CHAPTER 1

INTRODUCTION

The cotton plant was primarily grown for years only for the use of its fiber whereas the seed was of little value. At present, cotton seed becomes one of the major industries and takes one of the most important roles in economics of the world. As we know, edible vegetable oil can be obtained by extraction of cotton seed. The waste remained after extraction of cotton seed oil contains several useful and utilizable materials. Such materials are very short fiber called cotton fuzz, seed hull and kernel. Among these materials, cotton fuzz is considerably unseen useful substances. In fact, it provides pretty extensive application as for one of the most important raw materials or starting substances in manufacturing process of cellulose and its derivatives.

A well known member of cellulose derivatives to be commercially introduced with wide acceptance in its application is carboxymethylcellulose (CMC). It is the product commonly obtained from a reaction of monochloroacetic acid with alkali cellulose, and is generally supplied to the trade as the sodium salt known as sodium carboxymethylcellulose (Na-CMC). It is a white, granular, odorless and tasteless powder. It is also

readily soluble or dispersible in water or alkaline solution to form highly viscous solution which is useful for thickening, suspending and stabilizing.

The production of carboxymethylcellulose was first developed in Germany by Jansen in 1921 (1). However, it was not attained industrial status until the late 1930. The large scale uses began to emerge and commercial production appeared justified since World War II. In 1945, Hollabaugh, Burt and Walsh summarized the various uses of carboxymethylcellulose, particularly in the form of its sodium salt (2). Hollabaugh also cited out its numerous applications in the textile, paper and food industries and in the manufacture of drugs, ceramics, leather goods, paints and lacquers, films and filaments, and adhesives.

In Thailand, cotton seed is industrial used only in cottonseed-oil manufacture and its waste is transformed only to food for animals. According to the wide spread uses of cellulose and its derivatives in to-day daily and industrial applications, it is worthwhile to find out a way for utilizing the waste by using chemical conversion techniques in order to get other costly and useful products. The principal interest and purpose of this experiment is, therefore, to purify cellulose from cotton fuzz obtained from the local sources and to prepare

sodium carboxymethylcellulose with high degree of substitution from the cellulose obtained but, at this point, without consideration of the properties of the final products in actual utilization.

The analytical method employed in the course of preparation of Na-CMC is also the subject of interest. From the point of view of analytical chemistry, there are several methods both chemical and instrumental methods which can be used in the determination of percentage of sodium and hence the D.S. value. The instrumental techniques such as atomic absorption spectroscopy, though are widely used in other type of work in the determination of sodium but is considered not suitable for the work reported here because the use of the instruments has some limitations in industry owing to its high cost both in terms of initial expense and maintenance. Atomic absorption technique denotes any analytical method in which an element is atomized in order to permit the observation, selection and measurement of its absorption spectrum. The absorption is quantitatively a function of the concentration of atoms in the sample and can be shown by the photodetector. The sensitivity is good but the operation is rather delicate, the interference from other elements may be important. If a reliable result can be obtained in a reasonable length of time by the chemical analysis, almost always it is chosen in favour of the instrumental techniques since the cost of production will be lower. In the present work, the particular chemical method is chosen with reasons given in page 16.