

CASEIN AND ITS IMPACT ON THE DOMESTIC DAIRY INDUSTRY

**Report to the Committee on
Ways and Means of the United States
House of Representatives
on Investigation No. 332-105
Under Section 332 of the
Tariff Act of 1930, as Amended**



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UNITED STATES INTERNATIONAL TRADE COMMISSION

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Overview

On May 21, 1979, the Committee on Ways and Means, U.S. House of Representatives, requested the United States International Trade Commission to conduct a study pursuant to section 332 of the Tariff Act of 1930 on casein and its impact on the domestic dairy industry. ^{1/} On June 21, 1979, the Commission instituted an investigation on casein and mixtures in chief value of casein focusing on the following four areas of interest as outlined in the Ways and Means Committee request:

- (1) Sources of supply and United States demand-utilization for casein (a protein derived from milk);
- (2) The history of recent United States import patterns in casein, the end uses of such imports, and the milk equivalent of such imports;
- (3) Estimates of future United States demand-utilization and supply trends in casein; and
- (4) The relationship of casein imports to various forms of domestic dairy production and demand.

The information presented in this report was obtained during the course of the investigation through a public hearing and questionnaire survey, Commission fieldwork and data files, and from other Government agencies.

Background on U.S. casein market supply and demand

Sources of supply.--U.S. production of casein, the principal protein of milk, declined precipitously in the early 1950's following the establishment of the price-support program for milk and butterfat as required under the Agricultural Act of 1949. Under this program, the Department of Agriculture established a purchase price for nonfat dry milk (as well as butter and Cheddar cheese), and as a result the domestic supply of skim milk used for the production of casein was subsequently diverted to the production of nonfat dry milk. Thus, with the institution of the price-support program, domestic production of casein became less profitable than the production of nonfat dry milk. Since the late 1960's imports of casein have been the sole source of U.S. supply. Imports of casein and mixtures of casein are among the few products derived from cow's milk that are not subject to quotas imposed under section 22 of the Agricultural Adjustment Act, as amended.

^{1/} The request from the Committee is reproduced in app. A.

The historical pattern of countries supplying U.S. casein imports has changed in recent years. During the period from 1974 to the present, New Zealand has supplied increasing quantities of U.S. imports of casein and mixtures of casein. Beginning in 1977 and continuing to the present, New Zealand has accounted for over 60 percent of the average annual 140 million pounds of U.S. imports of these products. Other suppliers of note during the period under review include Australia (18 percent) and Ireland (6 percent); the U.S.S.R., the United Kingdom, Poland, and Argentina supplied most of the remainder. In prior years, France, Argentina, and West Germany had been among the leading sources, supplying industrial rather than edible-grade casein. The decline in the importance of these suppliers in the U.S. market can be attributed to a number of factors including (1) the increased U.S. demand for casein and mixtures of casein for both human food and animal feed and (2) the presence of certain bovine diseases in these countries which would prevent the use of the casein imports in animal feeds in the United States, except under limited conditions.

Although total import levels of casein and mixtures of casein have fluctuated over the past two decades, they have shown a small, but irregular, upward trend. Imports in 1977 and 1978 reached 144 million pounds and 137 million pounds, respectively, and imports continued to increase somewhat during January-September 1979. The majority of imports have traditionally consisted of casein; however, mixtures of casein have increased their share of the total quantity of imports, increasing from 9 percent in 1974 to 14 percent in 1978 and to 19 percent in January-September 1979.

In studying dairy products and the impact of imports of specific products on the domestic dairy industry, the concept of "milk equivalency" has been developed to facilitate comparisons. For practical purposes, the only product available for making casein in the United States is fluid skim milk, that portion of the milk remaining after butter is made from whole milk. In terms of skim-milk equivalent (i.e., the amount of skim milk required to produce the product), the annual imports of casein and mixtures of casein have been equivalent to an annual average of about 21 percent of such domestic fluid skim milk production over the 1974-78 period. However, domestic producers realize greater returns (nearly \$5.00 more per hundred pounds of skim milk used) by converting the fluid skim milk into nonfat dry milk than by making it into casein, and therefore they do not produce casein.

U.S. demand.--Because there is no domestic production of casein, for practical purposes, imports are considered to be equal to U.S. demand.

Prior to the 1970's, imports of casein were chiefly used for industrial purposes such as in the manufacture of adhesives, coated paper, and certain paints. By 1974, however, the proportions of total casein and mixtures of casein utilized in a wide variety of human foods and to a lesser extent in animal feeds had stabilized at about 75 percent of imports. Presently, virtually all imports of mixtures of casein are used in human foods and animal feeds. According to data received in response to the Commission's questionnaire, about 79 percent of the reported usage of casein and mixtures of casein was in food and feed in 1978, and 21 percent was for industrial purposes. The

leading food uses include imitation cheese, coffee whiteners, bakery products, frozen desserts, and whipped toppings. The principal use of casein and mixtures of casein in animal feeds is as an ingredient in milk replacers which are fed to calves. The increase of casein in food and feed uses can be attributed to its price relative to that of nonfat dry milk and other substitutable products and to certain special functional characteristics of casein which make it more desirable in many end uses than either dairy products or other substitutes such as soy products. 1/

Casein, in the form of caseinates, is a water-soluble protein which has emulsifying and buffering characteristics and melting and keeping qualities which make it specially suitable for use in products which contain vegetable oils (e.g., whipped toppings, coffee whiteners, and cheese substitutes). These characteristics are not found to the same degree in nonfat dry milk or other dairy products. In addition, since casein does not contain the lactose (milk sugar) and/or butterfat found in other dairy products it can be used in products in which lactose or butterfat cannot be used or is undesirable.

Future U.S. demand and supply trends

Based on information obtained during the course of the investigation, imports of casein are expected to stabilize within a range of 140-150 million pounds over the next 5 years. This leveling off of imports is expected to be the combined result of rising import prices and absolute world supply constraints, which appear to be developing as producers of butter divert their milk supply to cheese. Hence, the raw material for producing casein (skim milk) is limited. Also, casein usage is experiencing increased competition from lower-priced materials such as soy products. Moreover, certain end-use markets for casein are almost saturated. In conjunction with the above factors, simple economic forecasting techniques were used during the investigation (see app. B). The results support the estimates given above.

The existing relative shares of casein consumption for industrial versus food and feed uses is expected to remain essentially constant over the next 5 years, although there will likely be internal shifts in end-uses within these categories. Imitation cheese, for example, will continue to increase its relative share due to increasing demand from the fast food industry and a cholesterol conscious public while the share of animal feeds may continue to decrease should lower-priced soy products gain further acceptance.

1/ According to data received from the Commission's questionnaire, at least 54 percent of the casein accounted for in food and feed uses was used exclusively because of its special functional characteristics rather than because of price. Of the remaining 46 percent, end users accounting for 10 percentage points reported that nonfat dry milk was a more expensive alternative for casein, but they would use nonfat dry milk if casein were not available. Those accounting for another 5 percentage points said that if casein were not available they would use soy proteins, even though nonfat dry milk was an alternative; they did not, however, indicate which ingredient they would use if the price of nonfat dry milk became favorable. Those accounting for another 6 percentage points said that soy protein was their only alternative to casein. Users accounting for 25 percentage points did not provide sufficient information to determine if casein could be replaced by another raw material. Data are not available to determine the degree, if any, to which the information presented above reflects vested interests.

The potential for domestic production of casein is mainly a function of price. Using the protein equivalency ratio offered at the hearing for nonfat dry milk to casein (3:1), it is reasonable to suggest that the U.S. price of casein would have to rise to at least \$2.40 per pound in order to bring forth domestic production. However, with the exception of a few products such as certain pharmaceuticals, special infant formulas, and perhaps commodities which use proportionately small amounts of casein, there would be little U.S. demand for casein and mixtures of casein at a price of \$2.40 per pound.

The relationship of casein and mixtures of casein to various forms of domestic dairy production and demand

At the Commission's hearing on this investigation, representatives of the domestic milk producers indicated concern that increasing amounts of casein and mixtures of casein are being used as ingredients in a wide variety of human foods and in animal feeds. The dairymen claim that casein and mixtures of casein are displacing certain dairy products, particularly nonfat dry milk, in these food and feed uses. Hence, they allege that the imported products are depressing the price of nonfat dry milk, or at least preventing it from rising to a level that would otherwise be attained. They contend that removals of surplus nonfat dry milk from the commercial market under the price-support program of the Department of Agriculture are larger than they would have been in the absence of the imports of casein and mixtures of casein. They allege, therefore, a significant correspondence between rising casein imports and greater purchases of nonfat dry milk by the Commodity Credit Corporation (CCC) of the Department of Agriculture.

The data collected during the course of the Commission's investigation indicate virtually no relationship between imports of casein and mixtures of casein and purchases of nonfat dry milk under the price-support program in recent years. Likewise, no clear relationship is apparent between imports and domestic production or consumption of nonfat dry milk. Additionally, no clear relationship is apparent between imports of casein and mixtures of casein and other forms of domestic dairy production. ^{1/} Products of the dairy industry are not considered by most of the end users of the imports to be a primary or technically viable substitute for casein in many of its current uses. In its industrial applications (accounting for 21 percent of casein consumption in 1978 as reported in the Commission's questionnaire), casein's competition comes primarily from soy and other products outside the dairy industry. In the area of food and feed uses (accounting for 79 percent of reported casein consumption in 1978), casein can be said to compete with natural cheese and nonfat dry milk in a technical sense. Imitation cheese, the primary food product made from casein, accounted for only an estimated 2 percent of total U.S. consumption of natural and imitation cheese in 1978 and, hence, cannot be considered significant competition for natural cheese. Imitation cheese also has certain special characteristics, e.g., low cholesterol and improved melting qualities, which cause it to appeal to a different set of consumers, and thus it cannot be considered to be totally substitutable for natural cheese. Further, there is not currently a formulation for imitation cheese which could wholly substitute other dairy products for the casein in imitation cheese. Indeed, during the investigation information was submitted suggesting

^{1/} See views of Chairman Joseph O. Parker, pp. 5-6.

that when a natural cheese is blended with an imitation cheese, that quantity of natural cheese may never have been consumed if not for the economic attractiveness contributed by the blending with the substitute cheese.

In other food uses in which casein and other dairy products might be considered substitutes, casein often exhibits characteristics which make it particularly suitable for use in the end products. For example, the whipping and emulsifying characteristics of casein and mixtures of casein reportedly are conducive to the production of such products as frozen desserts and whipped toppings, and the emulsifying and buffering characteristics of casein enable it to be used successfully to prevent "feathering" or coagulation in coffee whiteners. Further, virtually uncontested information was presented at the hearing that milk products, including nonfat dry milk, could not replace casein and mixtures of casein in a number of nutritional formulations, particularly those for persons intolerant to lactose or intact proteins.

Casein and mixtures of casein are sometimes blended with domestic whey for making so-called whey-blends, low cost ingredients which reportedly are used to replace nonfat dry milk in, among other things, animal feeds and bakery uses. Blends of casein and whey are used extensively in calf milk replacer and other animal feeds (25 percent of reported casein consumption for food and feed in 1978). Because of its substantially higher price, nonfat dry milk is not a viable competitor with the whey-blends used for feed. Soy or other vegetable proteins are believed to be more competitive with casein in feed uses. Bakery products (10 percent of reported casein consumption for food and feed in 1978) is by far the largest food use for these whey-blends. Undoubtedly, some of these whey-blends displace nonfat dry milk in some food uses. In others, a vegetable protein is more competitive than the nonfat dry milk--usually because of price considerations.

Views of Chairman Joseph O. Parker

In my judgment, an investigation of the impact of imports of casein will not be complete unless it includes an analysis of the domestic milk price-support program and the production and marketing of milk products in comparison with the conditions under which milk and milk products are produced and marketed by the countries exporting casein to the United States. The report of the Commission, in my opinion, does not contain adequate information with respect to these matters to warrant the conclusion stated on page 4 of the report that there is ". . . virtually no relationship between imports of casein and mixtures of casein and purchases of nonfat dry milk under the price-support program in recent years. Likewise, no clear relationship is apparent between imports and domestic production or consumption of nonfat dry milk. Additionally, no clear relationship is apparent between imports of casein and mixtures of casein and other forms of domestic dairy production."

The price-support program of the Department of Agriculture for milk is designed to support the price of milk. Such price support is made effective primarily through acquisition of the products of milk at specified prices. Casein, even though it is not commercially produced in the United States, is a constituent of milk and is indirectly supported under the milk price-support program. Inasmuch as casein is not directly supported, producers obtain

greater returns by not producing casein and converting fluid skim milk into nonfat dry milk.

According to information presented at the hearing by a number of domestic witnesses, including witnesses of the National Milk Producers' Federation, a price of about \$2.40 per pound would be necessary to induce domestic plants to divert fluid skim milk from the production of nonfat dry milk to the production of casein. Inasmuch as imported casein is being marketed in the United States at about 90 cents per pound, domestic supplies of skim milk cannot be converted to casein and compete with imported casein at the current level of prices. Hence, casein is not currently produced in the United States regardless of the demand therefor.

Although the report does not contain specific information which will permit an analysis of the disparity between the prices of imported casein and the cost of domestic production of casein, this disparity may be the result of a number of factors including price-support programs, subsidies, differences in costs of production, and differences in marketing systems. For example, under the domestic milk price-support program, casein is not directly price-supported and is not protected under section 22 import programs as are other primary products of milk. The Foreign Agricultural Service of the United States Department of Agriculture reports that, under the milk program in effect in the European Community, the price of milk is about \$13 per hundred pounds and that the production of casein benefits from a subsidy which averages about \$1.40 per pound. In New Zealand and Australia, the price of milk is about \$4.50 per hundred pounds and the Foreign Agricultural Service reports that it is not aware of any specific subsidy being paid on casein by Australia or New Zealand. The price of milk in the United States is about \$11 per hundred pounds. The Department of Agriculture reports that there are no generally accepted data available on the cost or pricing of milk and dairy products in the U.S.S.R.

Casein is delivered by the U.S.S.R., the European Community, and New Zealand and Australia to the United States at about one-third of the price that casein produced in the United States would have to receive under the current milk program. Thus, at present, the open U.S. market and domestic and foreign milk programs serve to induce imports of casein into the United States. In my judgment, more information is required to permit definitive economic conclusions to be made concerning comparative advantage, direct and indirect subsidization, or other causes resulting in the lack of production of casein in the United States and the impact of imports of casein.

Casein imports are trending upward and increasing quantities of imported casein are being used for the production of feed and food products, particularly imitation cheese. This imitation cheese is marketed in direct competition with other U.S. cheese products on the basis of lower prices. To the extent that these imports of casein may be displacing U.S. dairy products or preventing the production of domestic casein, such displacement would appear to have an adverse effect on domestic producers and the domestic milk program. The limited data available in the report on comparative costs, U.S. and foreign government support programs and the interrelationship of the extensive and complex domestic and foreign programs will not permit more detailed analytical judgment of the underlying factors affecting the production and imports of casein into the United States.

INFORMATION OBTAINED IN THE INVESTIGATION

Summary of Positions Concerning Casein Imports

Domestic milk producers

During the investigation, testimony was presented by representatives of the domestic milk producers that imports of casein and mixtures of casein had displaced domestic nonfat dry milk and other dairy products as ingredients in the production of food and feed. Price, rather than special functional characteristics, was given as the reason for much of this displacement. Many contended that on a protein-equivalent basis, one pound of casein is equal to three pounds of nonfat dry milk; however, imported casein is priced at about 90 cents per pound while the price of an equivalent amount of protein in the form of domestic nonfat dry milk is about \$2.40. As a result of the use of imported casein and mixtures of casein rather than domestic dairy products, the domestic milk producers' representatives contended that price-support purchases of nonfat dry milk by the Department of Agriculture have been excessive and that imports of casein and mixtures of casein for food and feed use should be restricted. They contended that domestic dairy products would be used in place of casein in most uses and that a domestic casein industry (which they claimed would require little capital investment) could and would be able to supply casein for those uses which require casein because of its special functional characteristics.

Importers and end users

The importers and end users of casein contended that the special functional characteristics of casein are not found in nonfat dry milk or other dairy products; a number of examples were cited. Further, they stated that if casein were not available they would most often substitute ingredients other than nonfat dry milk in their food and feed formulations. They stated that when the U.S. price-support program for milk began, domestic producers of casein realized greater returns by shifting to nonfat dry milk production. Hence, there is no domestic production of casein. End users contended that resumption of domestic casein production would probably involve an initial capital expenditure of at least \$100 million. They also stated that foreign production of casein is limited by the overseas shift from butter to cheese production (and hence reduced amounts of skim milk available to make casein). Any decreased casein utilization in the United States would add to the existing surplus whey disposal problem, according to the importers and end users, since whey is blended with casein in certain cases. In addition, the

importance to dairy farmers of casein as an ingredient in calf feed was pointed out. Finally, importers and end users pointed out that there is no apparent relationship between imports of casein and price-support purchases of nonfat dry milk. They concluded, therefore, that there is no justification for quotas or other import restrictions on imported casein.

During the investigation, detailed consideration was given to all the views presented and summarized above. It is within this framework that the Commission's assessment of the impact of imports of casein and mixtures of casein on the domestic dairy industry is presented.

U.S. Imports of Casein and Mixtures of Casein

History of recent U.S. import patterns and sources of supply

During the last two decades imports of casein and mixtures of casein 1/ fluctuated sharply from time to time while showing a small but irregular rising trend. 2/ The low points for such imports during this period were in 1963 at about 88 million pounds, in 1965 at 92 million pounds, and in 1975 at 58 million pounds; the high points were reached in 1970 at about 135 million pounds, in 1977 at 144 million pounds, and in 1978 at 137 million pounds. It is estimated that imports of casein and mixtures of casein will total about 150 million pounds in 1979. New Zealand and Australia have been the principal suppliers of casein and mixtures of casein to the United States for many years and, with the exception of 1975, supplied the bulk of U.S. imports each year since 1968. During 1974-78 and January-September 1979, New Zealand supplied increasing quantities of U.S. imports of casein and mixtures of casein. Such imports reached a level of more than 60 percent of the total beginning in 1977 (table 1, app. C). Imports from Australia, however, fluctuated somewhat and generally constituted less than 20 percent of U.S. imports. Other important suppliers during the period included Ireland, the U.S.S.R., the United Kingdom, Poland, and Argentina.

Imports of casein and mixtures of casein from countries or areas which have not been declared free of rinderpest and foot-and-mouth diseases by the U.S. Secretary of Agriculture are subject to regulations of the Animal and Plant Health Inspection Service (APHIS) of the Department of Agriculture

1/ The bulk of the mixtures of casein consist of caseinates. Because caseinates are water-soluble forms of casein, they are more suitable for certain end uses such as coffee whiteners, whipped toppings and frozen desserts, etc.

2/ Imports of casein and mixtures of casein averaged annually about 94 million pounds during 1959-63, 105 million pounds during 1964-68, 115 million pounds during 1969-73, and 113 million pounds during 1974-79.

(9 CFR 94.16). 1/ Such imports represent only about 10 percent of total U.S. imports of casein and mixtures of casein. Essentially, imports from countries or areas not declared free of the diseases, as well as products made from such imports, are not to be used in animal feed in the United States, except under limited circumstances as set forth in the regulations issued by APHIS. However, casein and mixtures of casein from such countries or areas may be used in human foods in the United States as the virus is not injurious to human health. They may also be used for industrial purposes.

Over the years, the historical pattern of countries other than New Zealand and Australia supplying casein and mixtures of casein to the U.S. market has changed. In 1974, France, Argentina, and West Germany (countries not considered to be free of rinderpest and foot-and-mouth diseases) were among the important U.S. suppliers. In the period 1976-78 and January-September 1979, however, the dominant suppliers were countries or areas free of the diseases; imports from such countries currently account for about 90 percent of the total. Although imports from countries free of the diseases may be used for industrial purposes as well as for food and feed, the increase in the relative importance of imports from countries or areas declared free of the diseases can be attributed to the increased U.S. demand for casein and mixtures of casein for human foods and animal feeds.

Most of the imports of casein and mixtures of casein consist of casein (table 2), an article free of duty since 1957. 2/ More recently, however, imports of mixtures of casein (table 3) have increased their share of the total imports, rising from 9 percent in 1974 to 14 percent in 1978 and to 19 percent in January-September 1979. 3/ Mixtures of casein are currently

1/ Countries or areas designated by the Secretary of Agriculture to be free of rinderpest and food-and-mouth diseases are Great Britain, Northern Ireland, the Republic of Ireland, Norway, Denmark, Sweden, Finland, Iceland, Greenland, Canada, the Territory of Saint Pierre and Miquelon, Mexico, Panama, and all Central American countries, most Caribbean Islands (except Cuba, Curacao, Martinique, and Guadeloupe), Australia, New Zealand, Japan, and the Trust Territories of the Pacific Islands.

2/ Under the Defense Production Act of 1950, imports of casein were controlled from Aug. 9, 1951, to Dec. 30, 1952.

3/ In the recently concluded Tokyo round of multilateral trade negotiations, casein retained its duty-free status. The rate of duty on imports of mixtures of casein from most-favored nations (except certain of the mixtures containing specified dried milk, and therefore subject to a quota of zero under sec. 22 of the Agricultural Adjustment Act, as amended) was reduced from 1.3 cents per pound to 0.2 cent per pound, as shown in app. D. This reduction will become effective beginning Jan. 1, 1980.

dutitable at 1.3 cents per pound if from most-favored-nation countries or areas and at 5.5 cents per pound if from countries or areas designated by the President as being under Communist control or domination.

End uses of the imports (demand-utilization)

Since there is no domestic production of casein, imports are, for practical purposes, generally equivalent to use or demand-utilization. Data are not available on stocks of casein and mixtures of casein; however, it is apparent from information collected during the course of this investigation that such stocks are maintained, e.g., the fact that imports were at extremely low levels in 1975, and yet use of the products remained almost constant. Exports of casein and mixtures of casein, only a small part of demand-utilization, have averaged about 1.2 million pounds annually in recent years (table 4) and shown no discernible trend.

It is generally believed that in the United States casein was used chiefly for industrial purposes until the early 1970's when the price of nonfat dry milk began to escalate. From information collected during the course of this investigation, the shift from industrial to food and feed uses appears to have slowed by 1974 as the share of casein and casein mixtures reportedly utilized for food and feed purposes increased slowly from 75 percent of total reported usage in 1974, to 79 percent in 1978, and to 81 percent in January-June 1979 (table 5). ^{1/}

At the hearing, the increase in the uses of casein and mixtures of casein in foods and feeds was attributed both to the competitive price of casein compared with the price of dairy products, particularly nonfat dry milk, and to the development of products dependent on the special functional characteristics of casein and mixtures of casein.

The production of imitation cheese accounts for the largest share, by far, of the food use of casein and mixtures of casein, according to data received in response to the questionnaire. In fact, during 1974-78 the use of casein in the production of imitation cheese increased substantially each year, both in weight and as a share of total usage for food and feed. Questionnaire data indicate this use rose from 2.9 million pounds (or 7 percent of the reported total of food and feed usage) in 1974 to 14.8 million pounds in 1978 (or 19 percent of the reported total food and feed use). Comparable data for January-June 1979 are 14.7 million pounds (or 30 percent of the reported total of food and feed use) indicating that the increasing

^{1/} The weight figures on which these ratios are based were collected by a questionnaire survey of firms that consume casein and/or mixtures of casein in their operations; these data, for instance, totaled in 1974 about 57 million pounds (about 50 percent of imports for that year), in 1976 about 72 million pounds (64 percent of imports), and in 1978, 100 million pounds (73 percent of imports).

demand for production of imitation cheese is continuing unabated. Reportedly, imitation cheeses are becoming increasingly popular with consumers because such cheese analogs are generally 25 to 50 percent less expensive than their natural counterparts. They are lower in cholesterol content and their melting characteristics coupled with low cost make them competitive in the fast food industry, particularly the pizza trade. According to data received in response to the questionnaire, U.S. production of imitation cheese increased from an estimated 30 million pounds in 1974 to 76 million pounds in 1978; in January-June 1979, it amounted to 59 million pounds. However, the production of cheese made from cow's milk is much greater than the production of imitation cheese, the former having increased from 3.8 billion pounds in 1974 to 4.4 billion pounds in 1978. In January-June 1979, production amounted to 2.3 billion pounds.

Among the other notable foods in which casein and mixtures of casein are used are coffee whiteners, frozen desserts and whipped toppings (table 5). The emulsifying and buffering characteristics of casein reportedly enable it to be used successfully in producing coffee whiteners, while its whipping and emulsifying characteristics are conducive to the production of frozen desserts and whipped toppings. At the hearing, information was presented that milk products, including nonfat dry milk, could not replace casein and mixtures of casein in a number of nutritional formulations, particularly those for persons intolerant to lactose or intact proteins; this information was virtually uncontested.

Casein and mixtures of casein are sometimes blended with domestic whey ^{1/} for making so-called whey-blends which, because of their lower cost, reportedly are used to replace nonfat dry milk in, among other things, bakery uses and animal feeds. According to data submitted in response to the Commission's questionnaire, the quantities of domestic dried whey mixed with casein and mixtures of casein reportedly used in making human foods and animal feeds in the United States increased about 58 percent from 1974 to 1978, or from 130 million to 205 million pounds. The animal feeds have consisted primarily of calf milk replacers which are ultimately purchased by domestic dairy farmers. Blends of whey and casein or mixtures of casein displace nonfat dry milk on a price basis in some products. Likewise, soy products reportedly also displace casein because soy proteins are less expensive than animal proteins. However, casein is preferred over soy proteins in a variety of applications. For example, coffee whiteners made with soy proteins allegedly tend to "feather" or coagulate, whereas those made from casein do not because the emulsifying and buffering characteristics of casein successfully prevent feathering. Calf feeds made with soy proteins, although

^{1/} Whey is the liquid byproduct of cheese production, and as the U.S. output of cheese rose during the last two decades, the large quantities of whey thus produced became a serious disposal problem. The average annual production of whey products in the United States increased from 364 million pounds during 1959-63 to nearly 1.2 billion pounds during 1974-78.

reportedly less costly to produce than those made from casein or mixtures of casein, result in less weight gain and higher mortality rates.

As casein became more widely utilized in the production of various foods and feeds, casein usage for specific industrial needs also underwent change during 1974-78 and January-June 1979 (table 5). Some of this change in casein usage in industrial products has occurred as lower priced soy proteins and chemical products such as synthetic resins have been substituted for casein. Unlike the food and feed product area, nonfat dry milk was never used in most of the industrial products. Data collected during this investigation indicate a growing importance of casein in the manufacture of adhesive products and a generally declining use in the manufacture of paper products. For instance, such data reveal that about 4.6 million pounds (or about 32 percent of the reported industrial use) was utilized in 1974 in the manufacture of adhesives compared to 10.8 million pounds (or 51 percent) in 1978. Data derived from questionnaire responses indicated that casein used for paper products increased irregularly from a reported 8.2 million pounds in 1974 to a reported 8.8 million pounds in 1977 and 1978, but the percent of casein used in paper manufacture decreased from 58 percent of total reported industrial usage in 1974 to 42 percent in 1978.

Generally, industrial grade casein is less expensive than edible grade. The price difference probably reflects the fact that the U.S. Food and Drug Administration requires that casein and mixtures of casein used in edible food meet designated health and hygiene standards. Also, purchase contracts often call for casein to be processed according to certain specifications as may be required for use in individual food product formulas.

The milk equivalent of imports

To study the impact of imports of specific products on the domestic dairy industry, the concept of milk equivalency has been developed. The milk equivalent of a quantity of a particular dairy product is the weight of whole milk it would have taken to produce the product. Caution should be exercised in using the term "milk equivalent," because none of the products made from milk include all solid constituents of milk in the same proportions as found in whole milk. The content of milk is 87.7 percent water, 3.7 percent butterfat, and 8.6 percent nonfat solids; thus, there are about 3 parts butterfat for each 7 parts nonfat solids. The further removed a product is from this ratio, the more misleading the use of milk equivalents may become.

Casein does not contain any of the butterfat in milk, nor does it contain all of the nonfat solids in milk. Consisting of only the principal protein of milk, it contains none of the other proteins and none of the lactose. Because casein is made from fluid skim milk, the only reasonable milk equivalent of casein would be the amount of fluid skim milk that would have been required to produce a given amount of casein, or the "skim milk equivalent" (SME). It takes about 35.7 pounds of fluid skim milk to produce 1 pound of casein. 1/

1/ U.S. Department of Agriculture, Conversion Factors and Weights and Measures for Agricultural Commodities and their Products, Statistical Bulletin 616, March 1979.

The following table shows the SME of total U.S. production of whole milk, of fluid skim milk produced as a coproduct of butter, of nonfat dry milk production (the fluid skim milk that is dried), and of imports of casein and mixtures of casein. Also shown are the ratios of the SME of imports of casein and mixtures of casein to the SME's of total U.S. milk production, of skim milk produced as a coproduct of butter, and of production of nonfat dry milk.

Skim milk equivalent (SME) of imports of casein and mixtures of casein, of U.S. production of whole milk, of skim milk as a coproduct of butter, and of nonfat dry milk, 1974-78

Item	1974	1975	1976	1977	1978
SME of imports of casein and mixtures of casein-----billion pounds--	4.0	2.1	4.0	5.1	4.9
SME of production of whole milk billion pounds--	109.4	109.4	113.8	116.1	115.3
Ratio of imports to SME of production of whole milk-----percent--	3.7	1.9	3.5	4.4	4.2
SME of production of fluid skim milk as a coproduct of butter-----billion pounds--	18.6	19.2	18.7	21.1	19.1
Ratio of imports to SME of production of fluid skim milk as a coproduct of butter-----percent--	21.5	10.9	21.4	24.2	25.6
SME of production of nonfat dry milk billion pounds--	11.5	11.4	10.5	12.6	10.5
Ratio of imports to SME of production of nonfat dry milk-----percent--	34.8	18.4	38.1	40.5	46.7

Source: Computed by the staff of the U.S. International Trade Commission.

The above table provides a general relationship of the SME of imports of casein and mixtures of casein to total production of whole milk, fluid skim milk, and nonfat dry milk. However, as noted, caution should be exercised in making comparisons of these imports to production of the different products. The most logical comparison is the SME of the imports of casein and mixtures of casein to the SME of the fluid skim milk that results from the production of butter. Thus, the imports of casein and mixtures of casein in 1978 can be calculated to be equivalent to about 25 percent of the casein contained in the available U.S. supply of fluid skim milk that resulted from the production of butter.

Estimates of Future U.S. Demand-Utilization and Supply Trends in Casein and Mixtures of Casein

Attempts to project future U.S. use and supply of casein and mixtures of casein involve examining past and present trends, understanding the myriad inter-relationships of factors that affect casein usage and supply, and making assumptions regarding the future trends of these factors. The following analysis is an attempt to consolidate information presented at the hearing, provided by written submissions, and obtained in responses to questionnaires. Appendix B of this report contains an econometric analysis which parallels the estimates of future U.S. demand-utilization and supply trends contained in this section.

Casein supplies

Imports are currently the only source of casein in the United States since there is no domestic industry manufacturing the product.

World supplies of casein depend on both the production of milk and how that milk is utilized. Milk which is processed into manufactured dairy products (i.e., that which is not consumed as a beverage) goes principally into two major channels: (1) cheese (which contains nearly all of the solids in whole milk) with its accompanying byproduct, whey; and (2) the coproducts butter (which contains only the fat found in whole milk) and skim milk (from which, in turn, nonfat dry milk or casein is produced). As the production of cheese rises, the production of butter and skim milk decreases. Since the world production of cheese has been growing both absolutely and relative to that of butter, there has been a decreasing amount of skim milk available to produce either nonfat dry milk or casein. Though world production of casein increased erratically from 311 million pounds in 1974 to a high of 373 million pounds in 1977 and 1978 (table 6), testimony at the hearing, which is supported by information obtained from other industry sources, suggested that for the foreseeable future production of casein probably has stabilized or peaked at about the 1977-78 production level (in 1979 casein production is estimated at about 362 million pounds).

New Zealand and Australia have been the principal sources of U.S. imports of casein in recent years, supplying about 80 percent of the imports during the last three years. Testimony at the hearing indicated that production in these countries is not expected to increase significantly in the foreseeable future. Production of casein in Argentina and France, both of which were significant suppliers to the United States in early years, reportedly has been limited by increased usage of the available milk supply in the manufacture of cheese.

Demand-utilization trends

The use of casein and mixtures of casein in the United States has increased erratically in recent years. Between 1974 and 1978, the quantity of the reported usage of casein and mixtures of casein in industrial products increased irregularly from 14.2 million pounds in 1974 to 21.1 million pounds

in 1978. However, the percent of reported industrial usage (as opposed to food and feed usage) decreased from 25 percent in 1974 to 21 percent in 1978 (table 5). In January-June 1979, the percent reported used in industrial products suggests a further possible decline.

The manufacture of paper products accounted for the largest industrial use of casein in 1974 and adhesives accounted for most of the remainder. However, adhesives have increased their share of industrial use since 1974 and have also accounted for the largest single industrial use.

Aggregate food and feed usage of casein has grown at a rate slightly higher than total casein usage. Also, in recent years, there have been significant shifts in the quantity of casein used in particular products. The principal food use, as reported in the Commission's questionnaire, is for imitation cheese. This is a fairly recent development, growing rapidly from 7 percent of total reported food and feed usage in 1974 to 19 percent in 1978 and rising further to 30 percent in January-June 1979.

The second largest reported use, in calf milk replacers, declined from 26 percent of reported food and feed use in 1974 to 17 percent in 1978 and to 13 percent in January-June 1979, although the absolute quantities increased in every year except 1978. Reported usage in other animal feed (including pet food) declined from 12 percent of total reported food and feed use in 1975 to 8 percent in 1978 and to 7 percent in January-June 1979. The quantities of casein reported used in these other animal feeds increased each year during 1975-78. The third largest use reported was in coffee whiteners. This use, as a percent of reported food and feed usage, declined from 26 percent in 1974 to about 16 percent in 1978, and to 14 percent in January-June 1979; however, the actual quantities reported used for coffee whiteners remained relatively constant over the period. Reported usage in bakery products and in frozen desserts and whipped toppings increased both as a percentage of total reported food and feed usage and in terms of actual quantities reported used.

Information supplied during the investigation and projections of past usage trends on a product-by-product basis give some indication of future usage. For industrial purposes, it is expected that overall usage in the next 5 years will change very little. Price increases in the early 1970's were followed by declining industrial usage. During 1974-78, industrial usage fluctuated, although it increased somewhat in absolute terms in the latter part of the period. As a percent of the total quantity used, industrial usage declined during 1974-78 and the decline continued during January-June 1979. It is believed that in many cases for which alternative products can be used, substitutions may have already been made. For other industrial uses, it is expected that the demand for casein in adhesives will increase at approximately its present rate, while that in paper making will probably continue at its present level.

Imitation cheese has been the fastest growing use of casein, and it also provides the largest potential for future growth. Many of the imitation cheese products developed thus far have been for institutional or fast-food outlet products, particularly the pizza trade. The standards of identity for cheese (which do not allow the use of casein without labeling the product as

"substitute" or "imitation") thus far appear to have kept casein from making larger inroads than it has into the total market for cheese, which is growing rapidly. However, food technologists are continuing to develop consumer-oriented products, principally imitation Italian-type and process cheeses. Some of the imitation cheeses also contain natural cheese. All reportedly sell for prices up to 50 percent less than their natural counterparts and appear to have been readily accepted by consumers.

The use of casein and mixtures of casein in frozen desserts is also restricted by standards of identity. Although casein products can be used in frozen desserts, the casein does not count toward minimum milk solids content as required by the standards. Currently, the use of casein products in frozen desserts is not expected to change; the production of these products has been increasing only slightly.

Whipped toppings and coffee whiteners have been replacements for cream for many years. Most displacement of cream by casein in these markets occurred about a decade or so ago. The use of casein in these products is not expected to increase significantly in the future. Casein already has the largest part of this market because of its favorable emulsifying and buffering characteristics in comparison to soy protein. However, there is some indication that use of casein in coffee whiteners may decline if less expensive soy protein can make inroads in the market.

Casein usage in other foods is expected to increase slightly in the future as food technologists discover additional formulations and new products in which its use is advantageous from a cost or functional standpoint. According to information received in the investigation, research efforts on the use of casein are still being conducted in the imitation cheese area.

Casein is used in animal feeds mostly in two types of products. First, it is used, blended with dried whey, as a substitute for nonfat dry milk in calf milk replacers. Here there may be some additional substitution, but the overall market for milk replacers is stable to contracting as the number of dairy calves is reduced with the declining size of the dairy herd. Secondly, it is used in certain semi-moist pet foods to add a chewy consistency to the product. The pet food market has been growing; the relative cost of casein compared with alternative protein sources, however, will probably restrict casein usage in pet foods to those particular types of products for which the functional characteristics of casein are essential.

Based on the information gathered in the investigation, it is believed that for the foreseeable future world supplies of casein will not be significantly different from current supplies and U.S. demand for casein will not increase significantly. The United States presently imports about 40 percent of the world's supply and would have to compete with other user countries for an increased share. Information was presented that annual world production of casein has stabilized at about 360 million pounds; past trends in production tend to verify this contention. During the period 1974-78, world production ranged from 243 million pounds (1975) to 373 million pounds (1978). Indeed, the 1979 estimate for production (362 million pounds) reflects a decline of about 10 million pounds from the two previous years.

Many parties to the investigation agreed that the production had stabilized--some even suggested it was declining--because in many countries, as is the case in the United States, supplies of milk are being diverted from the production of butter to the production of cheese. Therefore, the raw material for casein production (skim milk resulting from the production of butter) is declining. Also, some testified that other countries are intensifying their competition for available casein supplies as they are beginning to use casein in food products, as has been done in the United States. Usage of casein and mixtures of casein in the United States probably will not increase more than marginally and may even decrease on a per capita basis; however, usage probably will continue to shift among products, with some new uses being found and some old uses declining, mainly because of the use of less costly substitutes, such as soy protein.

Relationship of Imports of Casein and Mixtures of Casein to Various Forms of Domestic Dairy Production and Demand

U.S. production of whole milk has averaged about 122 billion pounds annually since 1976. Of that total, about 43 percent has been marketed for fluid use (drinking purposes), 25 percent to produce cheese and its byproduct (whey), 17 percent to produce butter and its coproduct, fluid skim milk (mostly made into nonfat dry milk in the United States, but in many other countries it is also made into casein ^{1/}), and the remaining 15 percent to make a number of dairy products, including ice cream and condensed and evaporated milk. U.S. production of milk and the various forms of domestic dairy production--butter, nonfat dry milk, cheese, and whey products--is shown in table 7 for the period 1974-78 and January-June 1979. Also shown in the table are the combined imports of casein and mixtures of casein and the quantities thereof used for food and feed and for industrial purposes as estimated from the data obtained from the Commission's questionnaire.

Imports of casein and mixtures of casein show a small, but irregular rising trend during 1974-78 and January-June 1979. Of the principal products made from milk, only cheese and whey clearly demonstrate an upward trend during this period; both butter and nonfat dry milk fluctuated without establishing a clear trend.

During 1974-78 and January-June 1979, the relationship of imports of casein and mixtures of casein to the various forms of domestic dairy production varied from product to product. There has not been a clear relationship between the imports of casein and mixtures of casein and the principal forms of domestic dairy production in recent years.

^{1/} From 100 pounds of fluid skim milk can be made (a) about 9 pounds of nonfat dry milk or (b) about 3 pounds of casein. The current U.S. wholesale price for nonfat dry milk is about 84 cents per pound; the price for casein is about 90 cents per pound. Thus, by making nonfat dry milk from 100 pounds of fluid skim milk, U.S. producers currently receive \$7.56 (9 pounds X 84 cents). However, should they make casein, receipts would total only \$2.70 (3 pounds X 90 cents).

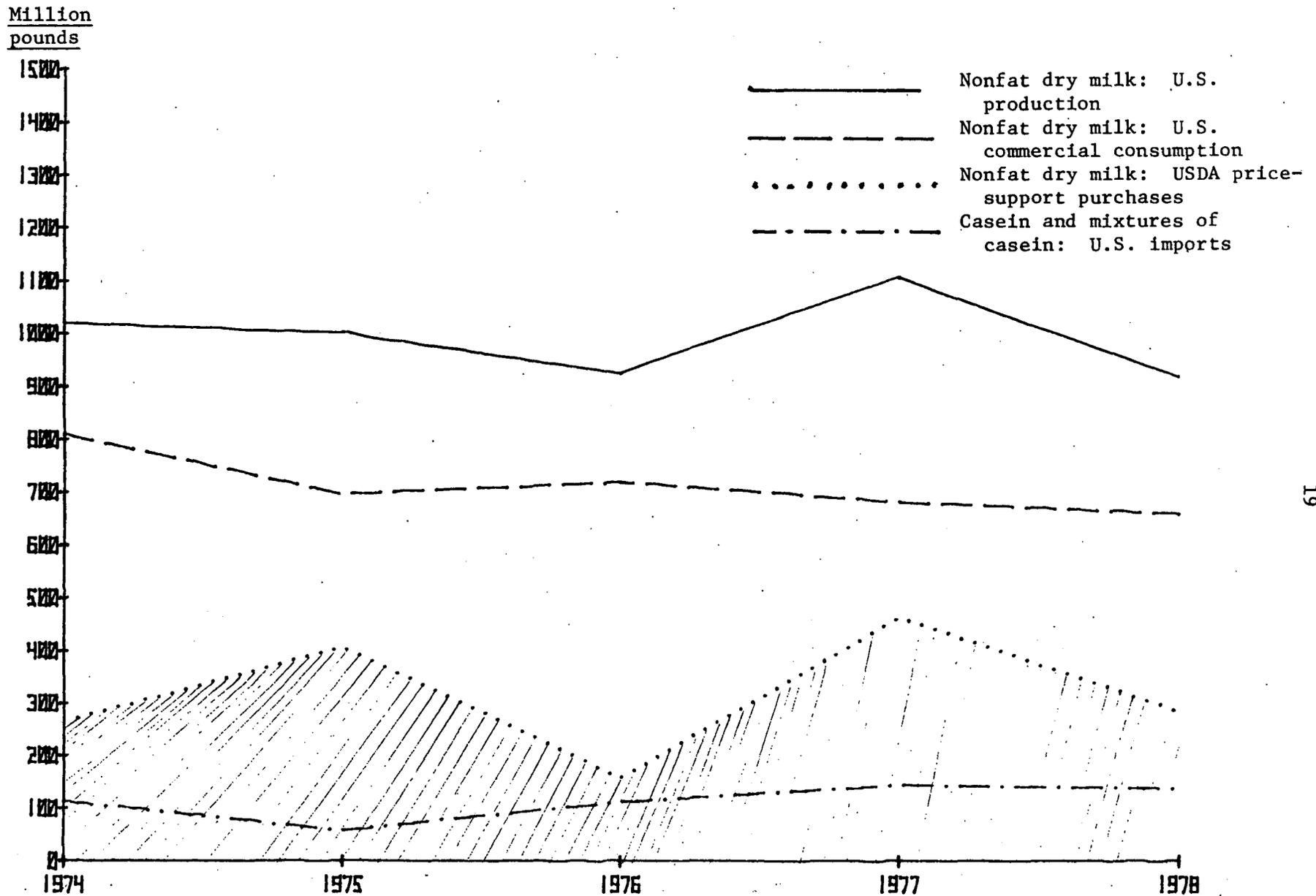
U.S. demand (commercial consumption) for whole milk and the principal products produced from it and imports of casein and mixtures of casein are shown in table 8 for 1974-78 and January-June 1979. During this period, the relationship of the imports of casein to the demand for the various dairy products varied from product to product. The demand for whole milk has increased and the demand for cheese has risen dramatically, even in the face of rising prices. The competition between cheeses made from milk and imitation cheeses appears to be limited. Imitation cheese currently accounts for only 2 percent of U.S. cheese consumption. The extent to which imitation cheese will make further inroads in the total cheese market is unknown; some firms reported, however, that they are currently conducting research on the use of casein in making cheese. The concentration of usage of imitation cheese appears to be in the institutional and pizza trade. The use of the product in that area appears to be fairly well accepted. U.S. production of cheese increased from 3.8 billion pounds in 1974 to 4.4 billion pounds in 1978; in January-June 1979, production amounted to 2.3 billion pounds. U.S. production of all imitation cheese for the same period, according to information obtained from the questionnaire, is estimated to have increased from about 30 million pounds in 1974 to about 76 million pounds in 1978; in January-June 1979 production amounted to about 59 million pounds. Contrary to the situation for cheese, the demand for butter and its coproduct, nonfat dry milk, has declined as prices have risen; also, butter is faced with significant competition from margarine.

At the hearing on this investigation much testimony was presented by representatives of the domestic milk producers that the imports of casein and mixtures of casein had displaced domestic nonfat dry milk as an ingredient in the production of food and feed. Price was given as the reason for this displacement. It was contended that on a protein-equivalent basis, 1 pound of casein is equal to 3 pounds of nonfat dry milk. However, it was pointed out that imported casein is priced at about 90 cents per pound, whereas the price of an equivalent amount of protein in the form of domestic nonfat dry milk is about \$2.40 per pound. As a result, the domestic milk producers' representatives contended that price-support purchases of nonfat dry milk by the Department of Agriculture have been excessive.

Figure 1 graphically shows the imports of casein and mixtures of casein and purchases of nonfat dry milk under the price-support program for the period 1974-78. At times, when imports have declined purchases have increased. Also, at times, as the imports have increased, purchases have declined. But there are periods when imports and purchases have tended to increase simultaneously. Therefore, there has been no clear relationship between the imports of casein and mixtures of casein and the purchases of nonfat dry milk under the price-support program in recent years.

To the extent that imports of casein and mixtures of casein are substitutable for nonfat dry milk in food and feed, imports could interfere with the price-support program. During the course of the investigation, the Commission tried to determine the substitutability of casein for nonfat dry milk in food and feed. At the hearing this issue was much discussed. Many stated that casein could and would be produced in the United States if the

Figure 1.--U.S. production, commercial consumption, and USDA price-support purchases of nonfat dry milk, and imports of casein and mixtures of casein, 1974-78.



Note.--  Area indicates USDA price-support purchases of nonfat dry milk.
Source: Tables 9, 10, 11, and 12.

price were to rise to a point where it became competitive with the purchase price established for nonfat dry milk under the Department of Agriculture's price-support program. Such production could take care of all domestic needs for casein they reported. They believed that the price would have to rise more than 2-1/2 times over what imported casein now sells for, i.e., from about 90 cents per pound to \$2.40 per pound, in order to bring forth domestic production. The domestic interests believed that the effect of imported casein was not limited to nonfat dry milk, but rather the imports impacted the demand and price of all components derived from domestic milk.

Many users of casein testified that should the product not be available, they would not use nonfat dry milk, mainly because of its high price and/or its lack of certain functional characteristics. They contended that they would use soy or other vegetable proteins in lieu of casein, or discontinue production of the food and feed products.

The fact that no substitutability exists between casein and nonfat dry milk in industrial and medical nutritional/pharmaceutical products was virtually uncontested during the investigation. Thus, based on information received in response to the questionnaire, at least 24 percent of the reported usage of casein and mixtures of casein in 1978 did not displace nonfat dry milk. Of the remaining 76 percent of the imports reported, imitation cheese, calf milk replacer, coffee whitener, bakery products, other animal feed (including pet food), frozen desserts and whipped toppings, breakfast foods, and diet foods, (in that order) accounted for the largest specified uses (81 percent of the total food and feed usage in 1978).

According to the information received from the producers of imitation cheese, nonfat dry milk is not a viable substitute for casein in the production of imitation cheese. If casein were not available for this purpose, they probably would discontinue production of the product, and sales of natural cheese might increase. Likewise, nonfat dry milk reportedly is not a substitute for casein in whipped toppings and coffee whiteners. If casein were not available, most producers of the items reported they would discontinue production, a few reported soy protein would be used as a substitute. Consumers, they agreed, would be either deprived of these convenience foods or would have available a less desirable substitute product. Under these conditions, however, the sales of fluid cream or condensed milk might increase since whipped toppings and coffee whiteners have been replacements for cream for many years.

The producers of certain animal feed calf milk replacers could substitute nonfat dry milk for casein. However, because of the price relationships, many indicated they would increase their usage of soy proteins if casein were not available. The producers of frozen dessert mixes would probably use dairy ingredients or soy proteins if casein were not available although some indicated they would discontinue production. About half of the producers of bakery products reported that they would use soy proteins, half would use dairy products.

In summary, end users of imports of casein and mixtures of casein used in food and feed covered by the questionnaire, who account for about 65 percent of the imports so used, reported that they would not use nonfat dry milk under current conditions if casein were not available. Rather, producers accounting for 54 percent said they would discontinue production of their products and those accounting for 11 percent said they would use soy or other vegetable proteins. It would be speculative to suggest the extent to which these statements merely reflect the self interests of the parties making them.

Table 13 shows that both market and support prices for the three products (butter, Cheddar cheese, and nonfat dry milk) purchased by the Department of Agriculture under the price-support program rose during 1974-79; some nearly doubled. Price-support purchases of the three products, shown in table 14, fluctuated widely during 1974-78 and January-September 1979 and showed no discernible trend.

APPENDIX A

LETTER AND RESOLUTION FROM THE COMMITTEE ON WAYS AND MEANS,
U.S. HOUSE OF REPRESENTATIVES, REQUESTING THE
U.S. INTERNATIONAL TRADE COMMISSION
TO CONDUCT A SECTION 332 STUDY
ON CASEIN AND ITS IMPACT
ON THE DOMESTIC
DAIRY INDUSTRY

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COMMITTEE ON WAYS AND MEANS

U.S. HOUSE OF REPRESENTATIVES

WASHINGTON, D.C. 20515

TELEPHONE (202) 225-3625

May 31, 1979

BUCKET NUMBER

#-580

Office of the Secretary
 Intl. Trade Commission

JOHN M. MARTIN, JR., CHIEF COUNSEL
 J. P. BAKER, ASSISTANT CHIEF COUNSEL
 JOHN K. MEAGHER, MINORITY COUNSEL

Honorable Joseph O. Parker
 Chairman
 U.S. International Trade Commission
 701 E Street, N. W.
 Washington, D. C. 20436

Dear Mr. Chairman:

On behalf of the Committee on Ways and Means and its Subcommittee on Trade, I would like to request that the International Trade Commission conduct a section 332 study on casein and its impact on the domestic dairy industry.

Attached is a resolution approved by the Committee defining the parameters of the requested study.

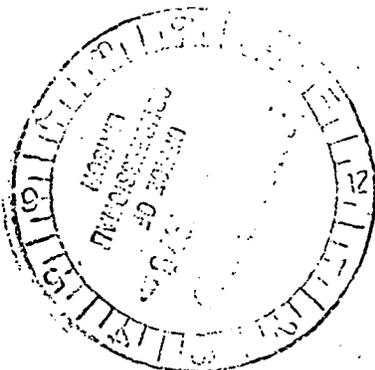
It is our understanding that the U.S. Department of Agriculture has previously completed studies on casein and may be in the process of updating some of their previous work on the subject. Therefore, we hope that you will work closely with the Department to coordinate your activities and avoid areas of duplication.

Thank you for your assistance in this request.

Sincerely yours,

Al Ullman
 Al Ullman
 Chairman

Enclosure
AU/HLb



RESOLUTION

Requesting the U.S. International Trade Commission to conduct a study of international trade in and domestic use of casein.

Pursuant to 19 USC 1332(g), the Committee on Ways and Means requests the United States International Trade Commission to conduct a study on the

- (1) sources of supply and United States demand-utilization for casein (a protein derived from milk),
- (2) the history of recent United States import patterns in casein, the end uses of such imports, and the milk equivalent of such imports;
- (3) estimates of future United States demand-utilization and supply trends in casein, and
- (4) the relationship of casein imports to various forms of domestic dairy production and demand.

To the extent feasible, the International Trade Commission should use such accurate data as is available from the United States Department of Agriculture so as to avoid duplication in data-gathering.

APPENDIX B

ESTIMATES OF FUTURE U.S. DEMAND-UTILIZATION AND SUPPLY TRENDS
IN CASEIN AND MIXTURES OF CASEIN

Estimates of Future U.S. Demand-Utilization and Supply
Trends in Casein and Mixtures of Casein

Demand-utilization trends

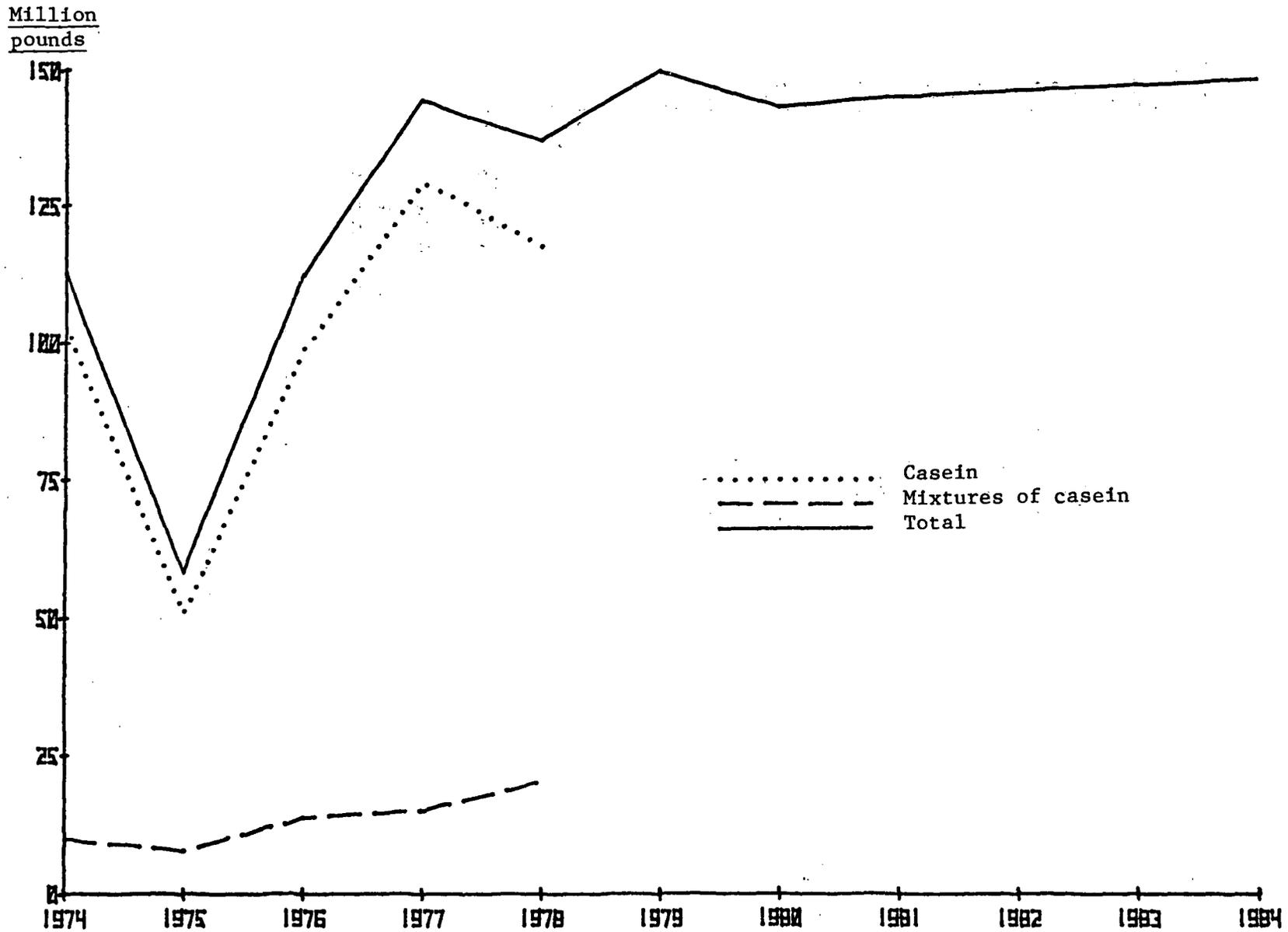
The demand for imported casein and mixtures of casein is wholly derived from the demand for industrial products, human food, and animal feed in which the imports are used as an ingredient. A review of the statistics (fig. 2) shows the importation of casein and mixtures of casein trending slightly upward in a highly erratic manner over the past few years.

In order to project imports of casein and mixtures of casein, an import demand function was developed. The more traditional import demand function specifies imports as dependent upon price, the price of the domestically produced substitute product, and an economic activity variable usually in the form of income (GNP). There is no domestic industry engaged in the production of casein, and attempts to specify an import demand function in terms of a potential substitute product proved unsatisfactory. ^{1/} Thus, the deflated market price of casein alone was used as a price variable, and real per capita disposable personal income was included as an income variable.

Statements by industry members indicated that the volume of imports of casein and mixtures of casein is determined mainly by the prevailing market price and consumer final demand, which tends to support the inclusion of the above described variables in the import demand function. It was further noted by industry members that contracts for imports of casein and mixtures of casein are let from 3 to 6 months and sometimes as many as 9 months in advance, and that these orders are subject to adjustments based on perceived changes in consumer behavior. For these reasons, different relationships between quarterly imports of casein and mixtures of casein and the price and income variables in earlier quarters were analyzed. The results indicated that the most statistically significant import demand function tested to date is one in which the imports of casein and mixtures of casein in any quarter are determined by the prevailing deflated market price of casein two quarters

^{1/} Specifically, when the deflated wholesale price of nonfat dry milk (suggested as a possible substitute intermediate good) or the Consumer Price Index for dairy products (suggested as a final demand substitute) were tested in conjunction with deflated market price of casein, nearly all statistical significance of the imports of casein and mixtures of casein was found to be attributed to the market price of casein. Moreover, a number of price relationships were examined during the investigation and none proved as statistically valid as the function contained herein.

Figure 2.--Casein and mixtures of casein: U.S. imports for consumption, 1974-78,
and import projections, 1979-84.



Source: Compiled from official statistics of the U.S. Department of Commerce; projections for 1979-84 made by the staff of the U.S. International Trade Commission.

earlier and real per capita disposable personal income in the previous quarter. ^{1/}

By virtue of having defined import demand for casein and mixtures of casein as a function of the deflated market price of these imports and real per capita personal income, the estimated future demand for these imports depends on the future level of these price and income variables. Using the method of least squares, time series for the explanatory variables (23 quarters and 14 quarters were used for income and price, respectively) were fitted and used to forecast quarterly price and income levels through the end of 1984. These forecasted prices and incomes were then used in the estimated import demand function for casein and mixtures of casein in order to forecast the level of demand through the same period. The results indicate that demand for imports of casein and mixtures of casein will average about 146 million pounds annually over the next 5 years, if income and prices continue to change over this period as they have over the past 3-7 years. (There has been relatively little change in recent years.) Deviations from the recent trends in prices or income would change the predicted levels of casein demanded in future periods.

Previously discussed data has shown that the percentage of total imported casein and mixtures of casein used in the two categories of industrial and food and feed products has been in the neighborhood of 23 percent and 77 percent respectively from 1974 to 1978. Although the data indicate that the proportion of imports used has shifted slightly to reflect relatively greater amounts of imported casein and mixtures of casein entering food and feed uses, there is insufficient evidence to suggest that a completely new trend has emerged. There is no reason to believe that the modest increases in imports of casein and mixtures of casein forecasted over the next 5 years will not continue to reflect the past distribution of these imports between the two broad categories of goods.

^{1/} The import demand function and appropriate statistics are as follows:

$$M_t = -9.427 + 0.014 Yd_{t-1} - 0.373 P_{t-2} \quad R^2 = 0.78$$

(1.83) (-4.15)

D-W = 2.19
Observations: 21

Where M_t = Quantity of imports of casein and mixtures of casein in time t

Yd_{t-1} = Real disposable income per capita in time t-1

P_{t-2} = Deflated casein market price in time t-2

Import supply

The supply for intermediate uses of casein and mixtures of casein comes entirely from abroad. The determinants of casein production throughout the world include the level of milk production and its alternative uses for making transportable and/or storable products such as cheese or butter and nonfat dry milk. Testimony presented at the Commission's hearing suggested that for the foreseeable future the world production of casein will remain stable at a level near the 1979 forecast production (362 million pounds). Indeed, some sources have suggested that casein currently is in tight supply because the supply of milk in many countries is being diverted to cheese.

The proportion of world casein production demanded by the U.S. market has averaged 37 percent for 4 of the 5 years during the period 1974-78; estimates for 1979 indicate the U.S. market demand will increase to about 42 percent (table 6). Assuming an average annual level for casein imports of 146 million pounds over the next 5 years, world production levels in the neighborhood of the current 360 million pounds would imply a continued U.S. share of approximately 40 percent of the total and would assure fairly stable prices. However, should more of the available milk supply in other countries be diverted to cheese production, considerable stress could develop in the market for casein and mixtures of casein if the U.S. requirements are to continue to be met.

Potential Domestic Supply

The potential for domestic production of casein is a function of price. Using the protein equivalency ratio suggested at the hearing for nonfat dry milk to casein (3:1), it is reasonable to suggest, as stated at the hearing, that the U.S. price of casein would have to rise to at least \$2.40 per pound in order to bring forth domestic production. The U.S. import demand function described above indicates that a price of \$2.40 per pound would effectively eliminate most of the U.S. demand for casein and mixtures of casein.

APPENDIX C
STATISTICAL TABLES

Table 1.--Casein and mixtures of casein: U.S. imports for consumption, by principal sources, 1974-78, January-September 1978, and January-September 1979

Source	1974	1975	1976	1977	1978	January-September--	
						1978	1979
Quantity (1,000 pounds)							
New Zealand-----	33,465	14,687	55,558	96,327	84,263	64,498	73,060
Australia-----	18,279	9,961	33,397	23,127	23,167	19,928	17,049
Ireland-----	7,327	5,657	3,320	4,299	9,188	7,097	9,338
U.S.S.R-----	3,758	3,342	1,934	4,315	4,496	3,372	3,520
United Kingdom---	2,962	659	269	1,669	2,997	2,330	1,508
Poland-----	6,759	3,989	2,822	4,301	4,307	3,956	1,703
Argentina-----	5,905	7,530	10,128	6,976	3,008	2,648	1,390
Norway-----	744	581	386	890	2,016	1,553	1,468
Netherlands-----	2,660	2,244	1,100	621	1,517	912	1,670
Canada-----	465	589	460	247	1,468	655	1,736
West Germany-----	5,457	3,433	1,134	450	217	206	168
France-----	22,841	5,192	176	97	55	55	452
All other-----	2,267	580	1,457	926	436	342	912
Total-----	112,889	58,444	112,141	144,245	137,134	107,553	113,974
Value (1,000 dollars)							
New Zealand-----	17,485	9,816	26,940	46,289	45,432	33,955	51,766
Australia-----	9,991	7,324	16,020	11,506	13,834	11,589	12,862
Ireland-----	4,216	4,427	1,493	2,514	5,984	4,486	7,350
U.S.S.R-----	2,039	1,711	732	1,701	2,362	1,766	2,108
United Kingdom---	1,722	413	183	979	2,096	1,549	1,164
Poland-----	3,884	1,890	1,215	1,832	2,034	1,856	1,014
Argentina-----	3,200	3,836	3,824	2,842	1,965	1,698	1,179
Norway-----	399	374	173	380	1,088	878	817
Netherlands-----	1,985	1,945	855	431	1,108	657	1,480
Canada-----	808	524	350	165	804	362	1,206
West Germany-----	3,256	2,361	649	260	103	117	120
France-----	15,138	3,544	98	49	35	35	412
All other-----	1,418	432	709	500	305	217	837
Total-----	65,541	38,597	53,241	69,448	77,150	59,165	82,315
Unit value (cents per pound)							
New Zealand-----	52	67	48	48	54	53	71
Australia-----	55	74	48	50	60	58	75
Ireland-----	58	78	45	58	65	63	79
U.S.S.R-----	54	51	38	39	53	52	60
United Kingdom---	58	63	68	59	70	66	77
Poland-----	57	47	43	43	47	47	60
Argentina-----	54	51	38	41	65	64	85
Norway-----	54	64	45	43	54	57	56
Netherlands-----	75	87	78	69	73	72	89
Canada-----	174	89	76	67	55	55	69
West Germany-----	60	69	57	58	47	57	71
France-----	66	68	56	51	64	64	91
All other-----	63	74	49	54	69	63	92
Average-----	58	66	47	48	56	55	72

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2.--Casein: U.S. imports for consumption, by principal sources, 1974-78, January-September 1978, and January-September 1979

Source	1974	1975	1976	1977	1978	January-September-- 1978	1979
Quantity (1,000 pounds)							
New Zealand-----	32,932	12,757	48,177	86,477	72,288	55,524	60,887
Australia-----	16,612	7,183	29,191	19,451	18,939	16,192	13,072
Ireland-----	4,675	5,657	3,210	4,266	9,041	7,064	8,603
U.S.S.R-----	3,758	3,342	1,934	4,315	4,496	3,372	3,520
Poland-----	6,759	3,989	2,822	4,301	4,307	3,956	1,703
Argentina-----	5,729	7,530	10,128	6,976	3,008	2,648	1,390
United Kingdom-----	1,651	483	<u>1/</u> 1	1,277	2,576	2,047	1,243
Norway-----	744	581	386	890	2,016	1,553	1,468
West Germany-----	5,457	3,433	1,134	433	190	190	132
France-----	22,841	5,192	176	97	55	55	414
All other-----	2,023	523	1,385	905	345	274	279
Total-----	103,181	50,670	98,544	129,388	117,261	92,874	92,711
Value (1,000 dollars)							
New Zealand-----	16,949	8,223	22,978	40,665	38,051	28,360	43,080
Australia-----	8,808	4,617	13,443	9,162	10,759	8,965	9,130
Ireland-----	3,077	4,427	1,423	2,495	5,855	4,459	6,782
U.S.S.R-----	2,039	1,711	732	1,701	2,362	1,766	2,108
Poland-----	3,884	1,890	1,215	1,832	2,034	1,856	1,014
Argentina-----	3,077	3,836	3,824	2,842	1,965	1,698	1,179
United Kingdom-----	1,097	263	<u>1/</u> 5	731	1,771	1,345	919
Norway-----	399	374	173	380	1,088	878	817
West Germany-----	3,256	2,361	649	247	103	103	78
France-----	15,138	3,544	98	49	35	35	373
All other-----	1,307	453	664	500	230	173	239
Total-----	59,031	31,699	45,204	60,604	64,253	49,638	65,719
Unit value (cents per pound) <u>2/</u>							
New Zealand-----	51	64	48	47	53	51	71
Australia-----	53	64	46	47	57	55	70
Ireland-----	66	78	44	58	65	63	79
U.S.S.R-----	54	51	38	39	53	52	60
Poland-----	57	47	43	43	47	47	60
Argentina-----	54	51	38	41	65	64	85
United Kingdom-----	66	54	<u>1/</u> 300	57	69	66	74
Norway-----	54	64	45	43	54	57	56
West Germany-----	60	69	57	57	54	54	59
France-----	66	68	56	50	64	64	90
All other-----	65	87	48	55	67	63	86
Average-----	57	63	46	47	55	53	71

1/ Data may contain error.

2/ Calculated from the unrounded figures.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3.--Mixtures of casein: U.S. imports for consumption, by principal sources, 1974-78, January-September 1978, and January-September 1979

Source	1974	1975	1976	1977	1978	January-September--	
						1978	1979
Quantity (1,000 pounds)							
New Zealand-----	533	1,930	7,381	9,850	11,975	8,974	12,173
Australia-----	1,667	2,778	4,206	3,676	4,228	3,736	3,977
Netherlands-----	2,660	2,244	1,100	621	1,517	912	1,670
Canada-----	432	547	460	225	1,455	648	1,607
United Kingdom-----	1,311	176	269	392	421	282	265
Ireland-----	2,652	22	110	33	147	33	735
All other-----	453	77	71	60	131	94	836
Total-----	9,708	7,774	13,597	14,857	19,873	14,679	21,263
Value (1,000 dollars)							
New Zealand-----	536	1,593	3,962	5,624	7,381	5,595	8,686
Australia-----	1,183	2,707	2,577	2,343	3,075	2,624	3,732
Netherlands-----	1,985	1,945	855	431	1,108	657	1,480
Canada-----	727	418	350	137	783	349	1,075
United Kingdom-----	625	150	183	248	325	204	245
Ireland-----	1,139	14	70	19	129	27	568
All other-----	315	71	40	43	96	71	810
Total-----	6,510	6,898	8,037	8,845	12,897	9,527	16,596
Unit value (cents per pound)							
New Zealand-----	101	83	54	57	62	62	71
Australia-----	71	97	61	63	73	70	94
Netherlands-----	75	87	78	69	73	72	89
Canada-----	168	76	76	60	54	54	67
United Kingdom-----	48	85	68	63	77	72	92
Ireland-----	43	66	64	57	88	82	77
All other-----	70	92	56	72	73	76	97
Average-----	67	89	59	59	65	65	78

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 4.--Casein and mixtures of casein: U.S. exports, imports for consumption, and apparent consumption, 1974-78 and January-June 1979 1/

(Quantity in thousands of pounds; value in thousands of dollars;
unit value in cents per pound)

Period	Exports	Imports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity				
1974-----	<u>2/</u> 2,297	112,889	<u>2/</u> 110,592	<u>2/</u> 102
1975-----	<u>2/</u> 676	58,444	<u>2/</u> 57,768	<u>2/</u> 101
1976-----	<u>2/</u> 1,127	112,141	<u>2/</u> 111,014	<u>2/</u> 101
1977-----	<u>2/</u> 934	144,245	<u>2/</u> 143,311	<u>2/</u> 101
1978-----	1,228	137,134	135,906	101
January- June 1979-----	341	79,684	79,343	100
Value				
1974-----	<u>2/</u> 2,029	65,541	<u>2/</u> 63,512	<u>2/</u> 103
1975-----	<u>2/</u> 931	38,597	<u>2/</u> 37,666	<u>2/</u> 102
1976-----	<u>2/</u> 1,190	53,241	<u>2/</u> 52,051	<u>2/</u> 102
1977-----	<u>2/</u> 1,086	69,448	<u>2/</u> 68,362	<u>2/</u> 102
1978-----	1,910	77,150	75,240	103
January- June 1979-----	697	55,324	54,627	101
Unit value				
1974-----	<u>2/</u> 88	58	-	-
1975-----	<u>2/</u> 138	66	-	-
1976-----	<u>2/</u> 106	47	-	-
1977-----	<u>2/</u> 116	48	-	-
1978-----	156	56	-	-
January- June 1979-----	204	69	-	-

1/ There has been no U.S. production of casein since the late 1960's. Although there is U.S. production of casein mixtures (caseinates), all is from imported casein.

2/ Estimated by the staff of the U.S. International Trade Commission.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 5.-- Reported distribution of usage of casein and mixtures of casein by product types, 1/ 1974-1978 and January-June 1979

	1974	1975	1976	1977	1978	January- June 1979
Quantity (1,000 pounds)						
Food and Feed:						
Imitation cheese-----	2,944	3,514	5,801	8,343	14,845	14,660
Calf milk replacer-----	10,925	10,939	12,191	14,455	13,628	6,174
Coffee whitener-----	10,968	9,954	11,859	10,993	12,514	6,773
Bakery products-----	2,071	2,172	4,868	6,782	7,624	4,349
Other animal feed (including pet food)-----	2/	4,830	4,924	6,002	6,570	3,253
Frozen desserts/whipped toppings---	2,333	3,363	3,778	5,021	6,288	4,369
Breakfast foods <u>3/</u> -----	1,973	2/	2/	3,212	2/	1,687
Medical/nutritional/ pharmaceutical-----	1,124	1,309	2,313	2,842	3,137	1,916
Diet foods-----	931	1,987	2,923	2,877	3,049	1,574
All other food-----	9,277	3,509	6,226	5,474	11,478	4,298
Total-----	42,546	41,577	54,883	66,001	79,133	49,053
Industrial:						
Adhesives-----	4,623	6,186	7,994	9,972	10,801	5,373
Paper products-----	8,216	5,922	7,921	8,791	8,775	5,136
Leather finishes-----	346	364	431	383	432	217
All other-----	1,051	891	886	1,003	1,059	601
Total-----	14,236	13,363	17,232	20,149	21,067	11,327
Percent of total quantity						
Food and Feed:						
Imitation cheese-----	7	8	11	13	19	30
Calf milk replacer-----	26	26	22	22	17	13
Coffee whitener-----	26	24	22	17	16	14
Bakery products-----	5	5	9	10	10	9
Other animal feed (including pet food)-----	2/	12	9	9	8	7
Frozen desserts/whipped toppings---	5	8	7	8	8	9
Breakfast foods <u>3/</u> -----	5	2/	2/	5	2/	3
Medical/nutritional/ pharmaceutical-----	3	3	4	4	4	4
Diet foods-----	2	5	5	4	4	3
All other food-----	22	8	11	8	15	9
Total-----	100	100	100	100	100	100
Industrial						
Adhesives-----	32	46	46	49	51	47
Paper products-----	58	44	46	44	42	45
Leather finishes-----	2	3	3	2	2	2
All other-----	7	7	5	5	5	5
Total-----	100	100	100	100	100	100

1/ Distribution by industrial uses and by food and feed uses was as follows:

Use	1974	1975	1976	1977	1978	January- June 1979
Quantity (1,000 pounds)						
Food and feed-----	42,546	41,577	54,883	66,001	79,133	49,053
Industrial-----	14,236	13,363	17,232	20,149	21,067	11,327
Total <u>4/</u> -----	56,782	54,940	72,115	86,151	100,200	60,380
Percent of total quantity						
Food and feed-----	75	76	76	77	79	81
Industrial-----	25	24	24	23	21	19
Total <u>4/</u> -----	100	100	100	100	100	100

2/ Data cannot be made public without disclosing business confidential information.

3/ Includes such items as cereal, imitation egg, and instant breakfast type products.

4/ Represents 50 percent, 94 percent, 64 percent, 60 percent, 73 percent, and 76 percent of the total quantity of imports of casein and mixtures of casein during 1974, 1975, 1976, 1977, 1978, and January-June 1979, respectively.

Source: Computed from data submitted in response to questionnaires of the U.S. International Trade Commission

Note.--Because of rounding, figures may not add to the totals shown.

Table 6.--Casein: World production and U.S. imports, 1974-79

Item	: 1974	: 1975	: 1976	: 1977	: 1978	: 1979 <u>1/</u>
World production-----million pounds--	: 310.8	: 242.5	: 324.1	: 372.6	: 372.6	: 361.6
U.S. imports-----do-----	: 112.9	: 58.4	: 112.1	: 144.2	: 137.2	: 151.8
Ratio of U.S. imports to world production-----percent--	: 36.3	: 24.1	: 34.6	: 38.7	: 36.8	: 42.0

1/ Estimated.

Source: World production compiled from official statistics of the U.S. Department of Agriculture; U.S. imports compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 7.--U.S. production of whole milk and the principal products produced therefrom, and imports of casein and mixtures of casein, 1974-78 and January-June 1979

(In millions of pounds, product weight)

Period	Whole milk	Principal products produced from milk				U.S. imports of casein and mixtures of casein			Total
		Butter	Nonfat dry milk	Cheese	Whey products	Used for foods and feeds ^{1/}	Used for industrial purposes ^{1/}		
1974-----	115,586	962	1,020	3,793	1,043	85	28	113	
1975-----	115,334	976	1,009	3,673	1,076	44	14	58	
1976-----	120,269	984	932	4,212	1,177	85	27	112	
1977-----	122,698	1,086	1,115	4,237	1,161	110	34	144	
1978-----	121,928	994	927	4,391	1,287	108	29	137	
1979									
(January- June)-----	62,735	549	490	2,328	596	65	15	80	

^{1/} Estimated from data obtained from the Commission's questionnaire. Usage of casein and mixtures of casein, as reported on the questionnaire, represented 50 percent, 94 percent, 64 percent, 60 percent, 73 percent, and 76 percent of the total quantity of such imports during 1974, 1975, 1976, 1977, 1978 and January-June 1979, respectively.

Source: Production compiled from official statistics of the U.S. Department of Agriculture; total imports compiled from official statistics of the U.S. Department of Commerce; use of the imports was estimated on the basis of data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 8.--U.S. demand (commercial consumption) for whole milk and for the principal products produced therefrom, and imports of casein and mixtures of casein, 1974-78 and January-June 1979

(In millions of pounds)

Period	Whole milk	Principal products produced from milk			U.S. imports of casein and mixtures of casein			Total
		Butter	Nonfat dry milk	Cheese	Used for foods and feeds ^{1/}	Used for industrial purposes ^{1/}		
1974-----	113,118	930	810	3,867	85	28	113	
1975-----	113,752	951	697	3,911	44	14	58	
1976-----	116,430	919	719	4,254	85	27	112	
1977-----	116,126	860	682	4,349	110	34	144	
1978-----	119,277	904	658	4,592	108	29	137	
1979								
(January-								
June)-----	59,265	443	313	2,318	65	15	80	

^{1/} Estimated from data obtained from the Commission's questionnaire. Usage of casein and mixtures of casein, as reported on the questionnaire, represented 50 percent, 94 percent, 64 percent, 60 percent, 73 percent, and 76 percent of the total quantity of such imports during 1974, 1975, 1976, 1977, 1978 and January-June 1979, respectively.

Source: Consumption compiled from official statistics of the U.S. Department of Agriculture; total imports compiled from official statistics of the U.S. Department of Commerce; and use of the imports was estimated on the basis of data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 9.--Nonfat dry milk: U.S. production, by quarters,
January 1974-September 1979

(In millions of pounds)

Year	: January- : March	: April- : June	: July- : September	: October- : December	: Total
1974-----	182.4	361.4	286.7	189.4	1,019.9
1975-----	267.2	361.6	210.1	162.6	1,001.5
1976-----	208.3	305.2	228.6	184.1	926.2
1977-----	230.1	356.2	306.8	213.5	1,106.6
1978-----	230.1	313.2	230.4	146.6	920.4
1979-----	186.1	304.8	<u>1/</u> 233.7	-	-

1/ Estimated.

Source: Compiled from official statistics of the U.S. Department of Agriculture, except as noted.

Table 10.--Nonfat dry milk: U.S. commercial consumption, by quarters,
January 1974-September 1979

(In millions of pounds)

Year	: January- : March	: April- : June	: July- : September	: October- : December	: Total
1974-----	266.4	222.8	181.9	138.8	809.9
1975-----	149.4	134.0	235.8	177.7	697.0
1976-----	182.0	188.5	200.7	148.0	719.2
1977-----	202.6	128.1	185.6	165.9	682.2
1978-----	177.9	135.2	190.3	155.0	658.4
1979-----	170.9	112.4	<u>1/</u> 196.9	-	-

1/ Estimated.

Source: Compiled from official statistics of the U.S. Department of Agriculture, except as noted.

Table 11.--Nonfat dry milk: U.S. Department of Agriculture price-support purchases, by quarters, January 1974-September 1979

(In millions of pounds)

Year	: January- : March	: April- : June	: July- : September	: October- : December	: Total
1974-----	10.3	39.5	131.2	84.0	265.0
1975-----	138.8	230.6	37.9	0	407.3
1976-----	19.2	44.1	47.9	45.9	157.1
1977-----	48.5	178.3	168.8	68.7	464.3
1978-----	63.8	133.1	72.8	15.2	285.0
1979-----	5.1	115.9	66.4	-	-

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 12.--Casein and mixtures of casein: U.S. imports for consumption, by quarters, January 1974-September 1979

(In millions of pounds)

Year	: January- : March	: April- : June	: July- : September	: October- : December	: Total
1974-----	38.8	28.7	28.9	16.5	112.9
1975-----	10.3	9.8	17.2	21.2	58.4
1976-----	25.3	21.8	31.8	33.1	112.1
1977-----	35.5	32.8	43.9	32.0	144.2
1978-----	44.4	30.0	33.1	29.6	137.1
1979-----	36.5	43.2	34.3	-	-

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 13.--Butter, Cheddar cheese, nonfat dry milk, and all milk for manufacturing: U.S. market prices, U.S. Department of Agriculture support prices, and price-support objective, 1974-79

Period	Butter (grade A) at Chicago		Cheddar cheese		Nonfat dry milk (spray process)		Milk for manufacturing		
	Market price	Support price	Market price (Wisconsin assembly points)	Sup- port price	Market price (U.S. average)	Sup- port price	Market price (U.S. average)	Price-support objectives	
								Amount	Per- cent of parity
-----Cents per pound-----									
1974: Apr. 1-Jan. 3 (1975)---	65.6	60.570	74.3	70.75	57.2	56.60	6.83	6.57	80
1975:									
Jan. 4-Mar. 31-----	67.7	68.070	76.4	77.25	60.3	60.6	6.97	7.24	80
Apr. 1-Oct. 1-----	75.9	69.193	85.1	79.25	61.5	60.6	7.46	7.24	75
Oct. 2-Mar. 31 (1976)-----	91.2	79.693	97.5	85.00	67.6	62.4	8.74	7.71	75
1976:									
Apr. 1-Sept. 30	96.5	85.817	98.6	90.50	63.0	62.40	8.54	8.13	80
Oct. 1-Mar. 31 (1977)	91.1	90.817	93.0	92.50	62.9	62.40	8.49	8.26	
1977: Apr. 1-Mar. 31 (1978)--	100.8	100.710	98.8	98.00	67.8	68.00	8.90	9.00	82.3
1978:									
Apr. 1-Sept. 30-----	109.8	196.710	105.1	103.25	71.3	71.00	9.44	9.43	<u>1/</u>
Oct. 1-Mar. 31 (1979)-----	115.4	111.300	118.3	106.00	75.8	73.75	10.78	9.87	80
1979:									
Apr. 1-Sept. 30-----	123.9	121.800	123.3	116.00	79.5	79.00	10.93	10.76	<u>1/</u>
Oct. 1-Nov. 30-----	<u>2/</u> 128.8	131.330	<u>2/</u> 128.8	124.00	<u>2/</u> 80.7	84.00	<u>2/</u> 11.60	11.49	80

1/ Not a change in price-support objective but a mid-year adjustment required by the Food and Agriculture Act of 1977.

2/ Prices are for the month of October.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 14.--Commodity Credit Corporation purchases, contract basis, butter, Cheddar cheese, and nonfat dry milk, by months, 1974-78 and January-September 1979

(In millions of pounds)														
Year and commodity	Jan-uary	Febru-ary	March	April	May	June	July	Aug-ust	Septem-ber	Octo-ber	Novem-ber	Decem-ber	Total	
1974:														
Butter-----	<u>1/</u> 1	<u>1/</u> 2	-	-	8	13	9	<u>2/</u>	-	-	-	1	34	
Cheddar cheese---	-	-	2	-	<u>2/</u>	3	31	1	4	7	17	6	72	
Nonfat dry milk--	9	1	3	3	<u>1/</u> 11	35	50	40	29	28	23	35	267	
1975:														
Butter-----	7	22	22	17	12	4	-	-	-	-	-	-	84	
Cheddar cheese---	8	12	15	9	5	7	<u>2/</u>	-	-	-	-	-	56	
Nonfat dry milk--	38	46	55	72	76	84	37	-	-	-	-	-	408	
1976:														
Butter-----	-	-	-	-	-	-	-	-	-	5	32	23	60	
Cheddar cheese---	-	-	1	1	3	6	-	-	-	2	28	21	62	
Nonfat dry milk--	7	6	13	18	25	33	39	27	19	16	24	29	258	
1977:														
Butter-----	21	45	-	34	35	23	16	13	-	7	5	<u>2/</u>	201	
Cheddar cheese---	16	16	6	22	13	8	14	24	3	1	<u>2/</u>	<u>2/</u>	125	
Nonfat dry milk--	33	34	16	38	63	73	65	63	36	26	22	20	490	
1978:														
Butter-----	26	39	19	27	17	5	<u>2/</u>	-	-	-	-	<u>2/</u>	134	
Cheddar cheese---	1	2	<u>2/</u>	11	16	12	2	-	-	-	-	-	44	
Nonfat dry milk--	29	23	12	28	55	57	47	15	5	6	5	3	285	
1979:														
Butter-----	9	2	-	14	26	8	-	-	-	-	-	-	-	
Cheddar cheese---	-	-	-	-	2	10	1	-	-	-	-	-	-	
Nonfat dry milk--	3	1	1	21	45	50	41	15	10	-	-	-	-	

1/ Includes purchases under sec. 4(a) of the Agriculture and Consumer Protection Act of 1973.

2/ Less than 500,000 pounds.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

APPENDIX D

Casein and mixtures in chief value thereof: Rates of duty scheduled to become effective as a result of the Tokyo round of trade negotiations

TSUS item No.	Article	Rate of duty	
		1	2
	Casein and mixtures in chief value thereof:		
493.15	Casein-----	Free	Free
493.16	Other, subject to quota <u>1/</u> -----	1.3¢ per lb.	5.5¢ per lb.
493.16	Other, not subject to quota-----	0.2¢ per lb.	5.5¢ per lb.

1/ Imports of certain dry milk mixtures are subject to additional import restrictions as set forth in item 950.19, pt. 3 of the Appendix to the TSUS (reproduced below):

950.19--Dried milk (described in items 115.45, 115.50, 115.55, and 118.05) which contains not over 5.5 percent by weight of butterfat and which is mixed with other ingredients, including but not limited to sugar, if such mixtures contain over 16 percent milk solids by weight, are capable of being further processed or mixed with similar or other ingredients and are not prepared for marketing to the retail consumers in the identical form and package in which imported; all the foregoing mixtures provided for in items 182.98 and 493.16, except articles within the scope of other import restrictions provided for in part 3 of the Appendix to the TSUS.

Library Cataloging Data

U.S. International Trade Commission.

Casein and its impact on the domestic dairy industry. Report to the Committee on Ways and Means of the United States House of Representatives on investigation no. 332-105 under section 332 of the of the Tariff act of 1930, as amended. Washington, 1979.

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1. Casein. 2. Dairying. 3. Dairy products. 4. Milk. I. Title.

UNITED STATES
INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C. 20436

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 - Change as Shown
- Please detach address label and mail to address shown above.