The Detergent Industry in China

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Household laundry powders based on synthetic surfactants appeared in the Chinese market in 1959 and became popular with consumers. This is shown by the sharp increase in usage each year. In 1960, the country's total detergent production was 9,500 tons, amounting to 3% of all cleaning products. It increased to 31,000 tons in 1965 and to 1,004,500 tons in 1985, accounting for 53.13% of all cleaning products. Annual soap and detergents production for the past two decades is shown in Figure 1.

The major use of detergents in China is in private households. However, industrial usage has increased rapidly since 1980.

Among synthetic detergents in China, heavy duty detergent powders account for about 70% and paste products approximately 5%; the rest, or 25%, are liquid detergents for kitchen use, and shampoos. Recently, several kinds of superconcentrated laundry powders with bulk density of about 0.6 have been developed and are achieving a good reputation on the market. With the development of tourism, special detergents for hotel use have been put into production.

EXPLOITATION OF NEW PRODUCTS AND THEIR MARKET

Great change has occurred in the Chinese market in the last five years. First, the assortment of fabrics has changed. It was in 1975 that China began to make synthetic fibers. In 1980, statistical data showed that synthetic and blended fibers accounted for 33% of total fabrics; in 1984 they accounted for 46.7%. (If this included imported fabrics, the percentage would rise to 50%.) Artificial wool fabrics, especially acrylics, increased rapidly. All these changes stimulated the rapid growth of detergent products.

Second, clothing colors have changed greatly. People in China like to wear light-colored, more expensive clothes. Hair cleansing products have changed gradually from soap to shampoo and rinse. The variation of the objects to be washed certainly would cause changes in detergents to be used.

The third main factor is that the washing machine has become surprisingly popular in China. In 1980, there were 245,300 machines made and used in the country. This increased to 2,557,000 in 1982 and to 5,472,700 in 1984 and 6,339,500 in 1985.

The washing machine popularly used in China is the Japanese type, and synthetic fabrics are more suitably washed in cold water, so most of the laundry powder on the Chinese market is of the cold-wash type. New products that have been developed are many.

All-purpose detergents. Chinese consumers like to buy laundry powders that can be used for many kinds of fabrics, so most of our detergent formulations are for all-purpose laundry powder which can be used to wash cotton, linen, wool and synthetic fibers. One of the important formulation methods is to blend nonionics with anionics, using both as active ingredients. At the same time, detergent builder is being improved, too. The first stage of this exploration work is almost completed and now we are working to improve the blends, to make the new products better.

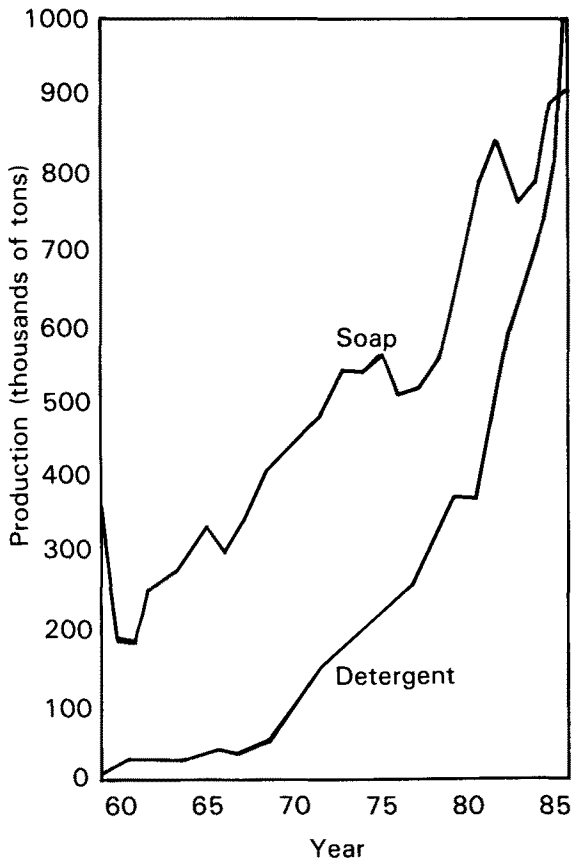

FIG. 1. Production of soaps and detergents.

Liquid laundry detergents, shampoo. In 1985, liquid soap appeared on the market and sales went well. This was because people found it easy to dissolve and convenient to pour a certain amount of liquid detergent into washing machines with a measuring cup. The plastic packaging industry in China also is growing rapidly, and it is possible to use plastic packaging at reasonable prices.

High bulk density super-concentrated laundry powder. Chinese consumers are particularly cautious about purchasing commodities. High bulk density superconcentrated laundry powder was popular, and consumers bought it after its trial sale in recent years. This kind of laundry powder is more suitable for fabric blends, for it contains more nonionic active agents.

Enzyme laundry powder. In the early 70's, enzyme laundry powder appeared on Shanghai markets and achieved good sales. After that, enzyme agents were improved quickly. The work done was to produce encapsulated enzymes to decrease the dust of enzymes and prolong their active life. Now, the total amount of enzyme laundry powder on sale, in some areas, was

about 40%. It is expected to be developed more in the future.

Disinfectant laundry powder. In institutions and industrial settings, a detergent needs not only to wash dirt away, but also to kill bacteria; because of this, we have on the market many laundry powders containing active chlorine.

Laundry powder containing oxidant. Although most Chinese consumers like to wash in cold water, they have special demands for the appearance of fine, bright and lustrous clothes. So, we have produced laundry powder containing sodium percarbonate and sodium perborate. Sales volume is not large yet, but manufacturers are optimistic about the future of the product.

Fabric softeners. Softeners containing cationic surfactants are on the market, and many first-class hotels have tried them. However, the electric dryer is not popularly used in Chinese households, and the need for adding antistatics is not urgent. The total sales of antistatics and softeners are not very large.

Bath products. Bath products have been introduced on the market as the use of cosmetics increased. Some first-class hotels supply them, and many families, such as in Guang Dong, Fu Jiang and Shanghai, use them.

Hard surface detergents. With the building of new hotels and the improvement of household sanitation and kitchen cleanliness, demands for hard surface detergents are increasing. There are now many research institutes and factories devoting themselves to the exploitation of these products.

Inexpensive dry cleaning detergents. Today, many Chinese consumers are concentrating their attention on clothing, and they commonly hope to use convenient dry cleaning detergents to deal with their better clothes. Absorption dry cleaning detergent is not welcome because of difficulties in packing. Some of the new products lately put on the market consist of solvents and few are water.

STUDY AND DEVELOPMENT OF NEW MATERIALS

China has a large population in a vast area, so the need for cleaning products is extremely large. The water hardness is quite different from South to North, and detergent compositions vary from one area to another. Some of the main materials used are:

Alkylbenzene. Since the very beginning of the detergent industry in China, linear alkylbenzene (LAB), instead of branched AB, was used as a raw material. Production units of small capacity, using paraffin chlorination as well as wax cracking processes, were established. At the end of 1980, a large LAB complex, with a capacity of 50,000 MTA using paraffin dehydrogenation process, licensed by UOP Inc., U.S.A., was built and commissioned in Nanking. The operation has gone quite well for five years, and the product quality was always first class. Now, this plant is being expanded. Plans for the construction of a new LAB production unit have been developed and will be implemented in the near future.

Fatty alcohol. Three plants in China are making fatty alcohols by means of high pressure hydrogenation. Owing to the lack of coconut oil, we did not have the chance to manufacture fatty alcohols previously, but that will be changed in the future. A project to develop synthetic alcohol has been started and the government is considering a program to build a factory that can produce 50,00 tons of synthetic alcohol each year.

Ethoxylated alcohol and its sulfate. Most of the ethoxylated alcohol used in China is imported because large-scale production of fatty alcohol and ethylene oxide is not yet possible. A plant for making ethylene oxide and alcohols with ethoxylation and sulfonation equipment has now been built, and I think the demand for AES, from now on, will gradually be supplied domestically.

Synthetic fatty acids. In the 60s and 70s, a synthetic fatty acid industry was established in China. The process technology adopted was paraffin wax oxidation developed by China. The total production capacity was 60,000 MTA. The products are used mainly for soapmaking, but a limited amount is used in fatty alcohol production.

STPP. In 1963, STPP production was started in China. In 1983, a large scale yellow phosphorus-STPP complex licensed from Hüchst A.G. W. Germany was built and commissioned in Kunming. For the time being the total production capacity of STPP, including that produced by the wet process, is about 130,000 MTA and basically meets the current demand.

Zeolite. As China is rich in aluminum, we are in a position to produce zeolite naturally. We produce both synthetic and natural zeolites, and we expect to supply more zeolites in the future.

China has an abundance of petroleum and animal and vegetable fats and oils. Its paraffin-based products are a good foundation on which to develop all kinds of surfactants.

The peroxidates developed will be in production. For cold wash in China, many detergent manufacturers are interested in using sodium percarbonates.

Environmental protection problems. China is a large country with abundant rivers and lakes. At present, detergent product consumption is low, and most of the products have a low phosphorus content. Eutrophication of waters by phosphorus is not a problem. The government has paid attention to that possibility, however, and there are now many research organizations starting to develop detergent products with low phosphorus contents. We have put several kinds of laundry powders containing zeolites on the market, and the government has prohibited the production of branched alkylbenzene. Now, biodegradation of alkylbenzene produced in China conforms with international standards.

It was reported a few years ago that BAS could cause deformities, and that affected China. Therefore, the Chinese government immediately organized its Public Health Division to investigate the matter. Tests were undertaken, and the results finally proved that ABS would not cause deformities.

DEVELOPING TRENDS OF THE DETERGENT INDUSTRY IN CHINA

With the new Chinese policy introduced recently, modernization of our detergent industry is being

accelerated. Since 1978, some of the large scale detergent factories in Shanghai, Beijing and Tianjing and other provinces have been studying the reformation technology which combines our own developed techniques with those introduced from abroad, such as increasing the capacity of spray powder manufacturers, stabilizing the bulk density of granular powders, fluidizing of powders, improving spray towers and developing techniques for film sulphonation. Equipment bought from abroad will be used to perfect our production.

As we are successful in developing superconcentrated powders, the technology of spray-mixing type production process will form a new type of manufacturing production.

Development of new materials during the coming five years will show chiefly in the increasing use of fatty alcohol products. Great progress will be made with some new materials that are used in liquids, such as liquid enzymes, polyacrylic acid salts, etc.

Development of industrial cleaners is increasingly important. With modernization of industry and other areas, large amounts of liquid detergents with good performance, which can replace solvents, are now used to clean metal spare parts and automobile bodies; they are needed in the maintenance of engines and equipment in China. A variety of these products is seen on the market, but they are still in development and need perfection.

On the whole, the detergent industry in China now is in the course of rapid development. Exchange of knowledge at this congress will surely promote wide cooperation between us and also is helpful in the development of the detergent industry worldwide.