International

Edible fats and oils in Korea: a brief report

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SUMMARY

The consumption of edible fats and oils in Korea is expected to reach 600,000 MT, a three-fold increase, in 10 years from 1979 to 1989. Even if the best efforts are applied to increasing the production of indigenous oil resources such as rice bran, rapeseed, sesame, perilla, peanut, and soybean, the dependence on imported fats and oils (about 80%) likely will continue. The rapid increase in consumption of edible fats and oils in future will certainly warrant intensified research efforts related to fat and oil production and consumption.

I. Demographics

The Republic of Korea, usually called South Korea or Korea, is in the southern part of the Korean Peninsula, which has been almost irreversibly partitioned from the northern part since the Korean War.

South Korea covers an area of about 98,970 square kilometers, which is slightly less area than the state of New York. The population in 1981 exceeded 39 million. The population of North Korea in 1979 was estimated to be about 17.5 million. North Korea covers an area of roughly 120,500 square kilometers.

During the 1970s, Korea experienced rapid industrialization as evidenced in the per capita GNP which climbed from $243 in 1970 to $1,546 in 1979 and in urban population which increased from 47% of the total population in 1967 to 71% in 1979.

Although Korea's per capita GNP is estimated to be one-sixth and one-eighth of that of Japan and the U.S., respectively, the rapid economic growth has brought relative material abundance to Korea and substantial improvement of living standards.

II. Consumption of edible fats and oils in Korea

In 1967, Korea consumed approximately 57,000 metric tons (MT) of fats and oils, 19,000 MT of which was edible fats and oils. The edible proportion to the total fats and oils has increased steadily from 34% in 1967 to more than 70% at present. Imported fats and oils in 1967 totaled about 5,000 MT, a quarter of the total edible fats and oils consumed in that year.

Annual consumption of edible fats and oils in 1980 was 198,000 MT, of which 156,000 MT was imported. It is estimated that the annual consumption will be more than 600,000 MT by 1989.

The vegetable oils most widely used in Korea in recent years have been soybean, rice bran, palm, rapeseed, sesame, and coconut oils. Besides these oils, red pepper seed, peanut, cottonseed, and perilla seed oils have been used in

small amounts. Consumption data are presented in Table 1.

By 1989, the annual consumption of soybean, rice bran, rapeseed, sesame, coconut, palm oils, beef tallow, lard, and fish oils is expected to reach 111,000, 29,000, 16,000, 15,000, 25,000, 26,000, 347,000, 7,000, and 17,000 MT, respectively. Since animal fats, coconut and palm oils, most of the soybean oil (as soybean), and part of the rapeseed oil have been imported, Korea's heavy reliance on imported fats and oils is likely to continue.

The dietary patterns of the Korean people seem to have changed significantly in recent years. The 1970s was characterized not only by continuous high economic growth, but also by extensive introduction of relatively new foods, such as various meat, dairy, and deep-fried products (Table 2). For example, Korea has been consuming annually a large amount of deep-fried instant noodle (well over 100,000 MT annually) and other deep-fried products with oil contents of 15% to 35%.

Per capita annual consumption of edible fats and oil increased four times during the 1970s, but was only one-third of that of Japanese and Chinese (Taiwan) in the same period. For example, the average daily per capita consumption of fats and oils (visible) for Korean, Japanese, and Chinese (Taiwan) in 1977 was estimated to be 9.3, 32.6, and 26.6 grams, respectively. Some nutritionists in Korea have insisted that the optimum daily fat intake for the average Korean adult lies between 15% to 25% of the daily total caloric intake. The current average fat intake is estimated to be roughly one-third of that level.

During the 1970s, Korea adopted agricultural policies similar to those of industrialized, export-oriented countries such as West Germany and Japan. Just like these countries, Korea has depended heavily on imported agricultural products for food, feeds, and fats and oils. Imported fats and oils now constitute about 80% of the total fats and oils consumed annually in Korea.

Indigenous oils in Korea are rice bran, rapeseed, sesame, red pepper seed, cottonseed, peanut, perilla, and soybean. Rice bran, sesame, perilla, peanut, and soybean have received special government attention as important oil sources that could reduce the dependence on the imported fats and oils.

In 1980, Korea produced 28,700 MT of rapeseed and 14,400 MT perilla seed which contain about 50% and 42% oil, respectively.

Although Korea has produced annually about 300,000 MT of soybeans, this has been consumed mainly by farmers for the production of soybean curd, soy sauce, and other fermented food products. Increased production of soybean oil from imported soybeans in recent years has caused some problems in increasing the production of indigenous rapeseed and perilla oils, neither of which has been able to compete with soybean oil without substantial government subsidies.

Unpolished rice contains 6% to 8% rice bran, which contains 18% to 20% oil and 12% to 18% good grade proteins. In 1979, Korea produced roughly 6 million MT of rice, with an estimated yield of 480,000 MT of rice bran. If the rice bran were used effectively for oil production,

TABLE 1

Annual production and imports[1] of edible fats and oils in the Republic of Korea during 1967-79 (Unit:M/T)

	1967	1973	1978	1979
Indigenous fats & oils				
Sesame oil	1,200	4,000	6,600	8,300
Rapeseed oil	6,200	9,500	7,500	9,400
Rice bran oil	3,300	6,500	14,500	15,200
Cottonseed oil	900	600	400	500
Red pepper seed oil	1,300	1,200	400	700
Other vegetable oils	900	9,200	900	800
Subtotal	13,800	31,000	30,300	34,900
Fish oils	–	–	1,200	1,300
Imported fats & oils				
Soybean oil	0	200	28,600	59,400
Cottonseed oil	0	800	1,300	1,200
Palm oil	0	4,600	2,700	14,200
Coconut oil	0	0	11,000	6,500
Corn germ oil	0	0	4,200	4,800
Other vegetable oils	0	100	1,800	2,100
Subtotal	0	5,700	49,600	88,200
Beef tallow	–	38,800	74,200	67,800
Lard	1,100	1,300	2,200	2,200
Fish oils	3,100	4,700	–	3,100
Other imported fats	600	1,200	–	–
Subtotal	4,800	46,000	76,400	73,100
Total	18,600	82,700	157,500	197,500
Percent degree of self-sufficiency	74	38	20	18
Per capita per annum consumption (unit:kg)	0.8	2.0	4.5	5.4

[1]Figures in the original source are expressed here in round numbers. Source: Ministry of Agriculture & Fisheries, Section of Agricultural Economy, Republic of Korea (1980).

TABLE 2

Increase of per capita Gross National Product and consumption of edible fats and oils and other important food items in the Republic of Korea during 1970-80

	1970	1975	1980
Per capita GNP (unit:$)	243	573	1,508
Annual consumption of edible fats & oils (unit:M/T)[1]	48,000	95,000	198,000
Per capita annual fat & oil consumption (unit:kg)	1.5	2.7	5.3
Per capita annual meat consumption (unit:kg)	8.3	9.3	13.9
Per capita annual milk consumption (unit:kg)	1.8	4.4	9.9
Per capita annual egg consumption (unit:kg)	3.2	4.0	5.6
Per capita daily total calorie intake (unit:Kcal)	2,370	2,390	2,590

[1]Figures in the original source are expressed here in round numbers. Source: Ministry of Agriculture & Fisheries, Republic of Korea (1981). (1981)

more than 80,000 MT of rice bran oil could have been produced. Actual production in 1979 was less than 15,300 MT.

Many research projects have been carried out for more efficient use of rice bran. Two types of problems seem to be involved: technical problems such as how to effectively inhibit rancidity development in rice bran prior to oil extraction and economic problems of establishing large-scale milling and oil extraction plants in several key regions. The government has encouraged small-scale operators to merge and establish large-scale modern plants by providing government and IBRD loans totaling together $50 million.

Korea annually imports a large quantity of beef tallow and lard for edible and industrial purposes. Although Koreans consume an increasing amount of meat and meat products every year, the use of domestic animal fats has been inefficient owing to the lack of large-scale modern processing plants.

III. Fats and Oils Industry

Although the appearance of contemporary oil extraction factories was recorded in 1910, the construction of truly modern oil production plants in Korea started in the 1960s. Until then, most Korean consumers bought oilseeds from farmers and sent the seeds to small-scale domestic oil shops for extraction. These small shops, which have been appropriately called "Killum-Jip" meaning "oil house," can still be seen in the side-streets of Seoul and other Korean cities.

The 1979 *Directory of the Korea Chamber of Commerce and Industry* listed more than 90 oil manufacturing companies each employing from 30 to more than a thousand persons. However, more than 70% of all edible fats and oils have been produced annually by six large manufacturing companies.

These companies are: Dong-Bang Oil Manufacturing Co., with an estimated annual production of more than 58,000 MT, mainly soybean and rapeseed oils; Je-Il Sugar Manufacturing Co., with an annual production of 30,000 MT, mostly soybean oil; Sam-Yang Food Manufacturing Co., with annual production of 20,000 MT, mainly soybean and salad oils; Lotte Sam-Gang Oil Manufacturing Co., with annual production of more than 22,000 MT of various oils, margarine, and shortening; Nong-Shim Food Manufacturing Co., with estimated annual production of 15,000 MT of mainly palm oil; and Seoul Food Manufacturing Company, with an annual production capacity of more than 40,000 MT, but actual production in 1980 of less than 20,000 MT of various oils, margarine, and shortening.

Responsibility for the quality of refined fats and oils has rested primarily on quality control laboratories of oil manufacturing plants. The safety and quality of fats and oils and fatty food products also have been monitored regularly by local or prefecture hygiene inspection laboratories, various consumer organizations, and the National Public Health Institute in Seoul.

IV. Research activities related to fats and oils

Research on edible fats and oils was not very active during the 1960s when annual consumption was less than one-tenth of the present level, and most edible fats and oils were processed by small-scale manufacturers. However, rising consumption of fats and oils and the development of wide varieties of dairy, meat, and deep-fried food products in the 1970s have shown the need to increase indigenous oil resources and to be more aware of the problems related to safety, keeping quality, and nutrition of these products.

Research to increase indigenous oilseed production has been undertaken at regional experiment stations and central research institutes of the Office of Rural Development (ORD), Ministry of Agriculture and Fisheries. The results of this research have not been effectively reflected or incorporated into national policies. Consequently neither farmers nor urban consumers seem to have benefited from these research activities. For example, despite the fact that many scientists have recommended the use of low-erucic, low-glucosinolate rapeseed, high-erucic rapeseed oils have been freely and frequently used as frying oils.

In addition to the regional and central institutes of the ORD, the Korea Advanced Institute of Science and Technology (on rice bran oil, frying oils, and antioxidants such as TBHQ), Food Research Institute (on rancidity problems of newly developed barley products) of Agriculture and Fisheries Corporation and many universities and colleges have contributed to the practical and academic research works on fats and oils and fatty food products. Seoul National University has actively engaged in research on the antioxidant activity of Korean ginseng; Korea University on the antioxidant activity of browning reaction products; Yonsei University on the lipid metabolism and nutritional aspects of some polyunsaturated fatty acids; Chungang University on the practical aspects of rancidity problems of deep-fried products; Dongkook and Hanyang Universities on the fatty acid or triglyceride compositions of various indigenous fats and oils and oil-containing seeds. These universities, all located in or near Seoul, are some of the institutes that are likely to become active centers for future fat and oil research in Korea.

Local national and private universities and colleges also have actively engaged in many specific research works on fats and oils. Notable among them is the National Fisheries College, Pusan, the second largest city in Korea. The college has published many works on the fats and oils related especially to Korean marine products.

Most of large oil manufacturing and food processing companies in Korea now have excellent quality control laboratories. Some companies recently have expanded their quality control laboratories into full-fledged food research institutes. However, their contribution in the fields of fats and oils is yet to be seen.

Korea has not experienced any major food poisoning incidents associated with rancid fats and oils. However, the danger of food poisoning has always existed and will continue.

The Korean government has solicited activities of various consumer organizations, but no consumer organization in Korea at present has ready access to facilities to test the quality of disputed commercial food products.

Cooperation among consumer organizations, universities, industry, and government agencies needs to be improved.