

## CHAPTER 3

### RESULTS



#### 1. Human Milk.

The results of folic acid content in 100 samples of human milk are shown in Table 3. The mean values  $\pm$  one S.D. of free, conjugated and total folic acid levels are found to be  $1.08 \pm 0.89$ ,  $4.83 \pm 3.17$  and  $5.91 \pm 2.83$   $\mu\text{g}/100$  ml with the range of 0.11-3.73, 0.69-12.39 and 0.96-13.68  $\mu\text{g}/100$  ml respectively. The relationship between folic acid content in human milk and the days after delivery, the gravida and the mother's age are shown in Tables 4, 5 and 6 respectively. There were no statistically significant differences ( $P > 0.05$ ) between these values in the present study.

#### 2. Cow's Milk.

The results of folic acid content found in 28 samples of fresh cow's milk are shown in Table 7. The mean values  $\pm$  one S.D. of free, conjugated and total folic acid contents are  $3.92 \pm 1.80$ ,  $7.79 \pm 5.97$  and  $11.71 \pm 6.37$   $\mu\text{g}/100$  ml with the range of 1.28 - 8.76, 1.20 - 20.91 and 2.80 - 25.47  $\mu\text{g}/100$  ml respectively.

The effect of pasteurization and sterilization on the free, conjugated and total folic acid content in 20 fresh cow's milk

samples are shown in Tables 8,9 and 10. Free folic acid content decreased about 41 % and 38 % after pasteurization and sterilization respectively. The conjugated folic acid content decreased to 35 % after pasteurization and 50 % after sterilization while total folic acid content lost about 35 % after pasteurization and 50 % after sterilization. There were the statistical significant difference ( $P < 0.05$ ) between the folic acid content before and after pasteurization and sterilization as shown in Table 11.

### 3. Other Cow's Milk Preparation in the Market.

All other cow's milk preparations purchased from the market were determined for folic acid. The data below show the average values of each 3 samples.

#### 3.1 Pasteurized Milk.

The free, conjugated and total folic acid content found in the pasteurized milk samples are shown in Table 12. The mean value  $\pm$  one S.D. of free, conjugated and total folic acid content were found to be  $3.97 \pm 1.53$ ,  $9.22 \pm 2.79$  and  $13.19 \pm 3.00$   $\mu\text{g}/100$  ml with the range of 1.65 - 5.70, 4.77 - 12.63 and 9.33 - 18.33  $\mu\text{g}/100$  ml respectively.

#### 3.2 Sterilized Milk.

The results of free, conjugated and total folic acid content found in the sterilized milk are shown in table 13. The mean value  $\pm$  one S.D. of folic acid content were found to be 1.18

$\pm 0.48$ ,  $3.15 \pm 3.09$  and  $4.33 \pm 3.02 \mu\text{g}/100 \text{ ml}$  respectively.

### 3.3 Evaporated Milk.

The mean values  $\pm$  one S.D. of free, conjugated and total folic acid content in the evaporated milk were found to be  $4.02 \pm 1.84$ ,  $3.36 \pm 2.70$  and  $7.38 \pm 2.98 \mu\text{g}/100 \text{ ml}$  with the range of  $2.24 - 7.47$ ,  $0.75 - 7.99$  and  $2.99 - 11.68 \mu\text{g}/100 \text{ ml}$  respectively as shown in Table 14.

### 3.4 Sweetened Condensed Milk .

The folic acid content found in sweetened condensed milk are shown in Table 15. The mean value  $\pm$  one S.D. of free, conjugated and total folic acid content were found to be  $6.14 \pm 2.07$ ,  $11.58 \pm 2.63$  and  $17.73 \pm 4.00 \mu\text{g}/100 \text{ g}$  respectively.

### 3.5 Powdered Milk.

The folic acid content found in powdered whole milk and powdered humanized milk are shown in Tables 16 and 17 respectively. The mean value  $\pm$  one S.D. of free, conjugated and total folic acid in powdered whole milk were  $30.06 \pm 20.02$ ,  $56.97 \pm 38.26$  and  $87.03 \pm 55.30 \mu\text{g}/100 \text{ g}$  and in powdered humanized milk were  $84.00 \pm 53.13$ ,  $82.61 \pm 37.32$  and  $166.62 \pm 80.37 \mu\text{g}/100\text{g}$  respectively.

### 3.6 Butter and Cheese.

The results of folic acid content found in butter and cheese samples are shown in Tables 18 and 19. The mean values  $\pm$  one S.D. of free, conjugated and total folic acid content in butter were  $0.41 \pm 0.28$ ,  $0.42 \pm 0.34$  and  $0.83 \pm 0.58 \mu\text{g}/100 \text{ g}$  and in cheese

were  $10.99 \pm 21.38$ ,  $10.99 \pm 5.72$  and  $21.98 \pm 25.59$   $\mu\text{g}/100$  g respectively.

Table 20 shows the mean values  $\pm$  one S.D. and the range of free, conjugated and total folic acid content in human milk, cow's milk and other cow's milk preparations. Cow's milk contained free folic acid about four-fold higher than that of human milk. Folic acid content in human milk and sterilized milk are very similar. In 100 ml of milk or milk preparation, the powdered milk contained the highest value of folic acid, i.e.  $27.77 \pm 13.36$   $\mu\text{g}/100\text{ml}$  of total folic acid content. On the other hand, butter contained the lowest value, i.e. only  $0.83 \pm 0.58$   $\mu\text{g}$  total folic acid per 100 ml.

TABLE 3

## FOLIC ACID CONTENT IN HUMAN MILK.

| No. | Mother's age (years) | Gravida | Days after delivery | Folic acid content $\mu\text{g}/100 \text{ ml}$ |            |       |
|-----|----------------------|---------|---------------------|---|------------|-------|
|     |                      |         |                     | free  | conjugated | total |
| 1   | 26                   | 2       | 3                   | 0.44  | 0.82       | 1.26  |
| 2   | 20                   | 2       | 3                   | 2.46  | 2.80       | 5.26  |
| 3   | 24                   | 1       | 4                   | 0.59  | 1.06       | 1.65  |
| 4   | 26                   | 2       | 4                   | 0.76  | 3.05       | 3.81  |
| 5   | 20                   | 1       | 5                   | 2.09  | 10.57      | 12.66 |
| 6   | 26                   | 2       | 6                   | 1.34  | 8.02       | 9.36  |
| 7   | 21                   | 2       | 3                   | 0.80  | 2.44       | 3.24  |
| 8   | 26                   | 2       | 4                   | 0.22  | 4.28       | 4.50  |
| 9   | 27                   | 2       | 8                   | 0.31  | 1.07       | 1.38  |
| 10  | 26                   | 1       | 12                  | 2.30  | 3.84       | 6.14  |
| 11  | 42                   | 5       | 8                   | 0.36  | 3.60       | 3.96  |
| 12  | 18                   | 2       | 4                   | 1.66  | 2.00       | 3.66  |
| 13  | 17                   | 1       | 3                   | 0.37  | 4.06       | 4.43  |
| 14  | 27                   | 3       | 5                   | 1.30  | 2.63       | 3.93  |
| 15  | 27                   | 3       | 6                   | 0.49  | 4.52       | 5.01  |
| 16  | 22                   | 2       | 2                   | 0.52  | 4.04       | 4.56  |
| 17  | 27                   | 3       | 6                   | 2.93  | 6.01       | 8.94  |
| 18  | 19                   | 3       | 8                   | 3.73  | 1.07       | 4.80  |
| 19  | 21                   | 1       | 4                   | 1.54  | 0.89       | 2.43  |
| 20  | 15                   | 1       | 5                   | 0.62  | 1.42       | 2.04  |

Table 3 Folic acid content in human milk (continued).

| No. | Mother's age (years) | Gravida | Days after delivery | Folic acid content $\mu\text{g}/100 \text{ ml}$ |            |       |
|-----|----------------------|---------|---------------------|---|------------|-------|
|     |                      |         |                     | free  | conjugated | total |
| 21  | 24                   | 2       | 4                   | 2.18  | 1.30       | 3.48  |
| 22  | 25                   | 1       | 4                   | 2.47  | 1.61       | 4.08  |
| 23  | 30                   | 5       | 6                   | 1.36  | 5.69       | 7.05  |
| 24  | 31                   | 4       | 4                   | 0.68  | 1.39       | 2.07  |
| 25  | 35                   | 6       | 6                   | 2.47  | 6.23       | 8.70  |
| 26  | 18                   | 1       | 8                   | 3.47  | 1.33       | 4.80  |
| 27  | 18                   | 1       | 6                   | 0.63  | 1.26       | 1.89  |
| 28  | 33                   | 2       | 3                   | 2.64  | 1.11       | 3.75  |
| 29  | 24                   | 4       | 7                   | 3.63  | 1.50       | 5.13  |
| 30  | 20                   | 1       | 4                   | 0.31  | 4.73       | 5.04  |
| 31  | 21                   | 2       | 5                   | 0.47  | 4.51       | 4.98  |
| 32  | 21                   | 1       | 4                   | 0.98  | 5.11       | 6.09  |
| 33  | 26                   | 1       | 9                   | 0.54  | 4.98       | 5.52  |
| 34  | 40                   | 6       | 4                   | 1.02  | 3.93       | 4.95  |
| 35  | 19                   | 1       | 3                   | 1.37  | 5.12       | 6.49  |
| 36  | 24                   | 1       | 3                   | 0.53  | 4.24       | 4.77  |
| 37  | 30                   | 4       | 2                   | 0.41  | 3.70       | 4.11  |
| 38  | 20                   | 2       | 4                   | 0.72  | 1.92       | 2.64  |
| 39  | 36                   | 3       | 6                   | 1.43  | 4.09       | 5.52  |
| 40  | 20                   | 2       | 4                   | 0.99  | 6.41       | 7.40  |
| 41  | 20                   | 1       | 5                   | 2.78  | 10.90      | 13.68 |

Table 3 Folic acid content in human milk (continued).

| No. | Mother's age (years) | Gravida | Days after delivery | Folic acid content $\mu\text{g}/100\text{ml}$ |            |       |
|-----|----------------------|---------|---------------------|---|------------|-------|
|     |                      |         |                     | free  | conjugated | total |
| 42  | 21                   | 1       | 2                   | 1.20  | 8.07       | 9.27  |
| 43  | 26                   | 3       | 2                   | 0.53  | 12.10      | 12.63 |
| 44  | 19                   | 2       | 3                   | 1.34  | 4.84       | 6.18  |
| 45  | 24                   | 1       | 2                   | 1.83  | 4.35       | 6.18  |
| 46  | 21                   | 1       | 6                   | 0.38  | 6.58       | 6.96  |
| 47  | 34                   | 3       | 6                   | 1.85  | 5.89       | 7.74  |
| 48  | 20                   | 3       | 3                   | 2.67  | 5.58       | 8.25  |
| 49  | 31                   | 3       | 6                   | 0.27  | 2.22       | 2.49  |
| 50  | 18                   | 1       | 2                   | 1.59  | 4.80       | 6.39  |
| 51  | 22                   | 3       | 2                   | 1.08  | 6.66       | 7.74  |
| 52  | 19                   | 1       | 2                   | 0.86  | 8.14       | 9.00  |
| 53  | 21                   | 2       | 4                   | 0.95  | 8.68       | 9.63  |
| 54  | 20                   | 1       | 3                   | 0.63  | 10.89      | 11.52 |
| 55  | 27                   | 4       | 3                   | 1.47  | 10.52      | 11.99 |
| 56  | 23                   | 3       | 5                   | 3.56  | 9.94       | 13.50 |
| 57  | 21                   | 1       | 4                   | 0.32  | 7.54       | 7.86  |
| 58  | 18                   | 3       | 3                   | 0.05  | 7.87       | 7.92  |
| 59  | 21                   | 2       | 4                   | 0.35  | 10.24      | 10.59 |
| 60  | 26                   | 3       | 5                   | 2.39  | 10.39      | 12.78 |
| 61  | 28                   | 4       | 5                   | 0.63  | 12.39      | 13.02 |
| 62  | 22                   | 1       | 7                   | 1.47  | 11.31      | 12.78 |

Table 3 Folic acid content in human milk (continued).

| No. | Mother's age (years) | Gravida | Days after delivery | Folic acid content $\mu\text{g}/100\text{ml}$ |            |       |
|-----|----------------------|---------|---------------------|---|------------|-------|
|     |                      |         |                     | free  | conjugated | total |
| 63  | 40                   | 11      | 6                   | 0.96  | 4.74       | 5.70  |
| 64  | 20                   | 1       | 3                   | 0.63  | 7.96       | 8.59  |
| 65  | 17                   | 1       | 4                   | 0.11  | 7.09       | 7.20  |
| 66  | 19                   | 1       | 4                   | 2.90  | 5.92       | 8.82  |
| 67  | 34                   | 3       | 4                   | 0.58  | 10.82      | 11.40 |
| 68  | 28                   | 4       | 4                   | 2.10  | 8.64       | 10.74 |
| 69  | 19                   | 1       | 3                   | 1.38  | 10.68      | 12.06 |
| 70  | 22                   | 2       | 3                   | 0.14  | 7.72       | 7.86  |
| 71  | 20                   | 2       | 4                   | 0.32  | 10.96      | 11.28 |
| 72  | 22                   | 1       | 5                   | 1.09  | 9.11       | 10.20 |
| 73  | 14                   | 1       | 4                   | 0.49  | 4.73       | 5.22  |
| 74  | 27                   | 3       | 3                   | 0.45  | 5.74       | 6.19  |
| 75  | 35                   | 3       | 4                   | 0.87  | 3.93       | 4.80  |
| 76  | 23                   | 1       | 7                   | 0.56  | 4.42       | 4.98  |
| 77  | 26                   | 2       | 4                   | 1.92  | 4.62       | 6.54  |
| 78  | 25                   | 2       | 8                   | 0.53  | 2.97       | 3.50  |
| 79  | 25                   | 2       | 4                   | 0.37  | 3.83       | 4.20  |
| 80  | 21                   | 1       | 5                   | 1.23  | 3.81       | 5.04  |
| 81  | 28                   | 3       | 5                   | 0.99  | 2.52       | 3.51  |
| 82  | 28                   | 5       | 3                   | 0.42  | 2.61       | 3.03  |
| 83  | 23                   | 2       | 4                   | 1.16  | 5.02       | 6.18  |



Table 3 Folic acid content in human milk (continued).

| No.   | Mother's age (years) | Gravida | Days after delivery | Folic acid content $\mu\text{g}/100\text{ml}$ |            |            |
|-------|----------------------|---------|---------------------|---|------------|------------|
|       |                      |         |                     | free  | conjugated | total      |
| 84    | 17                   | 1       | 4                   | 0.21  | 3.63       | 3.84       |
| 85    | 23                   | 2       | 4                   | 0.12  | 4.20       | 4.32       |
| 86    | 24                   | 5       | 5                   | 0.32  | 3.43       | 3.75       |
| 87    | 19                   | 1       | 3                   | 0.66  | 2.75       | 3.41       |
| 88    | 24                   | 3       | 3                   | 0.17  | 3.25       | 3.42       |
| 89    | 23                   | 1       | 5                   | 0.32  | 1.06       | 1.38       |
| 90    | 24                   | 2       | 4                   | 0.23  | 1.00       | 1.23       |
| 91    | 27                   | 5       | 4                   | 0.27  | 0.69       | 0.96       |
| 92    | 21                   | 3       | 3                   | 0.71  | 1.57       | 2.28       |
| 93    | 28                   | 3       | 3                   | 0.14  | 2.18       | 2.32       |
| 94    | 22                   | 2       | 2                   | 0.34  | 0.62       | 0.96       |
| 95    | 37                   | 5       | 2                   | 0.85  | 1.13       | 1.98       |
| 96    | 27                   | 4       | 3                   | 1.08  | 3.62       | 4.70       |
| 97    | 20                   | 1       | 4                   | 0.83  | 1.33       | 2.16       |
| 98    | 26                   | 1       | 5                   | 0.36  | 1.02       | 1.38       |
| 99    | 23                   | 3       | 3                   | 0.66  | 3.72       | 4.38       |
| 100   | 18                   | 1       | 4                   | 0.41  | 1.81       | 2.22       |
| Mean  |                      |         |                     | 1.08  | 4.83       | 5.91       |
| S.D.  |                      |         |                     | 0.89  | 3.17       | 2.83       |
| Range |                      |         |                     | 0.11-3.73                                     | 0.69-12.39 | 0.96-13.68 |

TABLE 4

Relationship Between Folic Acid Content in Human Milk and  
Days after Delivery.

| Days after delivery | No.of samples examined | Folic acid content $\mu\text{g}/100\text{ml}$ |                                 |                                 |
|---------------------|------------------------|---|---------------------------------|---------------------------------|
|                     |                        | free  | conjugated                      | total.                          |
| 2                   | 11                     | $0.90 \pm 0.48$<br>(0.34-1.83)                | $5.15 \pm 3.36$<br>(0.62-12.10) | $6.05 \pm 3.44$<br>(0.96-12.63) |
| 3                   | 23                     | $0.92 \pm 0.77$<br>(0.05-2.67)                | $4.87 \pm 3.05$<br>(0.82-10.89) | $5.79 \pm 3.12$<br>(1.26-12.06) |
| 4                   | 31                     | $0.89 \pm 0.75$<br>(0.11-2.90)                | $4.49 \pm 3.07$<br>(0.69-10.96) | $5.39 \pm 3.08$<br>(0.96-11.40) |
| 5                   | 14                     | $1.29 \pm 1.02$<br>(0.32-3.56)                | $5.97 \pm 4.27$<br>(1.02-12.39) | $7.27 \pm 5.00$<br>(1.38-13.68) |
| 6                   | 11                     | $1.28 \pm 0.86$<br>(0.27-2.93)                | $5.02 \pm 1.95$<br>(1.26-8.02)  | $6.30 \pm 2.48$<br>(1.89-9.36)  |
| 7-12                | 10                     | $1.69 \pm 1.45$<br>(0.31-3.73)                | $3.60 \pm 2.88$<br>(1.07-11.31) | $5.29 \pm 2.93$<br>(1.38-12.78) |
|                     | 100                    | Mean<br>$1.08 \pm 0.89$                       | Mean<br>$4.83 \pm 3.17$         | Mean<br>$5.91 \pm 2.83$         |



TABLE 5

Relationship Between Folic Acid Content in Human Milk and Gravida.

| Gravida | No. of samples examined | Folic acid content $\mu\text{g}/100\text{ml}$ |                                 |                                 |
|---------|-------------------------|---|---------------------------------|---------------------------------|
|         |                         | free  | conjugated                      | total                           |
| 1       | 37                      | 1.08 $\pm$ 0.84<br>(0.11-3.47)                | 5.08 $\pm$ 3.26<br>(0.89-11.31) | 6.16 $\pm$ 2.40<br>(1.38-13.68) |
| 2       | 25                      | 0.92 $\pm$ 0.73<br>(0.12-2.64)                | 4.29 $\pm$ 2.92<br>(0.62-10.96) | 5.22 $\pm$ 2.82<br>(0.96-11.28) |
| 3       | 21                      | 1.27 $\pm$ 1.13<br>(0.05-3.73)                | 5.36 $\pm$ 3.24<br>(1.07-12.10) | 6.64 $\pm$ 3.56<br>(2.28-13.50) |
| 4       | 8                       | 1.27 $\pm$ 1.12<br>(0.23-3.63)                | 5.34 $\pm$ 4.50<br>(1.00-12.39) | 6.62 $\pm$ 4.60<br>(1.23-13.02) |
| 5-11    | 9                       | 0.89 $\pm$ 0.70<br>(0.27-2.47)                | 3.56 $\pm$ 1.88<br>(0.69-6.23)  | 4.45 $\pm$ 2.44<br>(0.96-8.70)  |
|         |                         | Mean  | Mean                            | Mean                            |
|         | 100                     | 1.08 $\pm$ 0.89                               | 4.83 $\pm$ 3.17                 | 5.91 $\pm$ 2.83                 |

TABLE 6

Relationship Between Folic Acid Content in Human Milk and Mother's Age.

| Mother's age<br>(years) | No. of samples<br>examined | Folic acid content $\mu\text{g}/100\text{ml}$ |                                 |                                 |
|-------------------------|----------------------------|---|---------------------------------|---------------------------------|
|                         |                            | free  | conjugated                      | total                           |
| 18                      | 11                         | $0.87 \pm 1.01$<br>(0.05-3.47)                | $3.63 \pm 2.31$<br>(1.26-7.87)  | $4.51 \pm 2.05$<br>(1.89-7.92)  |
| 19                      | 7                          | $1.74 \pm 1.13$<br>(0.66-3.73)                | $5.50 \pm 3.20$<br>(1.07-10.68) | $7.25 \pm 2.91$<br>(3.41-12.06) |
| 20                      | 11                         | $1.31 \pm 2.47$<br>(0.31-2.78)                | $6.73 \pm 1.51$<br>(1.33-10.96) | $8.04 \pm 3.96$<br>(2.16-13.68) |
| 21                      | 11                         | $0.45 \pm 0.02$<br>(0.35-1.54)                | $5.40 \pm 3.07$<br>(0.89-10.24) | $6.21 \pm 2.91$<br>(2.28-10.59) |
| 22                      | 6                          | $0.77 \pm 0.51$<br>(0.14-1.47)                | $6.57 \pm 3.79$<br>(0.62-11.31) | $7.35 \pm 4.16$<br>(0.96-12.78) |
| 23                      | 6                          | $1.06 \pm 1.27$<br>(0.12-1.16)                | $4.72 \pm 2.90$<br>(1.06-9.94)  | $5.79 \pm 4.09$<br>(1.38-13.50) |
| 24                      | 8                          | $1.18 \pm 0.84$<br>(0.17-3.63)                | $2.51 \pm 1.44$<br>(1.00-4.35)  | $3.70 \pm 1.68$<br>(1.23-6.18)  |
| 25                      | 3                          | $1.12 \pm 1.16$<br>(0.37-2.47)                | $2.80 \pm 1.11$<br>(1.61-3.83)  | $3.92 \pm 0.37$<br>(3.50-4.20)  |
| 26                      | 10                         | $1.08 \pm 0.78$<br>(0.22-2.39)                | $5.31 \pm 3.75$<br>(0.82-12.10) | $6.39 \pm 4.09$<br>(1.26-12.78) |

Table 6 Relationship between folic acid content in human milk and mother's age (continued).

| Mother's age (years) | No. of samples examined | Folic acid content $\mu\text{g}/100\text{ml}$ |                                 |                                 |
|----------------------|-------------------------|---|---------------------------------|---------------------------------|
|                      |                         | free  | conjugated                      | total                           |
| 27                   | 8                       | $1.03 \pm 0.89$<br>(0.27-2.93)                | $4.35 \pm 3.17$<br>(0.69-10.52) | $5.38 \pm 3.68$<br>(0.96-11.99) |
| 28-42                | 19                      | $1.05 \pm 0.74$<br>(0.14-2.64)                | $4.56 \pm 2.77$<br>(1.11-12.39) | $5.62 \pm 3.31$<br>(1.98-13.02) |
|                      | 100                     | Mean<br>$1.08 \pm 0.89$                       | Mean<br>$4.83 \pm 3.17$         | Mean<br>$5.91 \pm 2.83$         |

TABLE 7

Folic Acid Content in Cow's Milk.

| No. | Age<br>(years) | Lactation<br>No. | Lactation<br>time<br>(months) | Folic acid content $\mu\text{g}/100\text{ml}$ |            |       |
|-----|----------------|------------------|-------------------------------|---|------------|-------|
|     |                |                  |                               | free  | conjugated | total |
| 1   | 6              | 3                | 14                            | 4.02  | 4.31       | 8.33  |
| 2   | 6              | 3                | 16                            | 4.20  | 2.13       | 6.33  |
| 3   | 6              | 4                | 4                             | 1.86  | 6.14       | 8.00  |
| 4   | 6              | 3                | 10                            | 5.19  | 3.41       | 8.60  |
| 5   | 5              | 4                | 6                             | 1.28  | 1.59       | 2.87  |
| 6   | 5              | 3                | 6                             | 3.27  | 12.71      | 15.98 |
| 7   | 8              | 3                | 11                            | 4.56  | 20.91      | 25.47 |
| 8   | 13             | 9                | 6                             | 3.06  | 19.67      | 22.73 |
| 9   | 4              | 2                | 7                             | 6.33  | 4.74       | 11.07 |
| 10  | 7              | 3                | 12                            | 4.95  | 3.93       | 8.88  |
| 11  | 5              | 2                | 10                            | 2.91  | 7.41       | 10.32 |
| 12  | 5              | 3                | 16                            | 5.16  | 15.18      | 20.34 |
| 13  | 5              | 2                | 10                            | 2.73  | 14.60      | 17.33 |
| 14  | 6              | 3                | 16                            | 2.46  | 14.54      | 17.00 |
| 15  | 13             | 9                | 6                             | 4.38  | 10.49      | 14.87 |
| 16  | 7              | 4                | 5                             | 4.47  | 14.85      | 19.32 |
| 17  | 5              | 2                | 9                             | 2.34  | 15.36      | 17.70 |
| 18  | 4              | 1                | 4                             | 3.12  | 2.08       | 5.20  |
| 19  | 11             | 6                | 5                             | 2.48  | 5.25       | 7.73  |

Table 7 Folic acid content in cow's milk (continued).

| No.   | Age<br>(years) | Lactation<br>No. | Lactation<br>time<br>(months) | Folic acid content $\mu\text{g/ml}$ |            |            |
|-------|----------------|------------------|-------------------------------|-------------------------------------|------------|------------|
|       |                |                  |                               | free                                | conjugated | total      |
| 20    | 5              | 1                | 10                            | 1.32                                | 1.48       | 2.80       |
| 21    | 6              | 1                | 16                            | 2.67                                | 1.20       | 3.87       |
| 22    | 4              | 1                | 5                             | 2.82                                | 2.72       | 5.54       |
| 23    | 8              | 2                | 7                             | 3.12                                | 2.88       | 6.00       |
| 24    | 13             | 4                | 6                             | 5.04                                | 6.03       | 11.07      |
| 25    | 4              | 1                | 5                             | 7.32                                | 3.75       | 11.07      |
| 26    | 9              | 3                | 1                             | 8.76                                | 9.38       | 18.14      |
| 27    | 7              | 2                | 5                             | 3.33                                | 1.74       | 5.07       |
| 28    | 6              | 1                | 8                             | 6.60                                | 9.70       | 16.30      |
| Mean  |                |                  |                               | 3.92                                | 7.79       | 11.71      |
| S.D.  |                |                  |                               | 1.80                                | 5.97       | 6.37       |
| Range |                |                  |                               | 1.28-8.76                           | 1.20-20.91 | 2.80-25.47 |

TABLE 8

Free Folic Acid Content in Fresh, Pasteurized, and Sterilized Cow's Milk.

| No. | Age<br>(years) | Lactation<br>No. | Lactation<br>time<br>(months) | Free folic acid content<br>$\mu\text{g}/100\text{ml}$ |             |            |
|-----|----------------|------------------|-------------------------------|---|-------------|------------|
|     |                |                  |                               | fresh   | pasteurized | sterilized |
| 1   | 6              | 3                | 14                            | 4.02  | 2.16        | 2.52       |
| 2   | 6              | 3                | 16                            | 4.20  | 3.39        | 2.10       |
| 3   | 6              | 4                | 4                             | 1.86  | 0.90        | 0.81       |
| 4   | 6              | 3                | 10                            | 5.19  | 3.84        | 1.44       |
| 5   | 5              | 4                | 6                             | 1.28  | 0.99        | 0.90       |
| 6   | 5              | 3                | 6                             | 3.27  | 2.88        | 2.28       |
| 7   | 8              | 3                | 11                            | 4.56  | 2.34        | 4.44       |
| 8   | 13             | 9                | 6                             | 3.06  | 2.40        | 2.61       |
| 9   | 4              | 2                | 7                             | 6.33  | 4.56        | 3.06       |
| 10  | 4              | 1                | 4                             | 3.12  | 1.32        | 1.56       |
| 11  | 11             | 6                | 5                             | 2.48  | 0.66        | 1.05       |
| 12  | 5              | 1                | 10                            | 1.32  | 0.96        | 1.20       |
| 13  | 6              | 1                | 16                            | 2.67  | 1.02        | 1.74       |
| 14  | 4              | 1                | 5                             | 2.82  | 1.26        | 2.01       |
| 15  | 8              | 2                | 7                             | 3.12  | 0.75        | 2.04       |
| 16  | 13             | 4                | 6                             | 5.04  | 3.95        | 3.30       |
| 17  | 4              | 1                | 5                             | 7.32  | 3.24        | 4.36       |
| 18  | 9              | 3                | 1                             | 8.76  | 5.58        | 6.09       |



Table 8 Free folic acid content in fresh, pasteurized and sterilized cow's milk (continued).

| No.    | Age<br>(years) | Lactation<br>No. | Lactation<br>time<br>(months) | Free folic acid content<br>$\mu\text{g}/100\text{ml}$ |             |            |
|--------|----------------|------------------|-------------------------------|---|-------------|------------|
|        |                |                  |                               | fresh   | pasteurized | sterilized |
| 19     | 7              | 2                | 5                             | 3.33  | 1.95        | 2.65       |
| 20     | 6              | 1                | 8                             | 6.60  | 3.18        | 3.78       |
| Mean   |                |                  |                               | 4.01  | 2.36        | 2.49       |
| S.D.   |                |                  |                               | 2.00  | 1.42        | 1.36       |
| Range  |                |                  |                               | 1.28-8.76   | 0.66-5.58   | 0.81-6.09  |
| % loss |                |                  |                               |   | 41.14       | 37.90      |

TABLE 9

Conjugated Folic Acid Content in Fresh, Pasteurized and Sterilized  
Cow's Milk.

| No.    | age<br>(years) | Lactation<br>No. | Lactation<br>time<br>(months) | Conjugated folic acid content<br>$\mu\text{g}/100\text{ml}$ |             |            |
|--------|----------------|------------------|-------------------------------|---|-------------|------------|
|        |                |                  |                               | fresh   | pasteurized | sterilized |
| 1      | 6              | 3                | 14                            | 4.31  | 3.30        | 0.01       |
| 2      | 6              | 3                | 16                            | 2.13  | 1.81        | 2.70       |
| 3      | 6              | 4                | 4                             | 6.14  | 3.70        | 1.97       |
| 4      | 6              | 3                | 10                            | 3.41  | 1.90        | 2.69       |
| 5      | 5              | 4                | 6                             | 1.59  | 1.68        | 1.23       |
| 6      | 5              | 3                | 6                             | 12.71   | 10.32       | 3.05       |
| 7      | 8              | 3                | 11                            | 20.91   | 10.99       | 9.43       |
| 8      | 13             | 9                | 6                             | 19.67   | 15.13       | 8.32       |
| 9      | 4              | 2                | 7                             | 4.74  | 3.57        | 4.21       |
| 10     | 4              | 1                | 4                             | 2.08  | 1.15        | 0.91       |
| 11     | 11             | 6                | 5                             | 5.25  | 2.14        | 0.69       |
| 12     | 5              | 1                | 10                            | 1.48  | 1.17        | 1.34       |
| 13     | 6              | 1                | 16                            | 1.20  | 1.78        | 0.60       |
| 14     | 4              | 1                | 5                             | 2.72  | 1.47        | 1.12       |
| 15     | 8              | 2                | 7                             | 2.88  | 2.19        | 1.56       |
| 16     | 13             | 4                | 6                             | 6.03  | 5.25        | 3.23       |
| 17     | 4              | 1                | 5                             | 3.75  | 1.80        | 2.77       |
| 18     | 9              | 3                | 1                             | 9.38  | 2.09        | 2.45       |
| 19     | 7              | 2                | 5                             | 1.74  | 1.65        | 1.22       |
| 20     | 6              | 1                | 8                             | 9.70  | 5.89        | 8.22       |
| Mean   |                |                  |                               | 6.09  | 3.94        | 2.88       |
| S.D.   |                |                  |                               | 5.74  | 3.84        | 2.70       |
| Range  |                |                  |                               | 1.48-20.91  | 1.15-15.13  | 0.01-9.43  |
| % loss |                |                  |                               |   | 35.30       | 52.70      |

TABLE 10

Total Folic Acid Content in Fresh, Pasteurized and Sterilized Cow's  
Milk.

| No.    | Age<br>(years) | Lactation<br>No. | Lactation<br>time<br>(months) | Total folic acid content<br>$\mu\text{g}/100\text{ml}$ |             |            |
|--------|----------------|------------------|-------------------------------|--|-------------|------------|
|        |                |                  |                               | fresh  | pasteurized | sterilized |
| 1      | 6              | 3                | 14                            | 8.33   | 5.46        | 2.53       |
| 2      | 6              | 3                | 16                            | 6.33   | 5.20        | 4.80       |
| 3      | 6              | 4                | 4                             | 8.00   | 4.60        | 2.78       |
| 4      | 6              | 3                | 10                            | 8.60   | 5.74        | 4.13       |
| 5      | 5              | 4                | 6                             | 2.87   | 2.67        | 2.13       |
| 6      | 5              | 3                | 6                             | 15.98  | 13.20       | 5.33       |
| 7      | 8              | 3                | 11                            | 25.47  | 13.33       | 13.87      |
| 8      | 13             | 9                | 6                             | 22.73  | 17.53       | 10.93      |
| 9      | 4              | 2                | 7                             | 11.07  | 8.13        | 7.27       |
| 10     | 4              | 1                | 4                             | 5.20   | 2.47        | 2.47       |
| 11     | 11             | 6                | 5                             | 7.73   | 2.80        | 1.74       |
| 12     | 5              | 1                | 10                            | 2.80   | 2.13        | 2.54       |
| 13     | 6              | 1                | 16                            | 3.87   | 2.80        | 2.34       |
| 14     | 4              | 1                | 5                             | 5.54   | 3.73        | 3.13       |
| 15     | 8              | 2                | 7                             | 6.00   | 2.94        | 3.60       |
| 16     | 13             | 4                | 6                             | 11.07  | 9.20        | 6.53       |
| 17     | 4              | 1                | 5                             | 11.07  | 5.04        | 7.13       |
| 18     | 9              | 3                | 1                             | 18.14  | 7.67        | 8.54       |
| 19     | 7              | 2                | 5                             | 5.07   | 3.60        | 3.87       |
| 20     | 6              | 1                | 8                             | 16.30  | 9.07        | 12.00      |
| Mean   |                |                  |                               | 10.10  | 6.36        | 5.38       |
| S.D.   |                |                  |                               | 6.47   | 4.26        | 3.56       |
| Range  |                |                  |                               | 2.80-25.47   | 2.13-17.53  | 1.74-13.87 |
| % loss |                |                  |                               |  | 37.02       | 46.73      |

TABLE 11

Effect of Pasteurization and Sterilization on Folic Acid  
Content of Cow's Milk.

|                  | Folic acid content $\mu\text{g}/100\text{ml}$ |                                 |                                  |
|------------------|---|---------------------------------|----------------------------------|
|                  | free  | conjugated                      | total                            |
| Fresh milk       | 4.01 $\pm$ 2.00<br>(1.28-8.76)                | 6.09 $\pm$ 5.74<br>(1.20-20.91) | 10.10 $\pm$ 6.47<br>(2.80-25.47) |
| Pasteurized milk | 2.36 $\pm$ 1.42<br>(0.66-5.58)                | 3.94 $\pm$ 3.84<br>(1.15-15.13) | 6.36 $\pm$ 4.26<br>(2.13-17.53)  |
| Sterilized milk  | 2.49 $\pm$ 1.36<br>(0.81-6.09)                | 2.88 $\pm$ 2.70<br>(0.01-9.43)  | 5.38 $\pm$ 3.56<br>(1.74-13.87)  |

TABLE 12

Folic Acid Content in Pasteurized Milk.

| Brand                   | Folic acid content $\mu\text{g}/100\text{ml}$ |                 |                  |
|-------------------------|---|-----------------|------------------|
|                         | free  | conjugated      | total            |
| Foremost                | 2.82  | 11.35           | 14.17            |
| Kasetsart University    | 5.10  | 7.55            | 12.65            |
| Nong Phoe               | 3.52  | 9.03            | 12.55            |
| Nong Phoe (sweetened)   | 3.39  | 11.55           | 14.94            |
| Pure                    | 1.65  | 7.68            | 9.33             |
| Thai-Danish             | 5.70  | 12.63           | 18.33            |
| Thai-Danish (sweetened) | 5.58  | 4.77            | 10.35            |
| Mean $\pm$ one S.D.     | 3.97 $\pm$ 1.53                               | 9.22 $\pm$ 2.79 | 13.19 $\pm$ 3.00 |
| Range                   | 1.65 - 5.70                                   | 4.77 - 12.63    | 9.33 - 18.33     |

TABLE 13

## Folic Acid Content in Sterilized Milk.

| Brand                   | Folic acid content $\mu\text{g}/100\text{ml}$ |             |             |
|-------------------------|---|-------------|-------------|
|                         | free  | conjugated  | total       |
| Bear                    | 1.70  | 6.57        | 8.27        |
| Pure                    | 1.37  | 1.00        | 2.37        |
| Pure (sweetened)        | 1.36  | 0.51        | 1.87        |
| Thai-Danish             | 0.42  | 6.48        | 6.90        |
| Thai-Danish (sweetened) | 1.06  | 1.17        | 2.23        |
| Mean                    | 1.18  | 3.15        | 4.33        |
| S.D.                    | 0.48  | 3.09        | 3.02        |
| Range                   | 0.42 - 1.70                                   | 0.51 - 6.57 | 1.87 - 8.27 |

TABLE 14

## Folic Acid Content in Evaporated Milk.

| Brand               | Folic acid content $\mu\text{g}/100\text{ml}$ |                 |                 |
|---------------------|---|-----------------|-----------------|
|                     | free  | conjugated      | total           |
| Alaska              | 2.70  | 2.87            | 5.57            |
| Birdwings           | 3.69  | 7.99            | 11.68           |
| Carnation           | 4.10  | 2.69            | 6.79            |
| Dutch Baby          | 7.47  | 1.03            | 8.50            |
| Falcon              | 3.93  | 4.82            | 8.75            |
| Mali                | 2.24  | 0.75            | 2.99            |
| Mean $\pm$ one S.D. | 4.02 $\pm$ 1.84                               | 3.36 $\pm$ 2.70 | 7.38 $\pm$ 2.98 |
| Range               | 2.24 - 7.47                                   | 0.75 - 7.99     | 2.99 - 11.68    |

TABLE 15

Folic Acid Content in Sweetened Condensed Milk.

| Brand               | Folic acid content $\mu\text{g}/100 \text{ g}$ |                  |                  |
|---------------------|--|------------------|------------------|
|                     | free   | conjugated       | total            |
| Alaska              | 5.99   | 13.07            | 19.06            |
| Bear                | 10.13  | 12.89            | 23.02            |
| Birdwings           | 5.81   | 9.22             | 15.03            |
| Mali                | 5.40   | 12.83            | 18.23            |
| Rose                | 4.03   | 7.42             | 11.45            |
| Ship                | 5.52   | 14.09            | 19.61            |
| Mean $\pm$ one S.D. | 6.14 $\pm$ 2.07                                | 11.58 $\pm$ 2.63 | 17.73 $\pm$ 4.00 |
| Range               | 4.03 - 10.13                                   | 7.42 - 14.09     | 11.45 - 23.02    |

TABLE 16

## Folic Acid Content in Powdered Whole Milk.

| Brand                   | Folic acid content $\mu\text{g}/100 \text{ g}$ |              |              |
|-------------------------|--|--------------|--------------|
|                         | free   | conjugated   | total        |
| Alacta N.F.             | 55.89  | 94.91        | 150.80       |
| Allourie                | 11.70  | 16.30        | 28.00        |
| Bear (full protein)     | 56.70  | 65.23        | 121.93       |
| Bear (sweetened)        | 45.72  | 108.68       | 154.40       |
| Dumilk                  | 7.80   | 14.28        | 22.08        |
| Klim                    | 22.27  | 38.64        | 60.91        |
| Lactogen (full protein) | 51.39  | 88.34        | 139.73       |
| Molley                  | 15.73  | 17.64        | 33.37        |
| Nespray                 | 22.86  | 98.80        | 121.66       |
| Suan Dusit              | 10.55  | 26.89        | 37.44        |
| Mean                    | 30.06  | 56.97        | 87.03        |
| S.D.                    | 20.02  | 38.26        | 55.30        |
| Range                   | 7.80-56.70                                     | 14.28-108.68 | 22.08-154.40 |

TABLE 17

Folic Acid Content in Powdered Humanized Milk.

| Brand                     | Folic acid content, $\mu\text{g}/100\text{g}$ |              |              |
|---------------------------|---|--------------|--------------|
|                           | free  | conjugated   | total        |
| Bear (infant formula)     | 64.36   | 90.97        | 155.33       |
| Enfamil                   | 78.36   | 112.30       | 190.66       |
| Dumex                     | 15.84   | 10.56        | 26.40        |
| Lactogen (infant formula) | 39.78   | 90.86        | 130.64       |
| Mamex                     | 22.97   | 20.10        | 43.07        |
| Meiji                     | 151.45  | 90.68        | 242.13       |
| Nan                       | 119.40  | 83.16        | 202.56       |
| P-7f-Snow                 | 175.80  | 97.19        | 272.99       |
| Pelargon                  | 126.72  | 134.94       | 261.66       |
| S-26                      | 83.25   | 70.11        | 153.36       |
| Similac                   | 46.08   | 107.94       | 154.02       |
| Mean                      | 84.00   | 82.61        | 166.62       |
| S.D.                      | 53.13   | 37.32        | 80.37        |
| Range                     | 15.84-175.80                                  | 10.56-134.94 | 26.40-272.99 |



TABLE 18

## Folic Acid Content in Butter.

| Brand                       | Folic acid content $\mu\text{g}/100\text{g}$ |            |           |
|-----------------------------|--|------------|-----------|
|                             | free   | conjugated | total     |
| Allourie (Thai)             | 0.34   | 0.48       | 0.82      |
| Anchor (Thai)               | 0.10   | 0.35       | 0.45      |
| Buttergold (Thai)           | 0.27   | 0.07       | 0.34      |
| Dannie (Thai)               | 0.31   | 0.59       | 0.90      |
| Danelea (Danish)            | 0.40   | 0.28       | 0.68      |
| Kraft (Australia)           | 0.49   | 0.00       | 0.49      |
| Luprak (Danish)             | 0.59   | 0.82       | 1.41      |
| Normandy (unsalted, France) | 1.05   | 1.01       | 2.06      |
| Orchid (Thai)               | 0.15   | 0.16       | 0.31      |
| Mean                        | 0.41   | 0.42       | 0.83      |
| S.D.                        | 0.28   | 0.34       | 0.58      |
| Range                       | 0.10-1.05                                    | 0.00-1.01  | 0.31-2.06 |

TABLE 19

## Folic Acid Content in Cheese.

| Brand  | Folic acid content $\mu\text{g}/100\text{g}$ |            |            |
|--|--|------------|------------|
|  | free   | conjugated | total      |
| Chalet : Pasteurized process<br>Gruyere cheese (Switzerland) | 8.00   | 6.59       | 14.59      |
| Chesdale : Processed cheddar<br>cheese (Newzealand)          | 5.03   | 12.14      | 17.17      |
| Danish blue cheese (Denmark)                                 | 67.78  | 21.08      | 88.86      |
| Galaxy cheese (Newzealand)                                   | 4.72   | 18.66      | 23.38      |
| Kraft : Processed cheddar<br>cheese (Australia)              | 2.13   | 9.83       | 11.96      |
| Kraft : Philadelphia cream<br>cheese pasteurized (Australia) | 1.36   | 4.06       | 5.42       |
| Kraft : Pasteurized processed<br>cheese (Phillipines)        | 3.46   | 12.05      | 15.51      |
| Pasteurized Gruyere-<br>processed cheese (Australia)         | 3.58   | 8.21       | 11.79      |
| Pasteurized processed smoked<br>Gruyere cheese (Australia)   | 2.85   | 6.25       | 9.10       |
| Mean   | 10.99  | 10.99      | 21.98      |
| S.D.   | 21.38  | 5.72       | 25.59      |
| Range  | 1.36-67.78                                   | 4.06-21.08 | 5.42-88.86 |

TABLE 20

Folic Acid Content of Human Milk, Cow's Milk  
and Other Cow's Milk Products.

| Products                   | No. of samples | Folic acid content $\mu\text{g}/100\text{ml}^*$ |                                  |                                   |
|----------------------------|----------------|---|----------------------------------|-----------------------------------|
|                            |                | free  | conjugated                       | total                             |
| Human milk                 | 100            | 1.08 $\pm$ 0.89<br>(0.11-3.73)                  | 4.83 $\pm$ 3.17<br>(0.69-12.39)  | 5.91 $\pm$ 2.83<br>(0.96-13.68)   |
| Cow's milk                 |                |   |                                  |                                   |
| Fresh milk                 | 28             | 3.92 $\pm$ 1.80<br>(1.28-8.76)                  | 7.79 $\pm$ 5.97<br>(1.20-20.91)  | 11.71 $\pm$ 6.37<br>(2.80-25.47)  |
| Pasteurized milk           | 7              | 3.97 $\pm$ 1.53<br>(1.65-5.70)                  | 9.22 $\pm$ 2.79<br>(4.77-12.63)  | 13.19 $\pm$ 3.00<br>(9.33-18.33)  |
| Sterilized milk            | 5              | 1.18 $\pm$ 0.48<br>(0.42-1.70)                  | 3.15 $\pm$ 3.09<br>(0.51-6.57)   | 4.33 $\pm$ 3.02<br>(1.87-8.27)    |
| Evaporated milk            | 6              | 4.02 $\pm$ 1.84<br>(2.24-7.47)                  | 3.36 $\pm$ 2.70<br>(0.75-7.99)   | 7.38 $\pm$ 2.98<br>(2.99-11.68)   |
| Sweetened condensed milk** | 6              | 1.23 $\pm$ 0.42<br>(0.81-2.03)                  | 2.32 $\pm$ 0.53<br>(1.48-2.82)   | 3.55 $\pm$ 0.80<br>(2.29-4.60)    |
| Powdered whole milk***     | 10             | 5.01 $\pm$ 3.34<br>(1.30-9.45)                  | 9.50 $\pm$ 6.37<br>(2.38-18.11)  | 14.51 $\pm$ 9.22<br>(3.68-25.73)  |
| Powdered-humanized milk*** | 11             | 14.00 $\pm$ 8.87<br>(2.64-29.30)                | 13.77 $\pm$ 6.22<br>(1.76-22.49) | 27.77 $\pm$ 13.36<br>(4.40-45.49) |
| Butter****                 | 9              | 0.41 $\pm$ 0.28<br>(0.10-1.05)                  | 0.42 $\pm$ 0.34<br>(0.00-1.01)   | 0.83 $\pm$ 0.58<br>(0.31-2.06)    |

TABLE 20 Folic acid content of human milk, cow's milk and other cow's milk products (continued).

| Products    | No. of sample | Folic acid content $\mu\text{g}/100\text{ml}$ |                                  |                                   |
|-------------|---------------|---|----------------------------------|-----------------------------------|
|             |               | free  | conjugated                       | total                             |
| Cheese **** | 9             | 10.99 $\pm$ 21.38<br>(1.36-67.78)             | 10.99 $\pm$ 5.72<br>(4.06-21.08) | 21.98 $\pm$ 25.59<br>(5.42-88.86) |

\* Mean value  $\pm$  one standard deviation with range in parenthesis.

\*\* 100ml in this datum contained 20 g sample.

\*\*\* 100ml in this datum contained 16.67 g sample.

\*\*\*\* 100ml in this datum contained 100 g sample.

TABLE 21

Folic Acid Content in Milk and Milk Preparation Compare with those of other Authors.

| Products          | Folic acid content $\mu\text{g}/100\text{ml}$ |            |       | Reference                     |
|-------------------|---|------------|-------|-------------------------------|
|                   | free  | conjugated | total |                               |
| <u>Human milk</u> | 0.92  | -          | -     | Jathar <u>et al.</u> , 1970.  |
|                   | 2.4   | -          | -     | Matoth 1965.                  |
|                   | 1.543   | 1.657      | 3.193 | Areekul <u>et al.</u> , 1978. |
|                   | 1.529   | -          | -     | " " "                         |
|                   | 1.08  | 4.83       | 5.91  | Present study.                |
| Colostrum         | 0.44  | -          | -     | Ramasastri 1965.              |
| Transitional      | 0.84  | -          | -     | " " "                         |
| Mature            | 1.65  | -          | -     | " " "                         |
| <u>Cow's milk</u> |   |            |       |                               |
| Fresh             | -   | -          | 2.4   | Hodson 1949.                  |
|                   | 8.95  | -          | -     | Naiman and Oski 1964.         |
|                   | 3.6-4.3                                       | -          | -     | Ghitis <u>et al.</u> , 1965.  |
|                   | 5.5   | -          | -     | Ghitis <u>et al.</u> , 1966.  |
|                   | 10.0  | -          | -     | Luhby and Cooperman<br>1963.  |
|                   | 3.77  | -          | -     | Matoth 1965.                  |
|                   | 5.9   | -          | 7.7   | Dong and Oace 1975.           |
|                   | 6.77  | 6.65       | 13.59 | Areekul <u>et al.</u> , 1978  |
|                   | 8.16  | -          | -     | " " "                         |
|                   | 4.01  | 6.09       | 10.10 | Present study                 |

Table 21 Folic acid content in milk and milk preparation compare with those of other authors (continued).

| Products                   | Folic acid content $\mu\text{g}/100\text{ml}$ |            |       | Reference                    |
|----------------------------|---|------------|-------|------------------------------|
|                            | free  | conjugated | total |                              |
| Cow's milk.<br>Pasteurized | 5.4   | -          | -     | Ghitis <u>et al.</u> , 1966. |
|                            | 3.53  | -          | -     | Matoth 1965.                 |
|                            | 4.68  | -          | -     | Vongyuthitham 1977.          |
|                            | 3.97  | 9.22       | 13.19 | Present study.               |
| Sterilized                 | 1.4-2.2                                       | -          | -     | Ghitis <u>et al.</u> , 1965. |
|                            | 0.93  | -          | -     | Matoth 1965.                 |
|                            | 1.18  | 3.15       | 4.33  | Present study.               |
| Evaporated                 | 1.3   | -          | -     | Hodson 1949.                 |
|                            | 8.47  | -          | -     | Naiman and Oski 1964.        |
|                            | 3.39  | -          | -     | Vongyuthitham 1977.          |
|                            | 4.02  | 3.36       | 7.38  | Present study.               |
| Sweetened condensed        | 9.97  | -          | -     | Vongyuthitham 1977.          |
|                            | 6.14  | 11.58      | 7.38  | Present study.               |
| Powdered whole milk        | 1.46  | -          | -     | Vongyuthitham 1977.          |
|                            | 5.01  | 9.50       | 14.51 | Present study.               |
| Similac                    | 6.1   | -          | -     | Naiman and Oski 1964.        |
|                            | 7.68  | 17.99      | 25.67 | Present study.               |
| Klim                       | 3.6   | -          | -     | Ghitis 1966.                 |
|                            | 3.71  | 6.44       | 10.15 | Present study.               |
| Nan                        | 5.2   | -          | -     | Ghitis 1966.                 |
|                            | 19.90   | 13.86      | 33.76 | Present study.               |

**TABLE 21** Folic acid content in milk and milk preparation compare with those of other authors (continued).

| Products | Folic acid content $\mu\text{g}/100\text{ml}$ |            |       | Reference                    |
|----------|---|------------|-------|------------------------------|
|          | free  | conjugated | total |                              |
| Butter   | 0.0   | -          | -     | Hurdle <u>et al.</u> , 1968. |
|          | 0.41  | 0.42       | 0.83  | Present study.               |
| Cheese   | 0.06  | -          | -     | Hurdle <u>et al.</u> , 1968. |
|          | 10.99   | 10.99      | 21.98 | Present study.               |