0.774	0.963
0.497	247.467	0.174	0.703	2.495	999.433	1.201	1.201	3.496	753.500	0.701	0.930
0.597	296.933	0.226	0.762	2.598	999.733	1.199	1.199	3.599	702.100	0.577	0.822
0.696	345.700	0.302	0.875	2.696	999.900	1.284	1.284	3.697	653.367	0.550	0.842
0.798	397.367	0.315	0.793	2.796	999.400	1.185	1.186	3.795	604.533	0.442	0.731
0.898	446.167	0.367	0.823	2.899	999.767	1.199	1.200	3.897	552.367	0.337	0.611
0.996	494.567	0.463	0.936	2.996	999.800	1.200	1.201	3.998	502.200	0.287	0.572
1.096	544.733	0.454	0.834					4.096	453.533	0.184	0.405
1.197	595.300	0.554	0.931	viscosity at 1000 1/s (mPa s)				4.196	404.400	0.065	0.160
1.297	645.867	0.670	1.037	mean	1.205			4.299	353.200	0.037	0.104
1.395	694.867	0.733	1.054	SD	0.053			4.397	303.933	0.000	0.000
1.496	744.867	0.847	1.137					4.495	255.300	0.000	0.000
1.598	796.467	0.891	1.119					4.595	205.500	0.000	0.000
1.696	846.067	1.039	1.228					4.696	154.867	0.000	0.000
1.796	895.767	1.058	1.181					4.797	103.700	0.000	0.000
1.896	945.767	1.161	1.228					4.898	53.300	0.000	0.000
1.997	996.033	1.277	1.282					4.996	3.710	0.000	0.000

Table g27. Viscosity data of formulation 0.5Dil+5TP+3P407 (pH7) after autoclaving
(batch 2).

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	
0.097	45.600	0.004	0.085	2.096	999.967	1.865	1.865	3.096	954.233	1.709	1.791	
0.196	94.617	0.085	0.899	2.200	1000.000	1.847	1.847	3.200	902.600	1.601	1.773	
0.298	147.767	0.215	1.453	2.297	1000.333	1.882	1.881	3.298	853.967	1.465	1.715	
0.397	197.233	0.305	1.549	2.395	1000.000	1.829	1.829	3.395	804.233	1.302	1.619	
0.496	247.067	0.378	1.530	2.500	1000.000	1.800	1.800	3.498	754.100	1.223	1.621	
0.595	296.467	0.474	1.598	2.598	999.967	1.866	1.866	3.599	702.500	1.108	1.577	
0.698	346.167	0.598	1.728	2.696	1000.000	1.822	1.822	3.697	653.800	1.018	1.557	
0.797	397.667	0.600	1.510	2.795	1000.000	1.839	1.839	3.795	604.533	0.893	1.478	
0.895	446.033	0.735	1.647	2.898	1000.000	1.878	1.878	3.899	551.900	0.783	1.419	
0.999	495.633	0.829	1.673	2.996	1000.000	1.813	1.813	3.997	502.800	0.660	1.313	
1.097	544.433	0.897	1.647					4.095	454.000	0.522	1.150	
1.197	596.333	1.024	1.717					4.196	405.867	0.490	1.207	
1.299	646.600	1.170	1.809					4.298	353.700	0.332	0.938	
1.397	695.167	1.323	1.904					4.396	303.933	0.231	0.760	
1.497	746.933	1.363	1.825					4.494	255.133	0.146	0.572	
1.595	796.033	1.456	1.829					4.596	206.000	0.115	0.559	
1.697	846.200	1.578	1.864					4.697	154.800	0.000	0.000	
1.797	897.367	1.709	1.904					4.798	102.833	0.000	0.000	
1.895	946.900	1.798	1.899					4.896	53.607	0.000	0.000	
1.998	996.767	1.876	1.882					4.997	3.842	0.000	0.000	
				viscosity at 1000 1/s (mPa s)								
				mean 1.844								
				SD 0.042								

Table g28. Viscosity data of formulation 0.5Dil+5TP+3P407 (pH7) after autoclaving
(batch 3).

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	
0.097	45.793	0.000	0.000	2.097	1000.000	1.991	1.991	3.097	954.233	1.772	1.857	
0.194	94.543	0.015	0.164	2.198	1000.000	1.948	1.948	3.195	905.133	1.662	1.837	
0.299	147.700	0.062	0.419	2.298	1000.000	1.967	1.967	3.298	853.667	1.482	1.736	
0.398	197.533	0.141	0.715	2.395	1000.000	1.934	1.934	3.396	804.533	1.388	1.725	
0.496	247.333	0.252	1.020	2.493	999.967	1.976	1.976	3.494	755.100	1.284	1.700	
0.596	296.467	0.363	1.226	2.599	999.967	1.927	1.927	3.600	702.767	1.149	1.636	
0.694	345.567	0.421	1.217	2.697	1000.000	1.964	1.964	3.698	654.100	0.993	1.518	
0.799	397.667	0.534	1.342	2.795	1000.000	1.972	1.972	3.796	604.267	1.026	1.698	
0.897	445.867	0.635	1.424	2.899	999.967	1.928	1.928	3.898	552.667	0.732	1.324	
0.995	494.900	0.818	1.653	2.997	1000.000	1.989	1.989	3.999	502.500	0.715	1.424	
1.095	545.167	0.848	1.555					4.097	454.000	0.518	1.141	
1.198	596.933	1.032	1.730					4.195	405.267	0.348	0.859	
1.296	645.867	1.129	1.748					4.300	353.400	0.331	0.936	
1.394	695.167	1.234	1.776					4.398	304.000	0.249	0.820	
1.499	747.633	1.345	1.800					4.496	254.833	0.160	0.630	
1.597	796.933	1.500	1.883					4.596	205.500	0.003	0.014	
1.694	845.900	1.646	1.945					4.694	155.667	0.000	0.000	
1.798	896.767	1.779	1.984					4.800	102.400	0.000	0.000	
1.898	947.333	1.914	2.020					4.899	53.313	0.000	0.000	
1.996	996.467	1.972	1.979					4.997	3.578	0.000	0.000	
				viscosity at 1000 1/s (mPa s)								
				mean 1.960								
				SD 0.045								

Table g29. Viscosity data of formulation 1.0Dil+5TP+3P407 (pH7) after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	
0.097	45.530	0.051	1.126	2.096	999.767	1.257	1.257	3.097	954.100	1.204	1.262	
0.194	94.530	0.130	1.370	2.200	999.967	1.315	1.315	3.200	902.200	1.096	1.215	
0.299	147.733	0.209	1.413	2.297	999.967	1.367	1.367	3.298	853.667	1.013	1.186	
0.397	196.800	0.252	1.282	2.394	999.933	1.287	1.287	3.395	804.833	0.903	1.122	
0.495	246.533	0.303	1.227	2.498	999.933	1.333	1.333	3.499	752.200	0.838	1.114	
0.596	296.033	0.310	1.048	2.595	999.967	1.267	1.267	3.597	703.400	0.665	0.946	
0.699	347.367	0.396	1.141	2.699	1000.000	1.370	1.370	3.694	655.133	0.622	0.949	
0.796	395.767	0.471	1.189	2.796	999.933	1.288	1.288	3.799	602.200	0.544	0.904	
0.896	445.033	0.501	1.125	2.898	999.967	1.312	1.312	3.896	553.367	0.445	0.803	
0.998	495.300	0.621	1.253	2.998	999.933	1.316	1.316	3.996	503.067	0.360	0.715	
1.095	544.867	0.660	1.212					4.098	452.467	0.273	0.602	
1.197	595.733	0.672	1.127					4.196	404.833	0.194	0.480	
1.297	646.467	0.719	1.112					4.300	353.233	0.130	0.369	
1.397	695.600	0.809	1.163					4.397	303.800	0.073	0.242	
1.498	746.767	0.925	1.239					4.495	255.300	0.019	0.076	
1.596	795.600	1.001	1.259					4.594	206.033	0.000	0.000	
1.696	845.033	1.108	1.311					4.699	153.267	0.000	0.000	
1.798	896.467	1.180	1.316					4.797	104.033	0.000	0.000	
1.895	945.300	1.290	1.365					4.895	54.633	0.000	0.000	
1.995	995.167	1.380	1.387					4.997	3.739	0.000	0.000	
				viscosity at 1000 1/s (mPa s)								
				mean 1.31 i								
				SD 0.049								

Table g30. Viscosity data of formulation 1.5Dil+5TP+3P407 (pH7) after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	
0.097	45.500	0.000	0.000	2.097	1000.000	1.451	1.451	3.097	954.367	1.380	1.446	
0.196	95.777	0.001	0.010	2.200	999.967	1.514	1.514	3.198	903.667	1.214	1.344	
0.298	147.700	0.076	0.517	2.298	1000.000	1.465	1.465	3.298	853.233	1.069	1.253	
0.397	197.067	0.132	0.672	2.395	999.967	1.430	1.430	3.395	803.833	1.003	1.247	
0.496	246.700	0.179	0.725	2.499	1000.000	1.464	1.464	3.496	753.967	0.922	1.223	
0.595	295.867	0.202	0.683	2.597	999.933	1.571	1.571	3.599	702.100	0.771	1.098	
0.697	346.900	0.280	0.808	2.695	999.967	1.496	1.496	3.696	653.367	0.666	1.020	
0.797	397.367	0.314	0.791	2.799	999.933	1.424	1.424	3.794	604.533	0.602	0.996	
0.895	445.000	0.412	0.926	2.897	999.933	1.443	1.443	3.899	551.767	0.488	0.885	
0.999	495.600	0.479	0.966	2.994	1000.333	1.481	1.480	3.997	502.633	0.365	0.727	
1.096	545.167	0.594	1.089					4.095	454.133	0.257	0.566	
1.197	595.300	0.657	1.104					4.197	403.833	0.172	0.426	
1.296	645.867	0.721	1.116					4.297	353.367	0.086	0.244	
1.397	695.733	0.839	1.206					4.396	304.967	0.019	0.063	
1.497	745.900	1.021	1.369					4.494	255.867	0.000	0.000	
1.595	795.133	1.093	1.375					4.596	205.100	0.000	0.000	
1.697	846.633	1.256	1.483					4.699	153.800	0.000	0.000	
1.798	896.467	1.287	1.436					4.797	103.967	0.000	0.000	
1.896	945.433	1.410	1.492					4.895	54.447	0.000	0.000	
1.996	995.900	1.570	1.576					4.996	4.839	0.000	0.000	
				viscosity at 1000 1/s (mPa s)								
				mean 1.474								
				SD 0.071								

Table g31. Viscosity data of formulation 0.25Theo+5TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	
0.096	45.983	0.007	0.148	2.096	1000.000	2.944	2.944	3.097	954.800	2.722	2.851	
0.198	96.980	0.171	1.768	2.200	999.967	2.948	2.948	3.200	902.933	2.602	2.882	
0.298	147.800	0.396	2.681	2.297	1000.000	2.914	2.914	3.298	853.967	2.386	2.794	
0.396	196.833	0.426	2.166	2.395	1000.333	2.949	2.948	3.395	805.000	2.212	2.748	
0.495	246.200	0.510	2.070	2.499	1000.000	2.971	2.971	3.500	752.767	2.075	2.757	
0.594	295.600	0.646	2.185	2.597	1000.333	2.975	2.974	3.598	703.833	1.836	2.608	
0.699	347.633	0.696	2.002	2.695	1000.000	2.930	2.930	3.696	655.000	1.683	2.569	
0.796	396.633	0.923	2.328	2.799	1000.000	2.941	2.941	3.796	605.000	1.539	2.544	
0.894	444.700	1.051	2.363	2.896	1000.000	2.958	2.958	3.898	552.933	1.318	2.384	
0.999	496.200	1.263	2.546	2.994	1000.000	2.942	2.942	3.995	504.233	1.154	2.289	
1.097	546.167	1.377	2.520					4.095	454.133	0.950	2.093	
1.195	595.033	1.582	2.658					4.198	403.967	0.813	2.012	
1.299	647.767	1.758	2.714					4.295	354.833	0.668	1.883	
1.397	696.633	1.958	2.811					4.396	305.167	0.482	1.581	
1.495	745.600	2.088	2.800					4.498	253.833	0.318	1.253	
1.599	797.900	2.235	2.801					4.597	204.100	0.178	0.872	
1.696	846.633	2.426	2.866					4.696	155.000	0.045	0.293	
1.794	895.167	2.575	2.877					4.794	105.400	0.000	0.000	
1.899	947.500	2.784	2.938					4.900	52.787	0.000	0.000	
1.997	996.900	2.940	2.949					4.997	3.270	0.000	0.000	
				viscosity at 1000 1/s (mPa s)								
				mean 2.947								
				SD 0.082								

Table g32. Viscosity data of formulation 0.50Theo+5TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	
0.097	45.940	0.012	0.253	2.096	1000.000	2.283	2.283	3.096	954.500	2.132	2.234	
0.198	96.923	0.092	0.951	2.199	999.767	2.263	2.263	3.200	903.067	1.992	2.205	
0.298	147.833	0.213	1.439	2.298	1000.300	2.307	2.307	3.298	853.667	1.884	2.207	
0.396	196.900	0.292	1.482	2.395	1000.000	2.331	2.331	3.395	805.267	1.722	2.139	
0.494	246.167	0.358	1.453	2.499	1000.333	2.278	2.277	3.500	752.933	1.531	2.034	
0.594	295.467	0.452	1.531	2.597	1000.333	2.321	2.321	3.597	703.533	1.378	1.959	
0.699	347.767	0.621	1.784	2.694	1000.000	2.311	2.311	3.695	654.667	1.321	2.018	
0.796	396.200	0.707	1.784	2.799	1000.667	2.288	2.287	3.797	603.800	1.175	1.945	
0.896	445.733	0.795	1.783	2.896	999.967	2.306	2.306	3.897	553.500	0.979	1.769	
0.999	496.333	0.983	1.980	2.994	1000.000	2.298	2.298	3.995	504.067	0.858	1.703	
1.096	545.600	1.112	2.038					4.098	452.633	0.721	1.593	
1.194	594.567	1.228	2.065					4.198	403.967	0.639	1.582	
1.298	647.367	1.360	2.101					4.295	355.133	0.495	1.394	
1.396	696.067	1.498	2.153					4.398	303.967	0.310	1.020	
1.494	745.300	1.660	2.227					4.498	253.967	0.084	0.332	
1.598	797.367	1.798	2.255					4.597	204.267	0.020	0.099	
1.696	845.600	1.927	2.279					4.696	154.933	0.000	0.000	
1.794	895.300	2.071	2.313					4.794	105.200	0.000	0.000	
1.899	947.500	2.211	2.334					4.899	52.873	0.000	0.000	
1.997	996.300	2.354	2.362					4.997	3.490	0.000	0.000	
				viscosity at 1000 1/s (mPa s)								
				mean 2.298								
				SD 0.053								

Table g33. Viscosity data of formulation 0.75Theo+5TP+3P407 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.096	45.850	0.057	1.250	2.097	1000.000	2.648	2.648	3.096	954.367	2.496	2.615
0.195	95.717	0.153	1.597	2.200	1000.000	2.686	2.686	3.200	902.767	2.266	2.510
0.298	147.800	0.230	1.557	2.298	1000.000	2.583	2.583	3.298	854.133	2.094	2.451
0.396	196.900	0.329	1.669	2.395	1000.000	2.632	2.632	3.395	805.000	2.008	2.494
0.494	246.133	0.461	1.874	2.499	999.967	2.542	2.542	3.500	753.067	1.809	2.402
0.594	295.600	0.503	1.700	2.597	1000.000	2.565	2.565	3.598	704.400	1.608	2.283
0.699	347.633	0.772	2.222	2.695	1000.000	2.641	2.641	3.696	654.667	1.508	2.303
0.796	396.467	0.814	2.053	2.799	1000.000	2.692	2.692	3.795	604.833	1.390	2.298
0.894	445.033	0.950	2.135	2.897	999.967	2.613	2.613	3.898	553.100	1.167	2.110
0.999	496.200	1.117	2.252	2.994	1000.000	2.649	2.649	3.995	504.100	1.063	2.109
1.096	545.767	1.318	2.414					4.095	453.967	0.825	1.816
1.194	594.433	1.430	2.405					4.198	403.967	0.855	2.115
1.299	647.633	1.623	2.506	viscosity at 1000 1/s (mPa s)				4.295	355.000	0.597	1.683
1.396	696.167	1.668	2.397	mean	2.625			4.062	305.000	0.463	1.518
1.494	745.167	1.866	2.504	SD	0.085			4.499	253.667	0.334	1.318
1.598	797.633	1.982	2.484					4.597	204.333	0.113	0.554
1.696	846.767	2.217	2.618					4.696	154.933	0.015	0.094
1.794	895.167	2.347	2.622					4.794	105.267	0.000	0.000
1.899	947.367	2.450	2.586					4.899	52.773	0.000	0.000
1.997	996.933	2.630	2.638					4.997	3.299	0.000	0.000

Table g34. Viscosity data of formulation 0.25Theo+5TP+2T80 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	46.337	13.998	302.100	2.096	1000.000	24.690	24.690	3.096	955.100	22.028	23.063
0.195	95.880	25.510	266.067	2.199	1000.000	24.557	24.557	3.199	903.700	21.547	23.843
0.295	146.533	26.542	181.133	2.296	1000.000	24.303	24.303	3.296	855.100	21.044	24.610
0.398	198.100	26.717	134.867	2.394	1000.000	23.977	23.977	3.394	806.167	20.533	25.470
0.496	247.267	26.523	107.267	2.498	1000.000	23.743	23.743	3.498	754.000	19.994	26.517
0.595	296.200	26.304	88.803	2.595	1000.333	23.535	23.527	3.595	704.833	19.477	27.633
0.699	348.067	26.106	75.003	2.697	1000.000	23.317	23.317	3.697	654.100	18.945	28.963
0.797	397.067	25.782	64.930	2.797	1000.000	23.093	23.093	3.797	603.400	18.502	30.663
0.894	445.300	25.547	57.370	2.895	1000.000	22.863	22.863	3.894	554.433	17.923	32.327
0.999	496.200	25.338	51.063	3.000	1000.000	22.690	22.690	3.999	502.467	17.350	34.530
1.097	545.600	25.298	46.367					4.097	454.267	16.987	37.393
1.194	594.300	25.173	42.357	viscosity at 1000 1/s (mPa s)				4.196	405.133	16.467	40.647
1.298	646.600	25.101	38.820	mean	23.676			4.299	354.133	15.872	44.820
1.396	695.767	24.969	35.887	SD	0.748			4.397	304.567	15.412	50.603
1.495	746.033	25.007	33.520					4.495	255.733	14.868	58.140
1.597	797.100	24.981	31.340					4.595	205.767	14.325	69.620
1.695	845.900	25.025	29.583					4.696	155.400	14.106	90.770
1.800	897.667	24.970	27.817					4.795	105.233	13.235	125.767
1.897	946.933	24.939	26.337					4.898	53.430	11.325	211.967
1.995	995.433	25.135	25.250					4.997	3.988	5.889	1476.667

Table g35. Viscosity data of formulation 0.50Theo+5TP+2T80 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	46.410	12.925	278.500	2.096	1000.000	23.300	23.300	3.096	954.967	20.869	21.853
0.195	95.967	21.887	228.067	2.199	1000.000	23.080	23.080	3.199	903.233	20.446	22.637
0.293	145.267	22.836	157.200	2.297	999.967	22.886	22.887	3.296	854.833	19.875	23.250
0.398	198.100	23.158	116.900	2.394	999.967	22.713	22.713	3.394	806.300	19.392	24.050
0.496	247.300	23.162	93.660	2.498	1000.000	22.470	22.470	3.498	753.700	18.890	25.063
0.595	296.033	23.098	78.027	2.595	1000.000	22.333	22.333	3.595	704.400	18.404	26.127
0.699	347.900	23.148	66.537	2.697	1000.000	22.103	22.103	3.697	653.833	17.876	27.340
0.796	397.200	23.073	58.090	2.797	1000.000	21.917	21.917	3.797	603.233	17.285	28.653
0.894	445.200	23.087	51.857	2.896	1000.000	21.727	21.727	3.895	553.967	16.927	30.557
0.999	496.033	23.170	46.710	2.999	1000.000	21.567	21.567	3.995	504.100	16.407	32.547
1.097	545.167	23.133	42.433	viscosity at 1000 1/s (mPa s)				4.096	454.233	15.924	35.057
1.194	594.133	23.189	39.030					4.198	403.500	15.387	38.133
1.298	663.433	23.746	35.793	mean	22.410	4.297	354.567	14.847	41.873		
1.395	695.633	23.257	33.433	SD	0.592	4.395	305.433	14.357	47.007		
1.497	746.767	23.334	31.247					4.498	254.267	14.074	55.350
1.597	797.100	23.368	29.317					4.595	205.567	13.408	65.223
1.694	845.900	23.403	27.667					4.698	154.200	12.716	82.467
1.799	897.933	23.529	26.203					4.797	104.500	12.324	117.933
1.896	946.200	23.608	24.950					4.896	54.560	10.375	190.167
1.994	995.300	23.632	23.743					4.995	5.147	4.583	890.533

Table g36. Viscosity data of formulation 0.75Theo+5TP+2T80 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.098	46.700	13.050	279.433	2.096	999.967	19.203	19.203	3.099	953.800	16.863	17.680
0.197	96.613	20.282	209.933	2.199	999.967	18.923	18.923	3.196	904.867	16.472	18.203
0.295	145.833	23.406	160.500	2.296	999.967	18.739	18.740	3.296	854.833	15.997	18.713
0.397	197.567	23.221	117.533	2.394	1000.333	18.469	18.463	3.398	803.200	15.518	19.320
0.497	247.767	23.229	93.753	2.498	1000.000	18.277	18.277	3.496	754.233	15.095	20.013
0.597	296.767	21.901	73.800	2.595	1000.333	18.153	18.147	3.597	704.233	14.657	20.813
0.698	347.633	21.498	61.840	2.697	1000.000	17.947	17.947	3.697	653.633	14.212	21.743
0.796	396.767	20.879	52.623	2.796	1000.000	17.783	17.783	3.797	603.533	13.763	22.803
0.896	445.767	20.744	46.537	2.894	1000.000	17.607	17.607	3.895	554.100	13.350	24.093
0.998	495.767	20.611	41.573	2.999	1000.000	17.453	17.453	3.995	503.633	12.891	25.597
1.096	545.333	20.106	36.870	viscosity at 1000 1/s (mPa s)				4.098	453.367	12.418	27.390
1.197	595.733	19.971	33.523					4.196	405.133	12.032	29.700
1.297	645.867	19.854	30.740	mean	18.254	4.296	355.133	11.624	32.730		
1.397	696.200	19.721	28.327	SD	0.578	4.399	303.667	11.133	36.663		
1.497	746.200	19.662	26.350					4.497	254.833	10.661	41.833
1.596	796.467	19.527	24.517					4.597	205.100	10.195	49.707
1.698	847.633	19.487	22.990					4.695	155.300	9.673	62.283
1.798	896.767	19.439	21.677					4.796	104.600	9.042	86.447
1.896	945.467	19.458	20.580					4.897	53.633	7.493	139.700
1.998	996.500	19.508	19.577					4.998	3.416	2.921	855.133

Table g37. Viscosity data of formulation 0.50Theo+5TP+3T80 after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.098	47.303	18.496	391.000	2.096	999.967	19.649	19.650	3.096	954.533	16.940	17.747
0.195	95.737	22.220	232.100	2.199	999.967	19.309	19.310	3.195	905.133	16.425	18.147
0.297	147.100	33.107	225.067	2.296	999.633	19.043	19.050	3.297	853.367	15.930	18.667
0.397	197.467	31.720	160.633	2.395	999.967	18.786	18.787	3.397	803.500	15.489	19.277
0.495	246.633	29.062	117.833	2.497	999.967	18.489	18.490	3.495	753.933	15.071	19.990
0.597	296.600	27.046	91.187	2.597	1000.000	18.253	18.253	3.599	702.533	14.596	20.777
0.699	347.367	25.229	72.630	2.698	1000.000	18.030	18.030	3.696	654.400	14.174	21.660
0.796	396.033	24.417	61.653	2.795	999.933	17.792	17.793	3.797	603.233	13.756	22.803
0.900	446.800	23.402	52.377	2.896	999.933	17.612	17.613	3.899	552.067	13.268	24.033
0.997	495.433	22.821	46.063	2.994	999.933	17.429	17.430	3.997	503.367	12.822	25.473
1.095	543.833	22.223	40.863	viscosity at 1000 1/s (mPa s)				4.098	452.800	12.399	27.383
1.198	596.333	21.703	36.393					4.195	404.833	12.068	29.810
1.295	645.133	21.345	33.087	mean	18.441	4.297	354.100	11.558	32.640		
1.398	695.900	21.083	30.297	SD	1.533	4.398	303.500	11.061	36.443		
1.498	745.900	20.831	27.927					4.496	254.833	10.648	41.783
1.595	794.867	20.627	25.950					4.596	205.600	10.362	50.400
1.698	846.600	20.474	24.183					4.694	155.733	9.872	63.393
1.796	895.600	20.360	22.733					4.798	103.500	9.278	89.640
1.895	945.467	20.214	21.380					4.899	53.110	8.080	152.133
1.997	996.767	20.098	20.163					4.997	3.871	3.784	977.433

Table g38. Viscosity data of formulation 0.25Theo+5TP+1EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.720	1.162	25.413	2.096	999.300	5.058	5.061	3.096	953.667	4.888	5.126
0.196	95.747	1.342	14.017	2.200	999.000	5.086	5.091	3.200	902.467	4.668	5.172
0.298	147.867	1.570	10.618	2.298	999.000	5.100	5.105	3.298	853.967	4.472	5.236
0.397	197.333	1.811	9.179	2.395	999.000	5.106	5.111	3.395	803.700	4.210	5.238
0.496	246.800	2.014	8.159	2.500	999.133	5.071	5.076	3.500	750.733	4.080	5.435
0.595	295.733	2.196	7.426	2.597	999.000	5.096	5.101	3.598	701.900	3.802	5.416
0.697	346.333	2.351	6.790	2.695	999.133	5.095	5.100	3.696	654.233	3.642	5.567
0.797	396.800	2.616	6.593	2.797	999.133	5.106	5.110	3.794	604.967	3.447	5.698
0.895	444.700	2.761	6.208	2.897	999.133	5.121	5.125	3.899	551.767	3.214	5.825
0.996	495.300	2.912	5.879	2.994	999.000	5.102	5.107	3.997	503.367	3.066	6.091
1.099	546.800	3.130	5.723	viscosity at 1000 1/s (mPa s)				4.095	454.267	2.851	6.275
1.196	595.633	3.375	5.666					4.199	402.933	2.648	6.573
1.296	646.200	3.521	5.449	mean	5.099	4.297	353.800	2.449	6.921		
1.397	694.733	3.799	5.468	SD	0.240	4.395	304.667	2.233	7.329		
1.497	745.467	4.046	5.428					4.495	255.000	1.974	7.740
1.595	794.700	4.205	5.291					4.595	205.367	1.734	8.441
1.697	845.767	4.485	5.303					4.698	153.900	1.563	10.155
1.798	895.733	4.669	5.213					4.797	104.333	1.315	12.603
1.896	945.000	4.897	5.182					4.895	54.753	1.097	20.030
1.998	996.333	5.082	5.100					4.996	4.765	0.169	35.457

Table g39. Viscosity data of formulation 0.25Theo+5TP+2EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	46.070	3.390	73.577	2.096	999.267	16.042	16.053	3.096	953.400	15.254	16.000
0.194	94.750	6.548	69.107	2.197	999.133	15.989	16.003	3.198	902.633	14.830	16.430
0.299	147.900	7.694	52.023	2.297	999.000	15.954	15.970	3.298	851.633	14.432	16.947
0.398	197.567	8.226	41.637	2.396	999.000	15.884	15.900	3.396	802.067	14.017	17.477
0.497	247.367	8.798	35.567	2.495	999.000	15.844	15.860	3.494	753.800	13.614	18.060
0.596	296.300	9.319	31.450	2.599	998.800	15.838	15.857	3.599	701.933	13.171	18.763
0.694	344.700	9.880	28.663	2.697	998.833	15.745	15.763	3.697	653.933	12.750	19.497
0.799	397.067	10.410	26.217	2.795	999.133	15.730	15.743	3.796	604.833	12.335	20.393
0.897	445.167	10.921	24.533	2.900	999.567	15.687	15.693	3.900	551.467	11.897	21.573
0.995	494.567	11.373	22.997	2.998	999.133	15.620	15.633	3.998	502.633	11.396	22.673
1.097	546.033	11.862	21.723					4.096	453.200	10.961	24.187
1.197	596.333	12.368	20.740	viscosity at 1000 1/s (mPa s)				4.195	405.100	10.531	25.997
1.295	646.333	12.903	19.963	mean	15.848			4.299	353.067	9.989	28.293
1.394	692.967	13.337	19.247	SD	0.802			4.397	304.100	9.526	31.327
1.499	744.867	13.852	18.597					4.495	255.100	9.039	35.433
1.597	794.000	14.239	17.933					4.596	206.133	8.579	41.617
1.694	842.233	14.728	17.487					4.696	154.967	7.703	49.707
1.800	895.200	15.162	16.937					4.800	103.067	7.162	69.493
1.898	944.733	15.604	16.517					4.898	53.537	5.072	94.743
1.996	995.000	15.950	16.030					4.997	4.076	0.748	183.467

Table g40. Viscosity data of formulation 0.50Theo+5TP+2EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	46.480	2.975	64.013	2.096	1000.000	10.576	10.576	3.096	954.233	9.968	10.446
0.194	95.407	5.517	57.827	2.200	1000.000	10.523	10.523	3.200	902.933	9.611	10.645
0.297	147.100	5.877	39.953	2.298	1000.000	10.561	10.561	3.298	853.700	9.330	10.929
0.398	198.033	6.255	31.587	2.395	1000.000	10.473	10.473	3.396	804.667	9.009	11.196
0.497	247.633	6.638	26.807	2.500	1000.000	10.517	10.517	3.494	755.433	8.704	11.522
0.597	296.900	6.935	23.357	2.598	1000.000	10.388	10.388	3.600	703.233	8.305	11.810
0.695	345.700	7.097	20.530	2.696	1000.000	10.360	10.360	3.698	653.633	7.931	12.133
0.797	397.067	7.505	18.900	2.794	1000.000	10.532	10.532	3.796	604.533	7.736	12.797
0.897	446.633	7.591	16.997	2.899	999.967	10.485	10.485	3.898	553.067	7.413	13.403
0.995	495.033	7.851	15.860	2.997	999.967	10.327	10.328	3.998	502.767	7.057	14.037
1.093	544.133	8.048	14.790					4.097	454.533	6.632	14.590
1.198	596.633	8.234	13.800	viscosity at 1000 1/s (mPa s)				4.195	405.733	6.396	15.763
1.296	646.333	8.639	13.367	mean	10.474			4.299	353.233	6.233	17.647
1.394	695.333	8.845	12.720	SD	1.439			4.398	304.100	5.717	18.800
1.497	746.633	9.094	12.180					4.496	255.267	5.444	21.327
1.597	796.633	9.374	11.767					4.595	205.833	5.259	25.550
1.695	846.067	9.606	11.354					4.696	154.767	4.660	30.107
1.798	897.500	10.016	11.160					4.798	104.033	4.465	42.923
1.899	947.633	10.431	11.007					4.896	54.410	3.754	69.003
1.997	996.600	10.587	10.623					4.997	3.856	0.941	244.067

Table g41. Viscosity data of formulation 0.75Theo+5TP+2EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)				
0.097	46.203	2.444	52.890	2.096	1000.000	11.060	11.060	3.097	954.500	13.328	13.963				
0.197	96.393	3.273	33.953	2.199	1000.000	11.580	11.580	3.200	902.633	13.064	14.473				
0.297	147.033	2.854	19.410	2.297	1000.000	12.063	12.063	3.298	853.967	12.761	14.943				
0.396	196.833	2.944	14.957	2.395	1000.000	12.447	12.447	3.395	804.833	12.523	15.560				
0.497	247.500	3.150	12.727	2.499	999.967	12.780	12.780	3.496	754.667	12.228	16.203				
0.596	296.500	3.303	11.140	2.597	1000.000	12.963	12.963	3.599	703.233	11.894	16.913				
0.697	346.033	3.336	9.641	2.695	999.933	13.142	13.143	3.697	653.800	11.622	17.777				
0.797	396.933	3.481	8.769	2.797	1000.000	13.293	13.293	3.795	604.533	11.273	18.647				
0.897	446.633	3.768	8.437	2.897	1000.000	13.423	13.423	3.900	551.767	10.910	19.773				
0.997	496.033	3.919	7.902	2.995	1000.000	13.513	13.513	3.997	502.933	10.506	20.890				
1.098	545.900	4.144	7.591	viscosity at 1000 1/s (mPa s)				4.095	454.400	10.204	22.457				
1.196	594.867	4.484	7.538	mean	12.627						4.196	405.300	9.804	24.190	
1.298	646.733	4.809	7.435	SD	0.973							4.298	354.133	9.370	26.460
1.398	696.800	5.173	7.423									4.396	304.833	8.992	29.497
1.496	745.900	5.665	7.595									4.494	255.567	8.519	33.333
1.596	796.000	6.277	7.885									4.596	205.333	8.121	39.550
1.699	847.500	7.106	8.385									4.697	154.700	7.691	49.717
1.797	896.300	8.034	8.963									4.798	103.967	6.993	67.267
1.895	945.167	9.083	9.610									4.897	54.470	6.567	120.567
1.997	996.667	10.264	10.298									4.997	3.607	3.425	949.500

Table g42. Viscosity data of formulation 0.5Ibu+5TP+3P407 after autoclaving (batch 1).

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)				
0.097	46.113	0.056	1.210	2.097	1000.000	0.938	0.938	3.096	954.233	0.822	0.861				
0.196	96.013	0.047	0.485	2.200	1000.333	0.912	0.912	3.200	902.900	0.752	0.833				
0.298	147.800	0.137	0.929	2.297	1000.000	0.902	0.902	3.297	854.233	0.691	0.809				
0.396	196.767	0.207	1.052	2.394	1000.000	0.964	0.964	3.394	805.733	0.575	0.714				
0.498	248.100	0.224	0.904	2.498	1000.000	0.921	0.921	3.498	753.533	0.509	0.675				
0.597	297.067	0.291	0.980	2.595	1000.000	0.929	0.929	3.595	704.567	0.510	0.724				
0.697	347.033	0.342	0.986	2.699	1000.000	0.938	0.938	3.697	653.967	0.404	0.618				
0.795	395.167	0.387	0.979	2.797	1000.000	0.934	0.934	3.796	604.533	0.349	0.577				
0.898	447.533	0.393	0.878	2.894	1000.000	0.956	0.956	3.894	554.833	0.234	0.422				
0.996	495.333	0.404	0.816	2.998	1000.333	1.004	1.004	3.998	502.500	0.197	0.392				
1.098	546.933	0.431	0.788	viscosity at 1000 1/s (mPa s)				4.096	454.267	0.110	0.243				
1.197	596.333	0.520	0.872	mean	0.940						4.197	404.100	0.071	0.177	
1.297	646.467	0.584	0.903	SD	0.056							4.297	354.700	0.015	0.044
1.397	696.367	0.567	0.814									4.394	305.900	0.000	0.000
1.496	745.900	0.651	0.872									4.498	253.667	0.000	0.000
1.598	797.333	0.722	0.906									4.597	204.433	0.000	0.000
1.697	847.200	0.790	0.932									4.695	155.267	0.000	0.000
1.795	896.033	0.861	0.961									4.800	102.400	0.000	0.000
1.897	946.500	0.939	0.992									4.898	53.287	0.000	0.000
1.996	996.767	1.024	1.027									4.996	4.472	0.000	0.000

Table g43. Viscosity data of formulation 0.5Ibu+5TP+3P407 after autoclaving (batch 2).

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	
0.098	46.113	0.005	0.103	2.097	999.800	1.205	1.205	3.097	954.100	0.987	1.035	
0.195	95.043	0.042	0.446	2.198	999.767	1.159	1.159	3.200	902.633	0.916	1.015	
0.297	146.900	0.074	0.503	2.298	999.967	1.158	1.158	3.298	853.667	0.878	1.028	
0.398	197.500	0.151	0.763	2.395	999.967	1.131	1.131	3.395	804.667	0.754	0.937	
0.496	247.100	0.211	0.853	2.499	999.967	1.169	1.169	3.498	753.233	0.629	0.835	
0.596	296.033	0.274	0.924	2.597	999.767	1.165	1.165	3.598	703.233	0.611	0.869	
0.696	345.600	0.293	0.847	2.695	1000.000	1.166	1.166	3.696	654.233	0.501	0.766	
0.798	397.067	0.415	1.045	2.797	1000.000	1.141	1.141	3.797	602.933	0.379	0.629	
0.898	446.467	0.464	1.039	2.897	999.967	1.115	1.115	3.897	552.633	0.324	0.586	
0.996	494.867	0.538	1.088	2.997	999.800	1.151	1.151	3.995	504.067	0.287	0.569	
1.098	546.333	0.551	1.009					4.098	452.800	0.206	0.455	
1.197	596.333	0.563	0.944					4.195	404.700	0.152	0.375	
1.295	645.600	0.626	0.970					4.298	353.500	0.062	0.175	
1.395	695.300	0.749	1.078					4.398	303.800	0.003	0.010	
1.498	746.033	0.811	1.087					4.496	254.700	0.000	0.000	
1.598	796.900	0.853	1.070					4.596	205.633	0.000	0.000	
1.695	845.467	0.994	1.175					4.696	154.933	0.000	0.000	
1.797	896.500	1.067	1.190					4.797	103.933	0.000	0.000	
1.897	946.467	1.155	1.221					4.898	53.093	0.000	0.000	
1.995	995.133	1.247	1.253					4.996	4.208	0.000	0.000	
				viscosity at 1000 1/s (mPa s)								
				mean 1.156								
				SD 0.045								

Table g44. Viscosity data of formulation 0.5Ibu+5TP+3P407 after autoclaving (batch 3).

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	
0.097	45.853	0.000	0.000	2.096	999.967	1.216	1.216	3.096	954.233	1.112	1.165	
0.194	94.870	0.051	0.542	2.197	999.967	1.145	1.145	3.200	902.767	0.951	1.053	
0.299	147.800	0.043	0.288	2.297	999.967	1.231	1.231	3.298	853.500	0.854	1.001	
0.398	197.567	0.130	0.656	2.395	999.767	1.196	1.197	3.395	804.100	0.719	0.894	
0.497	247.100	0.250	1.013	2.497	999.933	1.146	1.146	3.496	754.567	0.695	0.921	
0.596	296.167	0.298	1.005	2.598	999.967	1.191	1.191	3.599	702.500	0.587	0.835	
0.694	345.167	0.290	0.840	2.696	1000.000	1.222	1.222	3.697	653.833	0.552	0.844	
0.799	397.967	0.371	0.933	2.798	999.933	1.185	1.185	3.795	604.400	0.464	0.768	
0.897	445.600	0.361	0.809	2.898	1000.000	1.175	1.175	3.899	551.933	0.349	0.632	
0.995	494.900	0.486	0.983	2.996	1000.000	1.229	1.229	3.997	502.800	0.217	0.431	
1.099	547.367	0.511	0.934					4.095	454.000	0.217	0.477	
1.197	596.467	0.675	1.131					4.194	406.300	0.112	0.276	
1.295	645.600	0.770	1.193					4.298	353.367	0.080	0.227	
1.393	694.400	0.780	1.123					4.396	304.967	0.019	0.063	
1.499	746.900	0.804	1.077					4.494	255.600	0.000	0.000	
1.597	795.567	0.938	1.179					4.595	206.033	0.000	0.000	
1.694	845.300	1.052	1.244					4.700	152.900	0.000	0.000	
1.799	897.533	1.126	1.255					4.799	103.633	0.000	0.000	
1.897	946.167	1.224	1.294					4.897	53.713	0.000	0.000	
1.995	995.467	1.259	1.264					4.996	4.472	0.000	0.000	
				viscosity at 1000 1/s (mPa s)								
				mean 1.194								
				SD 0.062								

Table g45. Viscosity data of formulation 0.5Ibu+5TP+3P407 after autoclaving (batch 4).

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.570	0.019	0.424
0.193	94.560	0.011	0.112
0.298	147.700	0.106	0.720
0.397	196.933	0.159	0.810
0.495	246.267	0.192	0.781
0.594	295.600	0.251	0.850
0.699	347.367	0.288	0.829
0.797	397.067	0.368	0.928
0.895	445.200	0.468	1.051
1.000	497.067	0.501	1.007
1.098	546.500	0.596	1.090
1.196	595.767	0.609	1.022
1.295	645.733	0.645	0.999
1.399	696.800	0.749	1.075
1.497	746.033	0.912	1.223
1.595	795.267	0.917	1.153
1.699	847.500	1.047	1.235
1.797	896.467	1.139	1.270
1.895	944.900	1.170	1.239
1.997	996.633	1.333	1.338

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
2.096	999.967	1.250	1.250
2.200	1000.000	1.296	1.296
2.298	1000.000	1.245	1.245
2.395	999.967	1.243	1.243
2.500	999.967	1.192	1.192
2.597	999.967	1.272	1.272
2.695	1000.000	1.224	1.224
2.799	1000.000	1.248	1.248
2.897	999.967	1.251	1.251
2.994	999.967	1.236	1.236

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
3.097	954.233	1.133	1.187
3.198	903.933	0.992	1.097
3.298	853.833	0.910	1.065
3.395	804.100	0.838	1.042
3.495	754.533	0.768	1.017
3.599	702.933	0.646	0.919
3.697	654.267	0.599	0.916
3.795	604.833	0.547	0.905
3.899	552.367	0.459	0.831
3.997	503.200	0.370	0.736
4.095	454.267	0.229	0.504
4.197	403.933	0.203	0.503
4.297	353.667	0.129	0.364
4.395	304.967	0.065	0.212
4.493	256.167	0.019	0.076
4.595	205.300	0.000	0.000
4.698	153.800	0.000	0.000
4.796	103.633	0.000	0.000
4.895	54.603	0.000	0.000
4.995	4.780	0.000	0.000

viscosity at 1000 1/s (mPa s)

mean 1.246
SD 0.066

Table g46. Viscosity data of formulation 1.0Ibu+5TP+3P407 after autoclaving (batch 1).

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.096	45.557	0.162	3.564
0.198	96.710	0.203	2.099
0.298	147.633	0.261	1.768
0.396	196.933	0.229	1.163
0.494	246.100	0.322	1.308
0.594	295.600	0.408	1.380
0.699	347.500	0.404	1.163
0.796	396.067	0.465	1.174
0.894	444.867	0.367	0.826
0.999	496.200	0.506	1.019
1.097	546.167	0.539	0.987
1.195	595.033	0.629	1.058
1.299	647.767	0.675	1.042
1.397	696.333	0.782	1.123
1.495	745.467	0.809	1.085
1.599	797.633	0.875	1.097
1.697	846.633	0.985	1.163
1.794	895.900	1.028	1.148
1.899	947.500	1.101	1.162
1.997	996.767	1.197	1.201

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
2.096	1000.000	1.094	1.094
2.199	1000.333	1.120	1.120
2.297	1000.333	1.141	1.141
2.395	1000.000	1.144	1.144
2.499	1000.000	1.095	1.095
2.597	1000.000	1.095	1.095
2.694	1000.333	1.186	1.185
2.798	1000.000	1.198	1.198
2.896	1000.000	1.132	1.132
2.994	1000.000	1.233	1.233

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
3.096	954.367	0.993	1.041
3.199	903.233	0.934	1.034
3.297	854.300	0.845	0.989
3.395	804.967	0.797	0.990
3.499	753.233	0.719	0.955
3.597	704.433	0.625	0.887
3.695	655.133	0.520	0.794
3.800	602.767	0.468	0.776
3.897	553.233	0.363	0.655
3.995	504.233	0.346	0.686
4.097	453.067	0.246	0.544
4.197	404.133	0.277	0.686
4.295	355.000	0.177	0.498
4.398	304.100	0.096	0.314
4.498	254.267	0.000	0.000
4.597	204.367	0.000	0.000
4.695	155.367	0.000	0.000
4.798	103.333	0.000	0.000
4.899	53.093	0.000	0.000
4.997	3.812	0.000	0.000

viscosity at 1000 1/s (mPa s)

mean 1.144
SD 0.062

Table g47. Viscosity data of formulation 1.0Ibu+5TP+3P407 after autoclaving (batch 2).

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.453	0.000	0.000	2.096	999.967	1.188	1.188	3.097	954.100	1.013	1.062
0.196	95.717	0.028	0.296	2.200	999.967	1.133	1.133	3.198	903.967	0.900	0.996
0.299	147.633	0.075	0.511	2.298	1000.333	1.168	1.168	3.298	853.833	0.868	1.017
0.397	197.233	0.119	0.603	2.395	999.967	1.238	1.238	3.395	804.233	0.729	0.906
0.496	246.633	0.205	0.830	2.499	999.967	1.083	1.083	3.498	753.100	0.686	0.910
0.595	295.733	0.168	0.569	2.597	1000.000	1.220	1.220	3.598	702.800	0.615	0.875
0.695	345.433	0.276	0.798	2.695	1000.000	1.184	1.184	3.696	654.233	0.469	0.717
0.798	397.367	0.322	0.810	2.797	1000.000	1.104	1.104	3.794	605.133	0.354	0.585
0.896	445.467	0.344	0.772	2.896	999.800	1.214	1.214	3.899	552.067	0.294	0.532
0.996	495.000	0.397	0.802	2.994	999.933	1.131	1.131	3.997	503.233	0.290	0.576
1.099	546.933	0.492	0.900	viscosity at 1000 1/s (mPa s)				4.095	454.267	0.161	0.353
1.197	595.633	0.506	0.850					4.199	402.933	0.060	0.149
1.296	646.167	0.571	0.884	mean	1.166	4.297	353.967	0.018	0.052		
1.399	697.233	0.689	0.989	SD	0.081	4.395	305.133	0.000	0.000		
1.497	746.333	0.797	1.067								
1.595	795.267	0.797	1.003								
1.698	846.933	0.982	1.160								
1.798	897.100	0.981	1.094								
1.896	945.733	1.140	1.205								
1.996	995.900	1.174	1.178								
								4.493	256.333	0.000	0.000
								4.598	204.133	0.000	0.000
								4.698	153.933	0.000	0.000
								4.796	104.300	0.000	0.000
								4.895	54.843	0.000	0.000
								4.997	3.607	0.000	0.000

Table g48. Viscosity data of formulation 0.5Ibu+5TP+1EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.643	2.266	49.647	2.097	999.967	3.747	3.747	3.097	954.367	3.190	3.342
0.194	94.823	2.028	21.383	2.200	1000.000	4.120	4.120	3.193	906.333	3.031	3.345
0.299	147.767	1.792	12.127	2.298	1000.000	3.742	3.742	3.298	853.533	2.844	3.332
0.398	197.600	1.787	9.044	2.395	1000.000	3.694	3.694	3.396	804.500	2.725	3.387
0.497	247.367	1.804	7.292	2.493	1000.000	3.687	3.687	3.494	754.967	2.538	3.362
0.596	296.467	1.879	6.338	2.599	1000.000	3.666	3.666	3.600	702.633	2.267	3.226
0.694	345.433	1.841	5.330	2.697	1000.000	3.537	3.537	3.698	653.500	2.218	3.393
0.799	398.100	1.980	4.973	2.795	1000.000	3.458	3.458	3.796	604.400	2.055	3.400
0.897	446.033	2.125	4.763	2.899	1000.000	3.401	3.401	3.896	553.400	1.866	3.372
0.995	494.900	2.252	4.551	2.997	1000.000	3.424	3.424	3.999	502.500	1.727	3.438
1.097	546.167	2.444	4.475	viscosity at 1000 1/s (mPa s)				4.097	453.367	1.931	4.259
1.198	596.900	2.751	4.609					4.195	405.267	1.478	3.647
1.296	646.000	2.742	4.245	mean	3.648	4.300	352.933	1.242	3.520		
1.394	695.333	2.909	4.183	SD	0.384	4.398	303.833	1.068	3.516		
1.499	747.500	3.123	4.178								
1.597	796.300	3.227	4.053								
1.695	845.767	3.405	4.026								
1.798	896.933	3.604	4.018								
1.899	947.367	3.777	3.987								
1.996	996.467	3.824	3.838								
								4.496	254.833	0.963	3.778
								4.597	205.067	0.746	3.636
								4.694	155.667	0.663	4.260
								4.798	103.267	0.363	3.518
								4.899	52.863	0.261	4.929
								4.997	3.226	0.000	0.000

Table g49. Viscosity data of formulation 1.0Ibu+5TP+1EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	46.307	3.721	80.357	2.097	1000.000	7.633	7.633	3.097	954.100	7.089	7.430
0.194	95.263	3.829	40.193	2.200	999.967	7.581	7.581	3.193	906.200	6.855	7.564
0.298	146.867	3.680	25.060	2.298	1000.000	7.511	7.511	3.298	853.800	6.594	7.723
0.398	198.000	3.649	18.430	2.395	1000.000	7.503	7.503	3.396	804.833	6.401	7.954
0.498	247.333	3.720	15.040	2.495	1000.000	7.494	7.494	3.494	754.967	6.181	8.188
0.597	296.900	3.897	13.127	2.599	1000.000	7.463	7.463	3.600	702.767	5.938	8.449
0.695	345.700	4.139	11.973	2.697	1000.000	7.483	7.483	3.698	653.800	5.653	8.647
0.796	396.033	4.446	11.227	2.795	1000.000	7.417	7.417	3.796	604.567	5.500	9.098
0.898	446.467	4.577	10.253	2.899	1000.000	7.416	7.416	3.895	553.833	5.171	9.337
0.996	494.900	4.998	10.100	2.997	999.967	7.344	7.344	3.999	502.333	5.033	10.020
1.094	544.600	5.221	9.587	viscosity at 1000 1/s (mPa s)				4.097	453.700	4.716	10.394
1.197	595.600	5.650	9.486					4.195	405.133	4.467	11.027
1.297	646.767	6.029	9.321	mean	7.485	4.300	353.067	4.360	12.350		
1.395	695.600	6.237	8.966	SD	0.613	4.398	303.667	4.124	13.580		
1.497	746.633	6.503	8.709					4.496	255.100	3.866	15.153
1.597	797.100	6.754	8.474					4.596	205.267	3.525	17.173
1.695	846.200	7.041	8.321					4.694	155.633	3.254	20.907
1.798	897.633	7.377	8.219					4.796	104.467	3.047	29.163
1.899	947.633	7.572	7.990					4.900	52.713	2.706	51.343
1.997	996.600	7.740	7.766					4.997	3.123	1.035	331.433

Table g50. Viscosity data of formulation 1.5Ibu+5TP+1EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	46.290	4.450	96.137	2.096	1000.000	9.123	9.123	3.097	954.367	8.593	9.004
0.194	95.290	4.546	47.707	2.200	1000.000	9.098	9.098	3.198	903.667	8.037	8.893
0.293	144.700	4.632	32.010	2.298	1000.000	9.175	9.175	3.298	853.800	8.066	9.447
0.399	198.267	4.676	23.587	2.395	1000.000	9.087	9.087	3.396	804.667	7.791	9.682
0.498	247.400	4.768	19.273	2.500	1000.000	9.134	9.134	3.494	755.400	7.588	10.045
0.598	296.900	4.995	16.823	2.598	1000.000	9.061	9.061	3.599	702.933	7.225	10.279
0.696	345.867	5.279	15.263	2.696	1000.000	9.043	9.043	3.697	654.367	6.921	10.577
0.794	394.900	5.643	14.290	3.128	1000.000	8.969	8.969	3.795	604.533	6.793	11.237
0.898	446.800	5.816	13.017	2.899	1000.000	8.888	8.888	3.898	552.800	6.466	11.697
0.996	494.900	6.221	12.570	2.997	1000.000	8.881	8.881	3.998	502.800	6.295	12.520
1.094	544.567	6.448	11.840	viscosity at 1000 1/s (mPa s)				4.096	454.000	6.070	13.370
1.197	596.200	6.823	11.443					4.194	406.033	5.789	14.257
1.297	646.467	7.132	11.033	mean	9.046	4.298	353.700	5.452	15.413		
1.395	695.467	7.470	10.741	SD	0.555	4.397	304.700	5.185	17.017		
1.497	747.200	7.795	10.432					4.495	255.700	4.896	19.147
1.598	797.367	8.123	10.187					4.595	205.700	4.676	22.730
1.696	846.200	8.454	9.990					4.696	154.933	4.385	28.300
1.794	895.600	8.718	9.734					4.797	103.667	4.130	39.843
1.899	948.067	8.969	9.460					4.899	53.093	2.854	53.750
1.997	997.067	9.196	9.223					4.997	3.226	1.340	415.500

Table g51. Viscosity data of formulation 0.5Ibu+5TP+2EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.893	2.567	55.923	2.096	999.800	6.451	6.453	3.097	954.400	6.066	6.356
0.194	94.663	3.472	36.677	2.200	999.967	6.408	6.408	3.198	903.800	5.825	6.445
0.299	147.833	3.442	23.283	2.298	1000.000	6.443	6.443	3.298	853.667	5.616	6.579
0.398	197.633	3.470	17.557	2.395	999.967	6.378	6.378	3.395	804.367	5.398	6.710
0.496	247.133	3.652	14.777	2.500	1000.000	6.346	6.346	3.495	754.400	5.200	6.893
0.596	296.033	3.785	12.787	2.598	999.967	6.395	6.395	3.599	702.500	4.926	7.013
0.694	344.400	3.863	11.217	2.695	999.933	6.341	6.341	3.696	653.967	4.735	7.240
0.799	397.700	4.194	10.546	2.797	1000.000	6.295	6.295	3.795	604.533	4.580	7.576
0.896	445.867	4.332	9.715	2.897	999.933	6.324	6.324	3.899	551.633	4.258	7.719
0.994	494.800	4.575	9.245	2.995	999.967	6.372	6.372	3.998	502.767	4.183	8.319
1.099	546.467	4.740	8.673					4.096	454.000	3.932	8.660
1.197	595.333	4.969	8.346					4.196	405.133	3.672	9.063
1.295	645.300	5.206	8.068	viscosity	at 1000	1/s	(mPa s)	4.298	353.533	3.560	10.070
1.400	697.533	5.443	7.804		mean	6.376		4.396	304.533	3.370	11.067
1.498	746.467	5.580	7.475		SD	0.072		4.494	255.900	3.145	12.290
1.596	795.700	5.743	7.217					4.596	205.100	2.854	13.913
1.698	847.067	5.969	7.047					4.699	153.633	2.714	17.663
1.798	897.067	6.135	6.839					4.797	103.867	2.329	22.427
1.896	945.867	6.365	6.730					4.896	54.210	2.151	39.683
1.994	994.733	6.489	6.523					4.995	5.103	1.529	299.667

Table g52. Viscosity data of formulation 1.0Ibu+5TP+2EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.707	9.385	205.333	2.095	1000.000	18.190	18.190	3.096	954.667	17.696	18.537
0.193	94.663	11.041	116.633	2.198	1000.000	18.187	18.187	3.199	903.233	17.405	19.270
0.298	147.733	12.170	82.380	2.295	1000.000	18.200	18.200	3.296	854.667	17.159	20.077
0.397	196.933	12.906	65.533	2.397	1000.000	18.220	18.220	3.398	803.333	16.857	20.983
0.495	246.633	13.636	55.287	2.496	1000.000	18.100	18.100	3.499	753.233	16.589	22.023
0.594	295.600	14.341	48.513	2.599	999.967	18.113	18.113	3.599	702.933	16.313	23.207
0.699	347.500	14.940	42.993	2.697	1000.000	18.023	18.023	3.697	653.633	15.986	24.457
0.797	397.067	15.482	38.990	2.795	999.967	18.046	18.047	3.795	604.267	15.822	26.183
0.894	444.700	15.931	35.823	2.897	999.967	18.013	18.013	3.897	552.667	15.447	27.950
1.000	496.333	16.171	32.580	2.994	999.967	18.093	18.093	3.998	502.767	15.091	30.017
1.097	545.467	16.428	30.117					4.096	453.800	14.705	32.403
1.196	594.867	16.696	28.067	viscosity	at 1000	1/s	(mPa s)	4.198	403.800	14.650	36.280
1.299	647.467	16.901	26.103		mean	18.119		4.298	353.667	14.076	39.800
1.396	695.767	17.095	24.570		SD	0.806		4.396	304.533	13.743	45.127
1.496	745.900	17.357	23.270					4.494	255.900	13.351	52.173
1.596	795.900	17.542	22.040					4.598	203.967	12.572	61.637
1.697	847.067	17.746	20.950					4.696	154.633	11.922	77.100
1.798	897.100	17.903	19.957					4.797	103.767	11.086	106.833
1.895	945.733	18.127	19.167					4.896	54.490	9.340	171.400
1.997	996.800	18.414	18.473					4.996	4.267	4.333	1015.533

Table g53. Viscosity data of formulation 1.5Ibu+5TP+2EL after autoclaving.

t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)	t (min)	D (1/s)	Tau (Pa)	Eta (mPa s)
0.097	45.733	11.755	257.033	2.096	999.967	21.753	21.753	3.096	954.833	21.035	22.030
0.194	94.737	15.069	159.067	2.199	999.967	21.689	21.690	3.199	902.900	20.764	22.997
0.298	147.500	16.137	109.400	2.297	1000.000	21.640	21.640	3.296	854.833	20.462	23.937
0.398	197.200	17.225	87.347	2.394	999.800	21.562	21.567	3.394	805.567	20.185	25.057
0.496	247.333	18.430	74.517	2.498	1000.333	21.564	21.557	3.498	753.500	19.855	26.350
0.598	297.067	19.062	64.167	2.595	1000.000	21.590	21.590	3.595	704.700	19.555	27.750
0.697	347.067	19.575	56.400	2.699	1000.000	21.540	21.540	3.699	652.467	19.228	29.470
0.795	395.767	19.770	49.953	2.796	1000.000	21.500	21.500	3.796	603.667	19.005	31.483
0.897	445.733	19.902	44.650	2.896	999.967	21.369	21.370	3.894	554.300	18.610	33.573
0.997	495.333	20.157	40.693	2.999	1000.000	21.483	21.483	3.999	502.200	18.426	36.690
1.096	545.300	20.272	37.177	viscosity at 1000 1/s (mPa s)				4.096	453.833	18.010	39.683
1.196	595.300	20.423	34.307					mean	21.569	4.194	406.200
1.296	645.733	20.610	31.917	SD	0.483	4.297	354.133	17.403	49.143		
1.398	696.800	20.811	29.867			4.396	304.700	17.156	56.303		
1.497	746.767	21.002	28.123			4.496	254.867	16.712	65.570		
1.595	795.767	21.181	26.617			4.597	204.900	16.229	79.207		
1.697	846.633	21.324	25.187			4.695	155.233	15.690	101.077		
1.797	896.767	21.534	24.013			4.797	104.300	14.877	142.633		
1.896	945.900	21.652	22.890			4.896	54.560	12.967	237.667		
1.996	996.167	21.876	21.960			4.998	2.727	5.469	2005.333		

APPENDIX H

Drug release from SLN

Table h1. Diltiazem HCl release from saturated solution (480.30 mg/ml).

time (hr)	%drug release from 480.30 mg/ml diltiazem HCl solution					
	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	0.81	0.83	0.81	0.82	0.013	1.60
0.67	1.72	1.72	1.75	1.73	0.016	0.94
1.00	2.70	2.63	2.72	2.68	0.047	1.76
1.50	4.14	4.07	4.21	4.14	0.071	1.71
2.00	5.59	5.47	5.65	5.57	0.092	1.65
3.00	8.52	8.26	8.68	8.49	0.207	2.44
4.00	11.36	11.01	11.54	11.31	0.273	2.41
6.00	16.96	16.21	16.96	16.71	0.435	2.60
8.00	22.05	21.01	21.95	21.67	0.574	2.65
10.00	26.72	25.56	26.75	26.34	0.680	2.58
12.00	31.17	29.81	31.06	30.68	0.755	2.46
16.00	39.39	37.72	39.13	38.75	0.897	2.32
20.00	46.61	44.70	45.79	45.70	0.958	2.10
24.00	53.13	50.76	51.48	51.79	1.216	2.35

Table h2. Diltiazem HCl release from formulation 0.5Dil+5TP+3P407.

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	5.29	5.18	5.77	5.41	0.313	5.79	5.13	4.81	5.04	4.99	0.168	3.36
0.67	10.15	9.99	10.90	10.34	0.486	4.70	9.32	9.31	9.29	9.31	0.015	0.16
1.00	14.64	14.49	15.90	15.01	0.776	5.17	13.39	13.52	13.58	13.50	0.096	0.71
1.50	21.29	20.74	22.79	21.61	1.062	4.92	18.79	19.64	19.02	19.15	0.441	2.30
2.00	28.20	27.01	29.87	28.36	1.439	5.07	24.20	25.09	24.21	24.50	0.510	2.08
3.00	40.00	38.99	42.78	40.59	1.961	4.83	35.20	35.71	34.80	35.23	0.458	1.30
4.00	49.95	49.20	52.79	50.64	1.894	3.74	45.52	45.31	45.00	45.28	0.266	0.59
6.00	62.95	63.12	66.11	64.06	1.777	2.77	60.52	59.94	60.44	60.30	0.316	0.52
8.00	71.21	71.73	73.82	72.25	1.382	1.91	70.99	70.15	70.74	70.63	0.431	0.61
10.00	76.33	77.37	78.48	77.39	1.078	1.39	77.89	77.25	77.69	77.61	0.331	0.43
12.00	79.42	80.96	81.31	80.56	1.006	1.25	82.68	82.16	82.55	82.47	0.271	0.33
16.00	82.14	83.17	83.50	82.94	0.709	0.86	86.44	86.24	86.49	86.39	0.134	0.16
20.00	83.23	84.67	84.34	84.08	0.753	0.90	89.73	89.73	89.74	89.73	0.006	0.01
24.00	83.71	85.34	84.73	84.59	0.825	0.98	92.32	92.55	91.98	92.28	0.286	0.31

Table h3. Diltiazem HCl release from formulation 1.0Dil+5TP+3P407.

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	5.04	4.98	5.17	5.06	0.097	1.91	4.58	4.88	5.29	4.92	0.358	7.27
0.67	10.06	9.63	10.00	9.90	0.234	2.36	8.86	9.08	10.01	9.32	0.609	6.53
1.00	14.92	13.87	14.55	14.45	0.535	3.70	12.67	12.95	14.37	13.33	0.909	6.82
1.50	21.85	20.41	20.67	20.98	0.771	3.67	18.18	18.44	20.86	19.16	1.477	7.71
2.00	28.70	26.79	27.16	27.55	1.013	3.68	23.41	23.82	27.01	24.74	1.970	7.96
3.00	40.48	38.55	39.21	39.41	0.980	2.49	33.79	34.69	39.15	35.88	2.867	7.99
4.00	49.88	48.04	48.92	48.95	0.922	1.88	43.08	44.54	48.94	45.52	3.047	6.69
6.00	62.80	61.51	62.52	62.28	0.676	1.09	57.55	59.48	63.52	60.18	3.044	5.06
8.00	71.08	70.20	70.96	70.75	0.475	0.67	67.64	69.36	72.97	69.99	2.723	3.89
10.00	76.16	75.71	76.31	76.06	0.311	0.41	74.83	76.15	79.36	76.78	2.331	3.04
12.00	79.41	80.17	80.29	79.96	0.474	0.59	79.80	81.02	83.69	81.50	1.992	2.44
16.00	82.41	83.32	83.31	83.02	0.523	0.63	84.40	85.49	87.65	85.85	1.655	1.93
20.00	83.64	84.61	84.38	84.21	0.505	0.60	88.22	88.53	90.23	88.99	1.084	1.22
24.00	84.18	85.31	84.94	84.81	0.580	0.68	92.15	92.11	92.82	92.36	0.399	0.43

Table h4. Diltiazem HCl release from formulation 1.5Dil+5TP+3P407.

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	4.97	5.37	5.13	5.16	0.200	3.87	4.80	5.30	5.05	5.05	0.247	4.89
0.67	9.72	10.30	10.13	10.05	0.297	2.95	9.15	10.20	9.61	9.66	0.529	5.48
1.00	14.20	15.00	14.63	14.61	0.405	2.77	13.26	14.70	13.96	13.97	0.719	5.15
1.50	20.91	21.65	21.26	21.27	0.368	1.73	19.46	21.50	20.46	20.47	1.021	4.99
2.00	27.47	28.12	27.98	27.86	0.344	1.24	25.54	28.14	26.82	26.83	1.298	4.84
3.00	38.86	40.59	39.82	39.76	0.864	2.17	37.02	40.12	38.29	38.47	1.560	4.05
4.00	48.17	50.11	49.10	49.13	0.968	1.97	46.60	49.90	48.38	48.29	1.651	3.42
6.00	61.50	63.94	62.15	62.53	1.264	2.02	61.00	64.11	62.07	62.39	1.581	2.53
8.00	69.92	72.42	70.50	70.95	1.306	1.84	70.99	73.61	71.79	72.13	1.339	1.86
10.00	75.39	77.68	75.82	76.29	1.215	1.59	77.64	80.01	78.41	78.68	1.209	1.54
12.00	78.81	80.77	79.46	79.68	0.999	1.25	82.37	84.32	83.03	83.24	0.992	1.19
16.00	82.21	83.83	82.70	82.91	0.833	1.01	87.88	89.49	88.55	88.64	0.809	0.91
20.00	83.62	84.81	83.56	84.00	0.704	0.84	90.90	92.03	91.46	91.46	0.563	0.62
24.00	84.20	85.28	84.12	84.54	0.647	0.77	92.35	93.38	92.99	92.91	0.519	0.56

Table h5. Diltiazem HCl release from formulation 0.5Dil+5TP+3P407 (pH7)
(batch 1).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	2.98	2.84	2.84	2.89	0.083	2.88	2.70	2.41	2.47	2.53	0.150	5.95
0.67	5.91	5.38	5.65	5.64	0.267	4.72	5.44	4.99	5.15	5.19	0.227	4.37
1.00	8.71	8.04	8.36	8.37	0.336	4.02	8.20	7.63	7.53	7.79	0.358	4.60
1.50	12.63	11.76	12.16	12.18	0.435	3.57	12.19	11.40	11.18	11.59	0.532	4.59
2.00	16.24	15.19	15.66	15.70	0.525	3.34	16.06	14.87	14.65	15.19	0.759	5.00
3.00	22.39	21.09	21.63	21.70	0.653	3.01	23.15	21.39	20.98	21.84	1.155	5.29
4.00	27.38	25.74	26.50	26.54	0.822	3.10	29.20	27.36	26.65	27.74	1.315	4.74
6.00	34.29	32.45	33.49	33.41	0.923	2.76	38.84	36.61	35.85	37.10	1.554	4.19
8.00	38.74	36.99	38.05	37.93	0.878	2.32	46.42	44.14	43.78	44.78	1.430	3.19
10.00	41.45	39.91	40.90	40.75	0.777	1.91	53.21	50.34	49.48	51.01	1.955	3.83
12.00	43.25	41.86	42.83	42.65	0.711	1.67	58.39	55.82	55.29	56.50	1.657	2.93
16.00	45.21	43.97	44.92	44.70	0.652	1.46	66.25	64.11	63.81	64.72	1.329	2.05
20.00	46.11	44.94	46.00	45.68	0.646	1.41	72.15	70.24	69.73	70.71	1.273	1.80
24.00	46.52	45.39	46.51	46.14	0.650	1.41	76.90	75.26	74.54	75.57	1.211	1.60

Table h6. Diltiazem HCl release from formulation 0.5Dil+5TP+3P407 (pH7)
(batch 2).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	2.54	2.89	2.85	2.76	0.193	6.99	2.38	2.44	2.59	2.47	0.110	4.45
0.67	5.33	5.96	5.86	5.72	0.339	5.93	4.86	4.94	5.29	5.03	0.230	4.56
1.00	7.98	8.82	8.68	8.49	0.449	5.28	7.33	7.45	7.99	7.59	0.355	4.68
1.50	11.59	12.70	12.65	12.31	0.629	5.11	10.88	11.18	11.88	11.31	0.515	4.55
2.00	14.91	16.23	16.22	15.79	0.757	4.79	14.32	14.73	15.63	14.89	0.668	4.49
3.00	21.12	22.63	22.34	22.03	0.800	3.63	20.87	21.36	22.45	21.56	0.810	3.76
4.00	25.92	27.91	27.30	27.04	1.018	3.77	26.45	27.21	28.28	27.31	0.919	3.37
6.00	33.33	34.96	34.15	34.15	0.815	2.39	35.52	36.42	37.54	36.49	1.012	2.77
8.00	37.67	39.12	38.40	38.40	0.728	1.90	42.66	43.86	44.90	43.81	1.121	2.56
10.00	40.64	41.89	41.24	41.25	0.624	1.51	48.44	49.78	50.97	49.73	1.266	2.55
12.00	42.67	43.69	43.18	43.18	0.511	1.18	53.37	54.62	55.89	54.63	1.262	2.31
16.00	44.85	45.55	45.01	45.13	0.369	0.82	60.96	62.34	63.59	62.30	1.313	2.11
20.00	45.93	46.34	45.82	46.03	0.275	0.60	66.72	67.96	69.25	67.98	1.267	1.86
24.00	46.48	46.77	46.21	46.49	0.284	0.61	71.29	72.43	73.71	72.48	1.211	1.67

Table h7. Diltiazem HCl release from formulation 0.5Dil+5TP+3P407 (pH7)
(batch 3).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	2.97	3.01	2.68	2.89	0.179	6.21	2.67	2.67	2.45	2.60	0.125	4.82
0.67	5.96	6.20	5.52	5.90	0.350	5.93	5.46	5.46	4.95	5.29	0.293	5.54
1.00	8.84	9.05	8.13	8.67	0.480	5.53	8.27	8.24	7.46	7.99	0.457	5.71
1.50	12.86	12.90	11.72	12.49	0.673	5.39	12.22	12.11	11.07	11.80	0.636	5.39
2.00	16.50	16.51	15.12	16.04	0.800	4.98	16.01	15.85	14.50	15.45	0.828	5.36
3.00	22.60	22.90	21.07	22.19	0.983	4.43	22.93	22.93	20.89	22.25	1.179	5.30
4.00	27.42	27.86	25.94	27.07	1.005	3.71	28.92	29.02	26.41	28.12	1.478	5.26
6.00	33.91	34.45	32.62	33.66	0.940	2.79	38.43	38.56	35.54	37.51	1.708	4.55
8.00	38.12	38.47	36.84	37.81	0.857	2.27	45.90	46.08	42.80	44.93	1.846	4.11
10.00	40.59	40.99	39.69	40.42	0.664	1.64	51.95	52.17	48.52	50.88	2.048	4.02
12.00	42.34	42.58	41.60	42.17	0.512	1.21	56.99	57.11	53.79	55.97	1.883	3.37
16.00	43.94	44.14	43.67	43.92	0.233	0.53	64.38	64.75	61.81	63.65	1.604	2.52
20.00	44.62	44.77	44.66	44.68	0.076	0.17	70.05	70.59	67.74	69.46	1.517	2.18
24.00	44.96	45.08	45.16	45.07	0.105	0.23	74.54	74.99	72.24	73.93	1.478	2.00

Table h8. Diltiazem HCl release from formulation 1.0Dil+5TP+3P407 (pH7).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	3.33	3.49	3.11	3.31	0.187	5.64	3.19	3.53	3.46	3.39	0.178	5.25
0.67	6.56	6.83	6.15	6.51	0.342	5.25	6.35	7.04	6.80	6.73	0.347	5.16
1.00	9.76	10.13	9.22	9.70	0.456	4.70	9.57	10.51	10.23	10.10	0.480	4.75
1.50	14.31	14.85	13.61	14.26	0.620	4.35	14.01	15.36	15.06	14.81	0.711	4.80
2.00	18.52	19.28	17.82	18.54	0.731	3.94	18.02	19.98	19.79	19.26	1.079	5.60
3.00	25.58	26.88	25.13	25.86	0.913	3.53	25.78	28.34	27.68	27.26	1.331	4.88
4.00	31.29	32.87	30.83	31.66	1.071	3.38	32.59	35.49	34.66	34.25	1.492	4.36
6.00	39.37	40.93	38.61	39.64	1.185	2.99	42.82	45.98	45.34	44.71	1.672	3.74
8.00	44.53	46.09	43.82	44.81	1.162	2.59	50.94	53.62	53.27	52.61	1.454	2.76
10.00	47.92	49.43	47.38	48.24	1.059	2.20	56.90	59.26	59.09	58.42	1.318	2.26
12.00	50.20	51.88	50.10	50.73	1.003	1.98	61.69	63.92	63.67	63.10	1.223	1.94
16.00	52.60	54.35	52.98	53.31	0.922	1.73	68.45	70.28	70.23	69.65	1.040	1.49
20.00	53.62	55.45	54.39	54.48	0.922	1.69	73.27	74.67	74.78	74.24	0.842	1.13
24.00	54.17	56.01	55.12	55.10	0.922	1.67	76.99	78.20	78.30	77.83	0.731	0.94

Table h9. Diltiazem HCl release from formulation 1.5DiI+5TP+3P407 (pH7).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	3.78	3.66	3.57	3.67	0.102	2.78	3.99	4.02	3.58	3.86	0.249	6.45
0.67	7.46	7.25	7.13	7.28	0.166	2.28	7.90	7.99	7.31	7.73	0.366	4.73
1.00	11.00	10.79	10.71	10.83	0.149	1.38	11.68	11.96	10.88	11.50	0.558	4.85
1.50	16.01	15.73	15.69	15.81	0.175	1.11	17.05	17.51	14.92	16.49	1.381	8.38
2.00	20.61	20.45	20.44	20.50	0.099	0.48	22.01	22.59	19.93	21.51	1.399	6.51
3.00	28.40	27.93	27.93	28.09	0.268	0.95	30.72	31.60	28.47	30.26	1.619	5.35
4.00	34.73	34.39	34.34	34.49	0.215	0.62	38.01	38.82	35.37	37.40	1.802	4.82
6.00	43.90	43.84	43.79	43.84	0.054	0.12	48.81	49.90	46.26	48.32	1.871	3.87
8.00	50.05	50.06	50.07	50.06	0.006	0.01	56.37	57.45	53.96	55.93	1.784	3.19
10.00	53.92	54.14	54.25	54.10	0.171	0.32	61.82	63.06	59.51	61.47	1.802	2.93
12.00	56.54	56.88	57.02	56.81	0.249	0.44	65.96	67.30	63.74	65.67	1.799	2.74
16.00	59.77	60.13	60.19	60.03	0.231	0.38	71.60	72.96	69.50	71.35	1.743	2.44
20.00	61.27	61.73	61.73	61.58	0.267	0.43	75.32	76.61	73.28	75.07	1.677	2.23
24.00	62.01	62.63	62.61	62.42	0.355	0.57	78.08	79.46	76.05	77.86	1.714	2.20

Table h10. Theophylline release from saturated solution (10.05 mg/ml).

time (hr)	%drug release from 10.05 mg/ml theophylline solution					
	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	16.56	17.26	17.20	17.01	0.392	2.30
0.67	30.06	31.35	31.09	30.83	0.682	2.21
1.00	41.32	43.56	43.35	42.74	1.238	2.90
1.50	56.31	58.08	57.90	57.43	0.974	1.70
2.00	67.22	68.59	68.59	68.14	0.789	1.16
3.00	81.39	81.87	82.02	81.76	0.329	0.40
4.00	89.15	89.22	89.32	89.23	0.085	0.10
6.00	95.38	95.04	95.08	95.17	0.187	0.20
8.00	97.22	97.66	98.05	97.64	0.414	0.42
10.00	97.74	97.91	98.19	97.95	0.226	0.23
12.00	97.92	98.05	98.29	98.09	0.188	0.19
16.00	98.01	98.10	98.33	98.15	0.167	0.17
20.00	98.03	98.12	98.35	98.17	0.164	0.17
24.00	98.04	98.13	98.36	98.18	0.165	0.17

Table h11. Theophylline release from formulation 0.25Theo+5TP+3P407.

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	12.77	13.67	12.27	12.90	0.707	5.48	12.91	13.52	13.00	13.14	0.327	2.49
0.67	23.97	23.87	22.60	23.48	0.764	3.25	22.12	24.76	22.24	23.04	1.494	6.49
1.00	33.69	33.43	32.10	33.07	0.850	2.57	30.74	33.36	30.20	31.43	1.692	5.38
1.50	45.37	43.87	42.71	43.99	1.330	3.02	42.03	44.35	40.81	42.40	1.800	4.25
2.00	55.68	52.62	51.78	53.36	2.051	3.84	52.64	55.08	50.34	52.69	2.373	4.50
3.00	71.90	68.77	66.93	69.20	2.513	3.63	68.75	70.94	65.88	68.53	2.536	3.70
4.00	81.18	79.90	79.65	80.24	0.818	1.02	80.53	82.47	79.60	80.87	1.464	1.81
6.00	87.96	87.81	87.00	87.59	0.516	0.59	91.79	92.78	92.26	92.28	0.496	0.54
8.00	89.94	90.16	89.67	89.92	0.243	0.27	95.58	96.03	96.06	95.89	0.269	0.28
10.00	90.62	91.08	90.52	90.74	0.298	0.33	96.99	97.17	97.38	97.18	0.192	0.20
12.00	90.87	91.41	90.91	91.06	0.300	0.33	97.53	97.64	97.88	97.68	0.181	0.18
16.00	91.01	91.57	91.22	91.27	0.285	0.31	97.86	97.94	98.23	98.01	0.193	0.20
20.00	91.05	91.65	91.33	91.35	0.301	0.33	98.00	98.07	98.37	98.14	0.197	0.20
24.00	91.12	91.71	91.42	91.42	0.298	0.33	98.09	98.15	98.47	98.23	0.203	0.21

Table h12. Theophylline release from formulation 0.50Theo+5TP+3P407.

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	12.26	11.27	11.87	11.80	0.501	4.25	11.44	11.77	11.69	11.63	0.172	1.48
0.67	22.97	20.12	22.43	21.84	1.512	6.92	19.53	20.49	20.43	20.15	0.536	2.66
1.00	34.13	28.39	32.31	31.61	2.936	9.29	27.62	28.26	28.93	28.27	0.657	2.32
1.50	48.22	40.62	46.02	44.96	3.913	8.70	38.61	38.72	39.56	38.96	0.522	1.34
2.00	59.57	52.49	57.50	56.52	3.639	6.44	50.28	48.50	51.62	50.13	1.567	3.13
3.00	74.58	69.47	72.73	72.26	2.583	3.58	69.50	67.41	70.06	68.99	1.397	2.03
4.00	82.59	79.64	81.42	81.22	1.482	1.82	80.31	79.28	81.09	80.22	0.908	1.13
6.00	89.07	88.60	88.57	88.75	0.284	0.32	89.53	89.89	90.44	89.96	0.458	0.51
8.00	91.03	90.92	90.91	90.95	0.067	0.07	92.67	93.21	93.64	93.18	0.485	0.52
10.00	91.71	91.87	91.81	91.80	0.082	0.09	93.87	94.55	94.80	94.41	0.483	0.51
12.00	91.95	92.25	92.11	92.11	0.154	0.17	94.30	95.05	95.27	94.87	0.508	0.54
16.00	92.07	92.48	92.26	92.27	0.203	0.22	94.59	95.33	95.52	95.15	0.491	0.52
20.00	92.11	92.54	92.31	92.32	0.213	0.23	94.68	95.43	95.62	95.25	0.495	0.52
24.00	92.14	92.58	92.36	92.36	0.218	0.24	94.73	95.50	95.68	95.31	0.504	0.53

Table h13. Theophylline release from formulation 0.75Theo+5TP+3P407.

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	9.59	9.91	9.98	9.83	0.205	2.09	12.39	13.01	12.81	12.74	0.317	2.49
0.67	17.91	16.97	17.28	17.39	0.481	2.76	22.10	22.87	22.16	22.37	0.429	1.92
1.00	24.08	22.88	23.50	23.49	0.603	2.57	30.45	31.69	30.65	30.93	0.663	2.14
1.50	31.81	31.74	31.53	31.69	0.147	0.47	42.07	44.88	42.95	43.30	1.441	3.33
2.00	39.32	39.34	38.87	39.18	0.266	0.68	52.58	56.52	54.74	54.62	1.974	3.61
3.00	54.04	54.04	53.70	53.92	0.197	0.37	71.76	74.80	74.06	73.54	1.584	2.15
4.00	62.51	62.12	62.39	62.34	0.201	0.32	83.68	84.92	85.11	84.57	0.776	0.92
6.00	69.50	68.81	69.27	69.20	0.353	0.51	94.41	93.69	94.85	94.32	0.583	0.62
8.00	71.81	70.95	71.35	71.37	0.427	0.60	97.94	96.39	97.83	97.39	0.869	0.89
10.00	72.51	71.68	71.97	72.06	0.422	0.59	99.27	97.23	98.85	98.45	1.079	1.10
12.00	72.82	72.02	72.20	72.35	0.420	0.58	99.83	97.58	99.27	98.89	1.168	1.18
16.00	72.97	72.22	72.33	72.51	0.406	0.56	100.18	97.78	99.49	99.15	1.234	1.24
20.00	73.01	72.33	72.37	72.57	0.382	0.53	100.35	97.84	99.59	99.26	1.287	1.30
24.00	73.05	72.43	72.42	72.63	0.363	0.50	100.42	97.88	99.65	99.32	1.302	1.31

Table h14. Theophylline release from formulation 0.25Theo+5TP+2T80.

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	13.96	13.09	13.25	13.43	0.466	3.47	11.92	11.86	12.41	12.06	0.300	2.48
0.67	25.69	24.80	23.17	24.56	1.277	5.20	19.18	18.96	20.28	19.47	0.709	3.64
1.00	34.14	33.28	32.14	33.19	1.002	3.02	24.76	24.77	26.55	25.36	1.028	4.05
1.50	47.15	45.45	44.48	45.69	1.355	2.97	31.51	31.76	34.31	32.53	1.551	4.77
2.00	58.94	56.39	56.20	57.18	1.530	2.68	37.61	37.84	40.77	38.74	1.759	4.54
3.00	76.44	73.83	73.47	74.58	1.620	2.17	47.69	47.89	51.26	48.95	2.008	4.10
4.00	85.38	83.49	83.16	84.01	1.201	1.43	55.90	56.03	59.24	57.05	1.892	3.32
6.00	91.66	90.70	90.62	90.99	0.581	0.64	67.91	67.26	70.43	68.54	1.674	2.44
8.00	93.17	92.67	92.77	92.87	0.266	0.29	76.06	74.49	77.55	76.03	1.532	2.01
10.00	93.65	93.29	93.45	93.46	0.185	0.20	81.72	79.43	82.04	81.07	1.423	1.75
12.00	93.83	93.52	93.67	93.67	0.156	0.17	85.43	82.73	84.90	84.36	1.431	1.70
16.00	93.91	93.62	93.78	93.77	0.146	0.16	89.35	86.39	87.86	87.87	1.482	1.69
20.00	93.96	93.67	93.82	93.82	0.147	0.16	91.21	88.11	89.06	89.46	1.591	1.78
24.00	93.98	93.76	93.84	93.86	0.110	0.12	92.08	88.90	89.62	90.20	1.666	1.85

Table h15. Theophylline release from formulation 0.50Theo+5TP+2T80.

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.33	12.30	13.67	12.66	12.88	0.711	5.52	9.99	12.19	11.36	11.18	1.111	9.94
0.67	21.55	24.05	22.11	22.57	1.311	5.81	17.76	19.78	18.26	18.60	1.051	5.65
1.00	29.67	32.90	30.72	31.10	1.644	5.29	24.03	25.77	24.09	24.63	0.989	4.02
1.50	40.50	43.67	43.23	42.47	1.714	4.04	31.42	32.97	31.20	31.86	0.964	3.02
2.00	50.97	55.74	55.09	53.93	2.585	4.79	37.71	39.08	37.44	38.08	0.881	2.31
3.00	69.00	72.71	70.99	70.90	1.859	2.62	47.98	49.50	47.15	48.21	1.192	2.47
4.00	78.67	80.44	80.01	79.71	0.924	1.16	56.59	57.65	55.01	56.42	1.331	2.36
6.00	86.04	85.48	87.01	86.17	0.772	0.90	68.94	69.83	66.20	68.32	1.893	2.77
8.00	88.19	86.63	88.97	87.93	1.191	1.35	77.35	77.49	73.81	76.21	2.080	2.73
10.00	88.76	86.98	89.65	88.46	1.359	1.54	83.18	82.64	79.16	81.66	2.183	2.67
12.00	89.01	87.11	89.89	88.67	1.419	1.60	87.11	86.05	82.95	85.37	2.165	2.54
16.00	89.13	87.18	90.01	88.77	1.447	1.63	91.49	89.48	87.60	89.52	1.946	2.17
20.00	89.17	87.20	90.05	88.81	1.460	1.64	93.63	91.03	89.92	91.52	1.903	2.08
24.00	89.19	87.21	90.08	88.83	1.468	1.65	94.73	91.69	90.82	92.41	2.054	2.22

Table h16. Ibuprofen release from saturated solution (58.07 µg/ml) (No. 1).

time (hr)	%drug release from 58.07 µg/ml Ibuprofen solution					
	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.50	23.58	20.46	18.29	20.78	2.657	12.79
1.00	38.89	35.36	34.61	36.29	2.282	6.29
1.50	54.13	49.18	47.64	50.32	3.392	6.74
2.00	64.38	61.00	57.17	60.85	3.604	5.92
3.00	83.84	78.95	75.06	79.29	4.401	5.55
4.00	95.80	91.21	88.40	91.81	3.736	4.07
6.00	111.25	107.54	105.71	108.17	2.819	2.61
8.00	118.58	115.29	115.03	116.30	1.980	1.70
10.00	121.91	118.61	119.49	120.00	1.709	1.42
12.00	123.92	120.62	121.27	121.94	1.748	1.43
16.00	123.87	120.65	121.36	121.96	1.690	1.39
20.00	124.34	121.12	121.83	122.43	1.690	1.38
24.00	124.80	121.59	122.29	122.90	1.690	1.38

Table h17. Ibuprofen release from saturated solution (69.03 µg/ml) (No. 2).

time (hr)	%drug release from 69.03 µg/ml Ibuprofen solution					
	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00
1.00	27.45	27.62	26.35	27.14	0.691	2.55
2.00	45.99	44.45	46.00	45.48	0.891	1.96
4.00	75.28	75.30	76.70	75.76	0.813	1.07
6.00	97.43	96.12	96.28	96.61	0.713	0.74
8.00	107.36	108.51	107.49	107.79	0.630	0.58
12.00	116.40	118.29	116.82	117.17	0.994	0.85

Table h18. Ibuprofen release from saturated solution (69.03 µg/ml) (No. 3).

time (hr)	%drug release from 69.03 µg/ml Ibuprofen solution					
	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00
1.00	27.67	28.70	25.78	27.38	1.480	5.40
2.00	53.02	48.10	45.47	48.86	3.830	7.84
4.00	86.60	81.82	77.75	82.06	4.428	5.40
6.00	102.84	100.75	97.78	100.46	2.543	2.53
8.00	112.79	110.98	108.81	110.86	1.993	1.80
12.00	120.17	118.29	117.73	118.73	1.280	1.08

Table h19. Ibuprofen release from formulation 0.5Ibu+5TP+3P407 (batch 1).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.50	0.34	0.34	0.39	0.36	0.027	7.70	0.49	0.52	0.48	0.50	0.022	4.46
1.00	0.69	0.69	0.76	0.71	0.038	5.38	0.94	1.02	0.88	0.94	0.069	7.35
1.50	1.02	1.03	1.12	1.06	0.056	5.33	1.40	1.50	1.31	1.40	0.097	6.87
2.00	1.38	1.38	1.50	1.42	0.069	4.89	1.86	1.98	1.69	1.85	0.145	7.83
3.00	2.01	1.98	2.20	2.06	0.117	5.66	2.78	2.91	2.59	2.76	0.159	5.75
4.00	2.67	2.64	2.91	2.74	0.150	5.46	3.69	3.84	3.45	3.66	0.197	5.38
6.00	3.77	3.67	4.12	3.85	0.235	6.10	5.37	5.63	5.17	5.39	0.232	4.31
8.00	4.81	4.66	5.24	4.90	0.302	6.17	7.13	7.39	6.84	7.12	0.278	3.90
10.00	5.77	5.58	6.28	5.88	0.362	6.16	8.85	9.12	8.42	8.79	0.356	4.05
12.00	6.66	6.41	7.21	6.76	0.409	6.05	10.51	10.83	9.96	10.43	0.438	4.20
16.00	8.03	7.68	8.69	8.14	0.513	6.31	13.35	13.77	12.79	13.30	0.488	3.67
20.00	9.28	8.70	9.90	9.29	0.599	6.44	15.95	16.38	15.27	15.87	0.562	3.54
24.00	10.23	9.45	10.88	10.19	0.713	7.00	18.60	19.21	18.02	18.61	0.596	3.20

Table h20. Ibuprofen release from formulation 0.5Ibu+5TP+3P407 (batch 2).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
1.00	0.82	0.90	0.83	0.85	0.043	5.10	0.94	0.99	0.93	0.95	0.030	3.19
2.00	1.57	1.75	1.61	1.64	0.094	5.75	1.80	1.90	1.76	1.82	0.072	3.93
4.00	3.03	3.34	3.08	3.15	0.168	5.33	3.41	3.55	3.29	3.42	0.133	3.90
6.00	4.38	4.79	4.47	4.55	0.216	4.76	5.04	5.27	4.84	5.05	0.214	4.23
8.00	5.59	6.04	5.73	5.79	0.233	4.02	6.65	6.96	6.40	6.67	0.281	4.21
12.00	7.51	8.00	7.69	7.73	0.249	3.22	9.54	9.94	9.18	9.55	0.383	4.00
16.00	9.05	9.54	9.19	9.26	0.253	2.73	12.46	12.86	11.87	12.40	0.499	4.02
20.00	10.32	10.80	10.42	10.51	0.252	2.39	14.51	14.90	13.69	14.37	0.614	4.28
24.00	11.37	11.81	11.46	11.55	0.235	2.03	17.01	17.36	15.94	16.77	0.738	4.40
30.00	12.49	12.87	12.57	12.64	0.201	1.59	20.33	20.79	19.17	20.10	0.834	4.15
36.00	13.25	13.55	13.30	13.37	0.162	1.21	23.42	23.88	22.11	23.14	0.919	3.97
42.00	13.69	13.98	13.81	13.83	0.146	1.06	26.51	27.04	25.08	26.21	1.010	3.86
48.00	13.93	14.20	14.10	14.07	0.136	0.97	29.50	30.13	27.94	29.19	1.127	3.86
54.00							32.29	32.80	30.30	31.80	1.319	4.15
60.00							35.02	35.48	32.85	34.45	1.403	4.07
66.00							37.78	38.28	35.58	37.21	1.438	3.86
72.00							40.54	41.01	38.14	39.90	1.538	3.85
78.00							43.16	43.61	40.65	42.47	1.596	3.76
84.00							45.73	46.17	43.11	45.00	1.656	3.68
90.00							48.18	48.64	45.49	47.44	1.704	3.59
96.00							50.60	51.03	47.83	49.82	1.737	3.49
104.00							53.52	53.90	50.63	52.68	1.790	3.40
112.00							56.22	56.60	53.25	55.36	1.835	3.32
120.00							58.81	59.12	55.71	57.88	1.888	3.26
128.00							61.28	61.55	58.13	60.32	1.899	3.15
136.00							63.68	63.81	60.43	62.64	1.913	3.05
144.00							65.95	65.98	62.62	64.85	1.928	2.97
152.00							68.11	68.04	64.74	66.96	1.927	2.88
160.00							70.20	69.97	66.73	68.97	1.938	2.81
168.00							72.14	71.78	68.61	70.84	1.943	2.74

Table h21. Ibuprofen release from formulation 0.5Ibu+5TP+3P407 (batch 3).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
1.00	0.76	0.83	0.92	0.84	0.077	9.19	0.88	1.02	0.95	0.95	0.071	7.47
2.00	1.43	1.54	1.64	1.54	0.102	6.65	1.70	1.94	1.82	1.82	0.122	6.72
4.00	2.72	2.94	3.01	2.89	0.155	5.37	3.25	3.61	3.46	3.44	0.181	5.28
6.00	3.97	4.24	4.30	4.17	0.181	4.33	4.82	5.35	5.10	5.09	0.265	5.21
8.00	5.08	5.37	5.45	5.30	0.197	3.72	6.38	7.11	6.81	6.76	0.363	5.37
12.00	6.83	7.10	7.16	7.03	0.177	2.52	9.26	10.21	9.77	9.75	0.477	4.89
16.00	8.14	8.37	8.42	8.31	0.149	1.79	11.96	13.15	12.54	12.55	0.595	4.74
20.00	9.20	9.34	9.40	9.31	0.103	1.11	14.53	15.91	15.21	15.22	0.691	4.54
24.00	9.99	10.04	10.12	10.05	0.067	0.67	17.00	18.64	17.80	17.81	0.820	4.60
30.00	10.77	10.65	10.77	10.73	0.067	0.62	20.38	22.22	21.22	21.27	0.923	4.34
36.00	11.14	10.95	11.12	11.07	0.104	0.94	23.46	25.41	24.41	24.43	0.975	3.99
42.00	11.31	11.07	11.28	11.22	0.130	1.16	26.43	28.54	27.46	27.48	1.057	3.85
48.00	11.36	11.12	11.38	11.29	0.144	1.28	29.33	31.59	30.35	30.42	1.134	3.73
54.00							32.29	34.54	33.24	33.36	1.131	3.39
60.00							35.02	37.38	35.97	36.12	1.188	3.29
66.00							37.71	40.11	38.67	38.83	1.211	3.12
72.00							40.33	42.82	41.31	41.49	1.252	3.02
78.00							42.88	45.49	43.87	44.08	1.313	2.98
84.00							45.45	47.99	46.32	46.59	1.290	2.77
90.00							47.91	50.46	48.78	49.05	1.298	2.65
96.00							50.25	52.87	51.14	51.42	1.332	2.59
104.00							53.20	55.82	53.98	54.34	1.344	2.47
112.00							55.79	58.37	56.59	56.92	1.322	2.32
120.00							58.44	60.91	59.15	59.50	1.273	2.14
128.00							60.97	63.36	61.56	61.96	1.244	2.01
136.00							63.35	65.70	63.90	64.32	1.228	1.91
144.00							65.67	67.92	66.15	66.58	1.186	1.78
152.00							67.90	70.02	68.27	68.73	1.133	1.65
160.00							69.98	72.07	70.33	70.79	1.123	1.59
168.00							71.98	73.96	72.23	72.72	1.080	1.48

Table h22. Ibuprofen release from formulation 0.5Ibu+5TP+3P407 (batch 4).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
1.00	0.70	0.77	0.74	0.74	0.037	4.98	0.81	0.82	0.86	0.83	0.028	3.34
2.00	1.34	1.44	1.40	1.39	0.055	3.97	1.60	1.60	1.67	1.62	0.041	2.55
4.00	2.54	2.72	2.76	2.67	0.118	4.40	3.08	3.10	3.14	3.11	0.033	1.08
6.00	3.75	3.96	4.01	3.91	0.137	3.50	4.63	4.65	4.71	4.66	0.040	0.85
8.00	4.86	5.08	5.13	5.03	0.142	2.82	6.20	6.25	6.30	6.25	0.046	0.73
12.00	6.63	6.83	6.89	6.78	0.139	2.04	9.09	9.16	9.17	9.14	0.043	0.47
16.00	7.97	8.18	8.22	8.12	0.135	1.66	11.83	11.89	11.91	11.87	0.044	0.37
20.00	9.04	9.20	9.24	9.16	0.107	1.17	14.44	14.46	14.45	14.45	0.013	0.09
24.00	9.86	9.97	10.00	9.94	0.075	0.76	16.95	16.98	16.97	16.97	0.016	0.09
30.00	10.69	10.66	10.70	10.68	0.021	0.19	20.40	20.28	20.30	20.33	0.064	0.32
36.00	11.14	11.04	11.05	11.08	0.055	0.50	23.56	23.31	23.25	23.38	0.166	0.71
42.00	11.38	11.23	11.21	11.27	0.097	0.86	26.60	26.27	26.29	26.39	0.183	0.69
48.00	11.49	11.31	11.27	11.36	0.117	1.03	29.61	29.15	29.18	29.31	0.253	0.86
54.00							32.54	31.98	31.98	32.17	0.322	1.00
60.00							35.34	34.65	34.66	34.88	0.394	1.13
66.00							38.09	37.27	37.27	37.54	0.474	1.26
72.00							40.77	39.85	39.88	40.17	0.526	1.31
78.00							43.42	42.38	42.43	42.74	0.583	1.36
84.00							45.94	44.80	44.87	45.20	0.636	1.41
90.00							48.43	47.18	47.21	47.61	0.713	1.50
96.00							50.85	49.55	49.53	49.98	0.756	1.51
104.00							53.84	52.29	52.18	52.77	0.926	1.76
112.00							56.53	54.91	54.71	55.38	0.999	1.80
120.00							59.17	57.41	57.15	57.91	1.098	1.90
128.00							61.73	59.80	59.50	60.34	1.208	2.00
136.00							64.20	62.23	61.79	62.74	1.286	2.05
144.00							66.58	64.47	63.98	65.01	1.380	2.12
152.00							68.85	66.60	66.06	67.17	1.479	2.20
160.00							71.00	68.71	68.06	69.26	1.542	2.23
168.00							73.06	70.67	69.96	71.23	1.623	2.28

Table h23. Ibuprofen release from formulation 1.0Ibu+5TP+3P407 (batch 1).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
0.50	0.27	0.29	0.25	0.27	0.019	7.03	0.36	0.33	0.37	0.35	0.021	5.82
1.00	0.48	0.51	0.47	0.49	0.019	4.00	0.69	0.64	0.72	0.68	0.042	6.08
1.50	0.69	0.70	0.68	0.69	0.010	1.42	1.01	0.95	1.08	1.02	0.064	6.25
2.00	0.91	0.91	0.90	0.91	0.002	0.17	1.31	1.27	1.43	1.34	0.082	6.14
3.00	1.36	1.38	1.36	1.37	0.014	0.99	1.98	1.91	2.11	2.00	0.101	5.07
4.00	1.76	1.79	1.77	1.77	0.016	0.88	2.57	2.50	2.76	2.61	0.137	5.23
6.00	2.58	2.59	2.55	2.58	0.023	0.90	3.73	3.58	4.02	3.78	0.220	5.82
8.00	3.25	3.24	3.20	3.23	0.023	0.71	4.80	4.70	5.19	4.89	0.258	5.28
10.00	3.83	3.82	3.81	3.82	0.012	0.31	5.90	5.73	6.35	5.99	0.320	5.34
12.00	4.38	4.35	4.37	4.36	0.016	0.36	6.95	6.73	7.49	7.06	0.392	5.55
16.00	5.36	5.33	5.37	5.35	0.025	0.47	8.76	8.53	9.45	8.92	0.475	5.33
20.00	6.03	5.95	6.08	6.02	0.066	1.10	10.37	10.12	11.15	10.54	0.537	5.09
24.00	6.56	6.41	6.63	6.53	0.115	1.77	12.02	11.81	12.89	12.24	0.573	4.68

Table h24. Ibuprofen release from formulation 0.5Ibu+5TP+3P407 (batch 2).

time (hr)	%drug release from water phase						%drug release from preparation					
	No.1	No.2	No.3	mean	SD	%CV	No.1	No.2	No.3	mean	SD	%CV
0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.000	0.00
1.00	0.37	0.42	0.39	0.39	0.028	7.17	0.66	0.71	0.60	0.66	0.053	8.09
2.00	0.70	0.81	0.76	0.76	0.054	7.14	1.27	1.35	1.16	1.26	0.093	7.40
4.00	1.34	1.51	1.44	1.43	0.085	5.91	2.36	2.49	2.24	2.36	0.124	5.24
6.00	1.97	2.21	2.11	2.10	0.120	5.71	3.41	3.59	3.29	3.43	0.155	4.51
8.00	2.55	2.83	2.70	2.69	0.141	5.24	4.42	4.69	4.30	4.47	0.200	4.48
12.00	3.50	3.87	3.68	3.68	0.186	5.05	6.20	6.55	6.06	6.27	0.256	4.08
16.00	4.27	4.67	4.50	4.48	0.199	4.43	8.09	8.45	7.96	8.17	0.256	3.13
20.00	4.96	5.38	5.19	5.17	0.211	4.07	9.41	9.75	9.27	9.48	0.249	2.63
24.00	5.56	5.98	5.80	5.78	0.211	3.65	10.95	11.35	10.80	11.04	0.284	2.57
30.00	6.25	6.69	6.52	6.49	0.223	3.43	13.10	13.50	12.87	13.16	0.317	2.41
36.00	6.79	7.24	7.07	7.03	0.226	3.21	15.17	15.57	14.88	15.21	0.345	2.27
42.00	7.22	7.65	7.50	7.46	0.219	2.94	17.11	17.73	16.87	17.24	0.445	2.58
48.00	7.57	7.96	7.83	7.79	0.200	2.57	19.08	19.73	18.81	19.21	0.475	2.48
54.00							20.97	21.64	20.70	21.10	0.480	2.28
60.00							22.82	23.50	22.66	22.99	0.449	1.95
66.00							24.63	25.35	24.54	24.84	0.445	1.79
72.00							26.36	27.11	26.38	26.62	0.428	1.61
78.00							28.07	28.88	28.16	28.37	0.446	1.57
84.00							29.79	30.94	29.87	30.20	0.640	2.12
90.00							31.43	32.67	31.77	31.96	0.642	2.01
96.00							33.05	34.35	33.44	33.62	0.664	1.98
104.00							35.07	36.46	35.44	35.65	0.718	2.01
112.00							36.95	38.37	37.38	37.57	0.728	1.94
120.00							39.13	40.29	39.27	39.57	0.632	1.60
128.00							40.93	42.13	41.10	41.39	0.651	1.57
136.00							42.74	43.93	42.86	43.18	0.655	1.52
144.00							44.54	45.66	44.63	44.94	0.627	1.40
152.00							46.36	47.39	46.35	46.70	0.596	1.28
160.00							47.93	49.12	47.98	48.34	0.676	1.40
168.00							49.80	50.74	49.64	50.06	0.594	1.19

BIOGRAPHY

Mr. Wiwat Pichayakorn was born on July 17, 1973 in Phang-nga province, Thailand. He received his Bachelor of Science in Pharmacy with a second class honors from the Faculty of Pharmaceutical Sciences, Prince of Songkla University, Songkhla, Thailand in 1996. He works in Department of Pharmaceutical Technology, Faculty of Pharmaceutical Sciences, Prince of Songkla University.