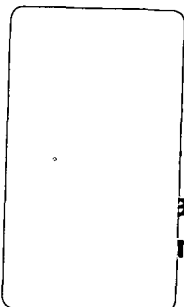


# Industry & Trade Summary

**Certain Miscellaneous  
Vegetable Substances  
and Products**



**USITC Publication 2898  
June 1995**



**INDUSTRIES  
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n, DC 20436**

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*This report was prepared principally by*

John Reeder

Agricultural Crops Branch  
Agriculture and Forest Products Division

**Address all communications to  
Secretary to the Commission  
United States International Trade Commission  
Washington, DC 20436**

## PREFACE

In 1991 the United States International Trade Commission initiated its current *Industry and Trade Summary* series of informational reports on the thousands of products imported into and exported from the United States. Each summary addresses a different commodity, industry area and contains information on product uses, U.S. and foreign producers, and customs treatment. Also included is an analysis of the basic factors affecting trends in consumption, production, and trade of the commodity, as well as those bearing on the competitiveness of U.S. industries in domestic and foreign markets.<sup>1</sup>

This report on miscellaneous vegetable substances covers the period 1989 through 1993, and represents one of approximately 250 to 300 individual reports to be produced in this series during the first half of the 1990s. Listed below are the individual summary reports published to date on the agricultural, animal, and vegetable products sector.

<i>USITC publication number</i>	<i>Publication date</i>	<i>Title</i>
2459	November 1991 .....	Live Sheep and Meat of Sheep
2462	November 1991 .....	Cigarettes
2477	January 1992 .....	Dairy Produce
2478	January 1992 .....	Oilseeds
2511	March 1992 .....	Live Swine and Fresh, Chilled, or Frozen Pork
2520	June 1992 .....	Poultry
2524	August 1992 .....	Fresh or Frozen Fish
2545	November 1992 .....	Natural Sweeteners
2551	November 1992 .....	Newsprint
2612	March 1993 .....	Wood Pulp and Waste Paper
2615	March 1993 .....	Citrus Fruit
2625	April 1993 .....	Live Cattle and Fresh, Chilled or Frozen Beef and Veal
2631	May 1993 .....	Animal and Vegetable Fats and Oils
2635	May 1993 .....	Cocoa, Chocolate, and Confectionery
2636	May 1993 .....	Olives
2639	June 1993 .....	Wine and Certain Fermented Beverages
2693	November 1993 .....	Printing and Writing Paper
2726	January 1994 .....	Furskins
2737	March 1994 .....	Cut Flowers
2749	March 1994 .....	Paper Boxes and Bags
2762	April 1994 .....	Coffee and Tea
2865	April 1995 .....	Malt Beverages
2859	May 1995 .....	Seeds
2825	May 1995 .....	Certain Fresh Deciduous Fruits
2898	June 1995 .....	Certain Miscellaneous Vegetable Substances and Products

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<sup>1</sup> The information and analysis provided in this report are for the purpose of this report only. Nothing in this report should be construed to indicate how the Commission would find in an investigation conducted under statutory authority covering the same or similar subject matter.



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## INTRODUCTION

This summary covers miscellaneous vegetable substances and products that are mainly provided for in chapters 12, 13, and 14 of the *Harmonized Tariff Schedule (HTS)*. All of the products found in chapter 13 are included, except for opium (the importation of which is illegal). Foliage, branches, and Christmas trees found in chapter 6 of the *HTS* are also included. The summary provides information on the structure of the U.S. and certain foreign industries, domestic and foreign tariff and nontariff trade measures, and the competitiveness of U.S. producers in foreign and domestic markets. A description of the products covered, the U.S. rates of duty, and U.S. exports and imports are shown in table A-1 in appendix A. The period of analysis is the 1989/90-1993/94 market year period.<sup>1</sup>

The articles covered in this summary include a wide variety of crude and processed vegetable products that are used largely as food, beverage, or flavoring ingredients, and, in the case of Christmas trees and cut foliage, as decorations. Total U.S. international trade in these products amounted to nearly \$1 billion in 1993. The seven most important products traded (based on U.S. import and export trade in 1993) were hops and hop byproducts, ginseng, vanilla beans, herbs, cut foliage branches, licorice root and extract, and guar gum, as shown in the following tabulation compiled from official statistics of the U.S. Department of Commerce (1,000 dollars):

<sup>1</sup> The "split" year refers to the market or crop year. The market years vary by crop. For example, hops has a September 1 - August 31 market year. Hence, 1989/90, for example, refers to the September 1, 1989 - August 31, 1990 period.

In terms of domestic production, in descending order by estimated value, the most important products covered in this summary are evergreen Christmas trees, hops and hop byproducts, mucilages and thickeners (such as guar gum and carrageenan), and ginseng. Many of the products covered by this summary are imported as raw materials, and then used as ingredients to make food, pharmaceutical, or industrial products.

Given the large number of products covered in this summary, the products have been divided into four groups: (1) hops, hop extract, and lupulin; (2) dried foliage, fibrous substances, and Christmas trees; (3) natural gums, lacs, balsams, resins of natural origins, and mucilages; and (4) botanical products for perfumery, flavoring, and pharmacy—crude, fresh, or dried.

The importance of international trade to each of these product groups varies considerably. Imports supply virtually all of the crude natural gums and resins consumed in the United States; guar gum and pine gum are the principal natural gums grown domestically. Domestic consumption and production of natural gums and flavorings used in foods has risen since the early 1980s, a reflection of heightened consumer demand for natural food stabilizers, additives and flavors, such as vanilla. U.S. sales of all gums, food emulsifiers,<sup>2</sup> and other water-soluble polymers (including synthetic gums and starches) are believed to

<sup>2</sup> Emulsifiers are food additives used to improve the texture, "feel," and appearance of processed food.

Item	U.S. imports	U.S. exports	Total U.S. trade
Hops and hop extract	26	97	123
Ginseng	13	78	91
Vanilla beans	63	1	64
Herbs	53	31	84
Cut foliage and branches	12	66	78
Licorice root and extract	33	25	58
Guar gum	34	18	52
Mucilages and thickeners, carrageenin	31	17	48
Seaweed and algae	27	14	41
Pectin and pectates	38	1	39
Gum arabic	17	4	21
Lacs	17	2	19
Evergreen Christmas trees	17	(2)	17
Locust bean gum	16	(3)	16
Broom corn	13	(3)	13
Psyllium seedhusks	17	(3)	17
Istle	5	(3)	5
All other	136	82	218
Total	568	436	1,004

<sup>1</sup> Exports of guar gum and locust bean gum.

<sup>2</sup> Not separately reported; included under "cut foliage and branches."

<sup>3</sup> Not separately reported.

have exceeded \$3 billion in 1993, according to trade estimates.

The U.S. hops industry in 1989-93 supplied about two-thirds of the domestic consumption of hops, hop extract, and lupulin that breweries used to make beer. The United States is the world's third-leading hops exporter, having shipped abroad nearly 100 million dollars' worth of hops and hop products (hop extract and lupulin) in 1993, and is the world's second-leading hops importer, with about 26 million dollars' worth of imports in that same year.

In 1993, sales of domestic Christmas trees were estimated at \$960 million; imports of Christmas trees (all from Canada) amounted to \$17 million in the same year. About 38 million Christmas trees were sold annually during 1989-93; about half of U.S. consumers used a natural Christmas tree.

During 1989-93, the U.S. trade balance in all miscellaneous vegetable substances averaged a \$130 million deficit annually (table A-2, in appendix A). U.S. exports of these products increased by \$91 million, mostly as a result of higher sales to European Union (EU) member countries (table A-3).

Meanwhile, U.S. imports rose by \$104 million, led by increased imports from India, China, Mexico, the EU, and Madagascar (table A-4).

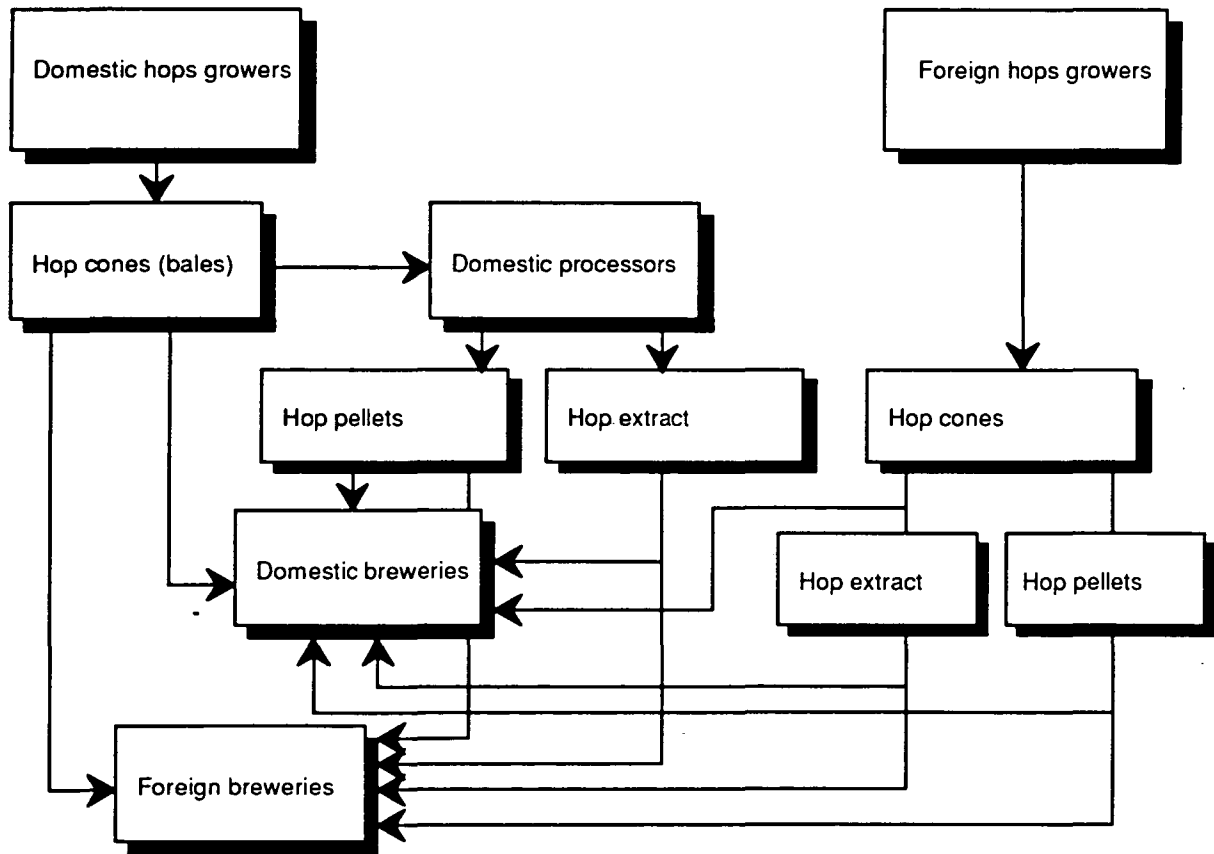
## HOPS, HOP EXTRACT

Hops are used to provide a distinctive flavor to beer and other fermented malt beverages, such as ale, stout, and porter. The production and marketing of domestic and foreign-produced hops are depicted in figure 1.

Two types of hops are grown in the United States and elsewhere: the alpha or high alpha variety and the traditional aroma variety. The alpha variety produces extracts with higher amounts of alpha acids and stronger flavoring potential than the aroma variety. Thus, smaller volumes of alpha hops, compared to aroma hops, are needed to produce a desired flavor.<sup>3</sup>

<sup>3</sup> U.S. Department of Agriculture (USDA), Foreign Agriculture Service (FAS), "U.S. Hops—Overview and Outlook," prepared by Jean Harman, *Horticultural Products Review*, Oct. 1993.

**Figure 1**  
Hops and hop extract: Marketing flow of domestic and foreign products



Source: USITC staff.

The hops of commerce are conelike flowering parts of certain varieties of a perennial vine grown in the northwestern United States and in many other countries. Hops, after picking, are kiln dried to retain from 8 to 10 percent moisture content, and are packed in bales also called "cones."

Hop cones can be processed into pellets or extracts; however, cones are the form in which most hops are sold into the domestic trade. The second-most common form of commercial hops is the hops powder pellet, in which blended hop leaves are hammer milled, passed through a standard die for a uniform size, and then packed in a foil pack under a vacuum or inert gas to insure freshness. Hop extract is produced from hammer-milled leaf hops using a solvent, such as liquid carbon dioxide, ethanol, or hexane, with the final product termed a "pure resin extract." Lupulin is a type of alpha-acid hop extract; the term "lupulin" is no longer used in commercial trade although it is cited in the HTS. In 1992/93, about 80 percent of U.S. breweries' consumption of hops products was in the form of cones and pellets, and 20 percent in the form of hop extract.<sup>4</sup>

In contrast to the domestic trade, most U.S. imports and exports in hops occur in the form of hop extract, followed by hop pellets, and hop cones.<sup>5</sup> Many domestic and foreign brewers prefer to use hop extract and hops pellets for more consistent results than can be derived from hops cones. In 1992/93, 61 percent of the value of U.S. hops exports were in the form of hop extract; 26 percent were hop pellets; and 13 percent were hop cones.<sup>6</sup>

## U.S. Industry Profile

### Industry Structure

The hops industry is segmented into growers (farmers), hops dealers, and hop extract or processing plants. The hops grown by farmers are sold to dealers (also called "merchants"), who are multinational firms that also operate hop extract or processing plants in the United States and abroad. Historically, the growers and the merchants were separately owned and managed, although in recent years some of the merchants have purchased hops farms.<sup>7</sup>

<sup>4</sup> Hop Growers of America, Inc., 1992-93 *Annual Statistical Report*, p. 12.

<sup>5</sup> Hop Growers of America, Inc.

<sup>6</sup> Hop Growers of America, Inc.

<sup>7</sup> Hops are classified under SIC number 0119 (Field crops, not elsewhere classified); hop extract and lupulin are classified under SIC 2082 (malt liquid). Because of the small volume of the industry, data are not specifically reported.

### Hops Growers

The typical U.S. hops farmer had about 200 acres of hops in 1987 based on U.S. Census data (which are the latest data available). About 60 percent of U.S. hops farmers are believed to be devoted solely to growing hops, and about 40 percent are diversified farming operations growing mint, deciduous tree fruits (apples and cherries), and field crops, as well as raising cattle, according to industry sources.

U.S. farmers harvested hops in 1987 from 30,000 acres on 149 farms. Washington was the leading producing State, accounting for about three-fourths of total U.S. hops production in 1987, as shown in the following tabulation compiled from official statistics of the U.S. Department of Commerce (1,000 kilograms):

State	1982	1987
Washington .....	25,498	17,704
Oregon .....	6,180	3,967
All others .....	3,411	1,418
Total .....	35,089	23,089

The number of domestic hops farms declined by about 25 percent, from the 200 farms in 1982 to 149 farms in 1987.

Although declining in number, hops farms have been increasing in size, and the total hops acreage has increased since 1987. Since that year, the total harvested acreage in hops rose steadily, reaching 43,100 acres in 1993/94, as shown in the following data, compiled from the Hops Growers of America, Inc.

Crop year	Yield (kilograms/acre)	Harvested acreage (acres)
1989/90 ....	779	34,548
1990/91 ....	727	35,463
1991/92 ....	793	39,553
1992/93 ....	798	42,266
1993/94 ....	802	43,100

The yield of hops per acre was 802 kilos in 1993/94, reflecting an increase of about 3 percent during the period.

Since the late 1980s, U.S. hops growers have also planted more of the alpha variety and less of the traditional aroma variety. In 1993, 61 percent of the acreage was in the alpha varieties, and 39 percent in the aroma varieties. In 1989, 57 percent of the hops acreage had been in alpha, and 43 percent in the aroma varieties.

Hops farming tends to be very capital-intensive, compared with traditional field crops. In 1994, the typical cost of establishing a U.S. hops farm was roughly \$10,000 per acre (including land charges, hops trellises, and equipment); plus an additional \$500,000

or more per farm for necessary farm equipment, including harvesters.<sup>8</sup> Because of the high cost of establishing hops farms, there have been few new entrants to the industry in recent years, with most farms remaining owned by the same families over the years.

### Hops Merchants

Growers ordinarily sell their hops to the seven U.S. dealers or merchants under contracts negotiated one or more years in advance of delivery.<sup>9</sup> The contracts specify the price and quantity to be delivered at a fixed date. The seven dealers, including a growers' cooperative and two large grower-dealers, market the vast majority of the domestic output of hops; some farmers may sell directly to breweries. The larger U.S. hops dealers also handle the bulk of the hops imports. Of the seven dealers, six are European owned.

### Hops Processors

Most hop extract is produced on a custom basis from hops owned by others. Two plants in Washington State produce hops extract; a third U.S. plant opened in 1993 in Nebraska, and a few chemical companies also produce the extract. Breweries also produce hop extract as captive production in the course of producing beer.

### Research and Development

Research and development of hops are financed chiefly through mandatory State Government assessments on growers, collected through the Washington State, Oregon, and Idaho Hops Associations. This research is carried out mainly at the land-grant universities in the three States. In addition, the U.S. Department of Agriculture (USDA) and, to a minor degree, some of the hops merchants and domestic breweries, provide supplemental funding of research on hops. The Hop Growers of America (HGA), a nonprofit promotional group, conducts marketing and promotion activities for sales of U.S. hops abroad.

### U.S. Government Programs

There are two U.S. Government programs that benefit U.S. exports of hops. (A longstanding U.S.

Department of Agriculture (USDA) marketing order program for domestic and imported hops was terminated in 1986; the program was established in 1937).<sup>10</sup>

USDA's Export Credit Guarantee Program (called "GSM-102") (7 U.S.C. 1736) provides export credits to finance the sale abroad of U.S. hops and other farm products.<sup>11</sup> The USDA will repay the principal and nearly all of the interest-owed to the financing bank for a default on a commercial loan used to finance the export of the U.S. farm product. The GSM-102 program provides credit guarantees for commercial credit from 6 months to 3 years. In 1991 and 1992, the value of U.S. hops exports assisted by this USDA credit guarantee program was about \$4.5 million annually of actual registered sales, all of which went to Russia.

The HGA has also received funds from the USDA under the Market Promotion Program (MPP) to promote sales of U.S. hops in foreign markets. The MPP was first authorized in the 1990 farm bill (the Food, Agriculture, Conservation, and Trade Act of 1990). In fiscal year 1993, the HGA received \$170,000 in MPP funds to promote hops and hop products abroad.

### Foreign Industry Profile

According to industry sources, the United States is the second-leading producer of hops in the world, after Germany. The five leading hops producers accounted for over three-quarters of world hops production in 1993, as shown in the following tabulation, as compiled from data of the Hop Growers of America, Inc.:<sup>12</sup>

	Production (Metric tons)	Share (percent)
Germany .....	37,750	28
United States .....	35,250	27
China .....	13,000	10
Former Soviet Union ...	10,500	8
Czech Republic .....	10,180	8
United Kingdom .....	5,280	4
Slovenia .....	3,600	3
Poland .....	2,560	2
Romania .....	2,000	2
Other .....	12,680	10
Total .....	132,800	100

<sup>10</sup> The marketing order, under the Agricultural Marketing Agreement Act of 1937, included volume control and allotment provisions for domestic hops growers that controlled how much would be produced or marketed. USDA terminated the marketing order because the required number of domestic growers did not favor its continuation.

<sup>11</sup> Harman.

<sup>12</sup> Hop Growers of America, Inc., *1992-93 Annual Statistical Report*, Jan. 27, 1994, p. 24.

<sup>8</sup> U.S. International Trade Commission (USITC) staff conversation with the Hop Growers of America, Inc., Aug. 24, 1994.

<sup>9</sup> For example, in a 1993 survey, U.S. hop growers indicated they had contracted (sold ahead) 87 percent of their expected 1993 crop, 83 percent of their expected 1994 crop, and 67 percent of their expected 1995 crop, according to a survey of the Hop Growers of America, Inc.

European countries supplied about 57 percent of world hops production in 1993. As well as being the leading world producer, Germany is also the leading world exporter and world importer of hops. The other foreign suppliers compete with U.S. hops for sales to importing countries with sizable beer production and consumption.

The European Union (EU)—particularly Germany—has dominated world trade in and production of hops. The half-dozen leading world merchants in hops products—hops cones, hops pellets, and hop extract—are German-owned firms. The EU pays producer subsidies to hops farmers that enable the EU producers to export hops at prices equal to or less than those of U.S. hops, according to the USDA.<sup>13</sup>

In the EU, average hops production costs were estimated at \$4,142 per acre in 1992, and yielded an average economic return (above costs) to the growers of about \$2,800 per acre of hops in full production.<sup>14</sup> According to these data, the EU grower subsidies in 1992 averaged \$205 per acre for the leading hops varieties (aroma and bitter).<sup>15</sup>

Hops are grown mainly in temperate climate regions, and thus breweries in tropical countries must import hops. However, because of differences in hop characteristics, there is hop trade even among the producing countries, such as Germany and the United States. Imported hop cones are often mixed with domestic hops, and then processed into extract or pellets to achieve a desired blend.

## U.S. Trade Measures

Table A-1 (at the end of this summary) shows the column 1 rates of duty, as of January 1, 1994, for the articles included in this summary (including both general and special rates of duty) and U.S. exports and imports for 1993. Table A-1 also shows the U.S. rates of duty agreed to under the General Agreement on Tariffs and Trade (GATT) Uruguay Round (UR) of trade negotiations. Generally, U.S. duties on hops and hops products will decline under the UR. (Statistical tables are in appendix A). An explanation of tariff and trade agreement terms is shown in appendix B.

The aggregate trade-weighted average rate of duty for all hops and hop products, based on 1993 imports, was an ad valorem equivalent of 2.0 percent; the average trade-weighted rate of duty for the dutiable

products was a 2.9 percent ad valorem equivalent. About 30 percent of the imports entered under the various preferential programs such as the Generalized System of Preferences (GSP), North American Free Trade Agreement (NAFTA), and Caribbean Basin Economic Recovery Act (CBERA).

The NAFTA, as approved by the North American Free Trade Agreement Implementation Act (Public Law 103-182, approved December 8, 1993), provided for the elimination of U.S. duties, effective January 1, 1994, on hops imported from Mexico. U.S. duties on hop extract from Mexico are being phased out over a 5-year period, beginning January 1, 1994. Mexico eliminated its duties on imports of all hops and hop products from the United States effective January 1, 1994, under the NAFTA. Canada also provides duty-free entry for U.S. hops products.

## Foreign Trade Measures

### Tariffs

Major U.S. trading partners in hops generally impose higher rates of duty on imports of hops than the United States. In 1993, the EU, the largest importer of U.S. hops, imposed a 12 percent ad valorem rate of duty on hops imports, and a 6-percent duty on hop extract imports. Among the other leading U.S. markets, Colombia imposed a duty of 10 percent ad valorem on hops imports in 1993, and 5 percent on hop extract imports. In 1993-94, Brazil imposed duties of 10 percent ad valorem on hops and hop extract; imports of hop pellets and hop extract were free of duty into Brazil in that year. South Korea, also an important U.S. market, imposed duties in 1993-94 of 30 percent ad valorem on imports of hops and hop extract. Finally in 1993, the Philippines imposed duties of 20 percent ad valorem on hops and 10 percent on hop extract.

### Production Assistance

EU production subsidies provide a competitive edge to EU hops in many markets over the U.S. product, according to USDA. Under the UR, the domestic support for EU growers of hops and the other agricultural products is to be reduced by 20 percent over 6 years or modified to be consistent with the UR limits (so-called "green box" subsidies).<sup>16</sup>

<sup>16</sup> Under the UR, international agricultural support programs are classified as either non-trade distorting (green) or trade-distorting (amber). Amber box measures are subject to the 20-percent reduction; green box measures are not. See U.S. International Trade Commission (USITC), *Potential Impact on the U.S. Economy and Industries of the GATT Uruguay Round Agreements, June 1994*, investigation no. 332-353, USITC publication 2790, vol. 1, pp. II-9 to II-14.

<sup>13</sup> USDA, "U.S. Hops," p. 22.

<sup>14</sup> Report of the European Council, May 17, 1993, as quoted in Hop Growers of America, Inc., 1992-93 Annual Statistical Report, Jan. 27, 1994, p. 22. The economic return shown is the average for producers in Germany and the United Kingdom.

<sup>15</sup> Ibid.

## U.S. Market

### Consumption

Consumption of hops is dependent on that of beer. During the period 1988/89 to 1991/92, U.S. brewers annually used an average 20 million kilograms of hops and hop extract (table 1). There was little change in the breweries' use of hops and hop products during this period because U.S. beer production declined minimally during 1989-93.<sup>17</sup> Of the total U.S. hops consumption over this period, the equivalent of about 3 million kilograms of hops was used annually in the form of extract. The average amount of hops required to brew a 31-gallon barrel of beer (the "hopping rate") remained unchanged at 0.10 kilo during this period.

To assure necessary supplies of hops when needed, brewers contract with hops dealers and growers from one to several years in advance and often carry a

<sup>17</sup> In 1993, U.S. beer output of 188 million barrels was about 1 percent below output in 1989.

6-month inventory. These inventories are held in cold storage to maintain quality; they are blended with each new crop to avoid abrupt changes in the flavor of the beer.

### U.S. Production

U.S. production of hops and hop extract, which averaged 29 million kilograms annually from 1988/89 through 1992/93, follows a pattern similar to that of hop acreage. Production of these products rose from 25 million kilos in 1988/89 to 34 million kilos in 1992/93. The price of hops rose from \$3.08 to \$4.01 per kilo during this period. Favorable export markets reportedly led to much of the increased prices and resulting higher output of hops, as the domestic market stagnated.

Beginning stocks of hops and hop extract, declined 6 percent from about 27.2 million kilograms in 1988/89 to 25.5 million kilograms in 1993/94. Since 1990/91, inventories have risen slightly each year.

**Table 1**

**Hops and hop extract: U.S. stocks, production, exports of domestic merchandise, imports for consumption, and apparent consumption, crop years 1988/89 to 1992/93**

Crop year beg Sept. 1	Beg stocks <sup>1</sup>	Pro- duction	Exports	Imports	Actual re- ported con- sumption by breweries	Ratio (per cent) of imports to con- sumption
<i>Quantity (1,000 kilograms)</i>						
1988/89 .....	27,200	24,810	8,141	5,066	19,900	25
1989/90 .....	23,400	26,910	15,601	5,594	19,890	28
1990/91 .....	23,500	25,790	14,508	7,816	20,810	38
1991/92 .....	24,580	31,370	9,224	9,395	20,260	46
1992/93 .....	25,510	33,720	12,160	8,582	( <sup>2</sup> )	( <sup>2</sup> )
<i>Value (\$1,000)</i>						
1988/89 .....	( <sup>2</sup> )	76,415	58,073	28,478	( <sup>2</sup> )	( <sup>2</sup> )
1989/90 .....	( <sup>2</sup> )	81,583	79,837	26,483	( <sup>2</sup> )	( <sup>2</sup> )
1990/91 .....	( <sup>2</sup> )	84,178	87,416	37,704	( <sup>2</sup> )	( <sup>2</sup> )
1991/92 .....	( <sup>2</sup> )	115,625	71,471	40,325	( <sup>2</sup> )	( <sup>2</sup> )
1992/93 .....	( <sup>2</sup> )	129,096	102,693	42,414	( <sup>2</sup> )	( <sup>2</sup> )
<i>Unit Value (per kilogram)</i>						
1988/89 .....	( <sup>2</sup> )	<sup>3</sup> \$3.08	\$7.14	\$5.63	( <sup>2</sup> )	( <sup>2</sup> )
1989/90 .....	( <sup>2</sup> )	3.03	5.12	4.73	( <sup>2</sup> )	( <sup>2</sup> )
1990/91 .....	( <sup>2</sup> )	3.26	6.02	4.82	( <sup>2</sup> )	( <sup>2</sup> )
1991/92 .....	( <sup>2</sup> )	3.69	7.75	4.29	( <sup>2</sup> )	( <sup>2</sup> )
1992/93 .....	( <sup>2</sup> )	3.84	8.42	4.94	( <sup>2</sup> )	( <sup>2</sup> )

<sup>1</sup> Stocks on Sept. 1 of first year shown.

<sup>2</sup> Not available.

<sup>3</sup> Season average price received by farmers for hops.

Note.—Stocks, production, and consumption data were converted from pounds to kilograms.

Source: Production, compiled from statistics of the Hop Growers of America, Inc; exports and imports, compiled from official statistics of the U.S. Department of Commerce.

Production data on hop extract are not separately reported. However, domestic output of hop extract is roughly equal to the sum of reported brewery consumption of hop extract and of exports of hop extract.

### U.S. Imports

During 1988/89 to 1992/93, total annual U.S. imports of hops, and hop extract increased from 5 million to 9 million kilos, and in 1991/92 supplied 46 percent of domestic consumption (table 1). The combined annual value of hops, and hop extract imports ranged from \$25 million to \$40 million during

the 5 years. In 1992/93, 74 percent of the \$40 million of imports consisted of unground hop cones; 13 percent of pellets; 13 percent, of ground hops cones; and less than 1 percent, of hop extract. Most domestic breweries prefer to import hop cones to more closely control its use in brewing, a more difficult task using foreign extract. The principal sources of hops imports have been Germany (44 percent of the value of U.S. imports in 1992/93), the Czech Republic (29 percent), and China (9 percent) (table 2). Generally, imported hops have accounted for about a third of U.S. reported consumption since 1988/89. This ratio has increased from 25 to 46 percent during 1988/89 to 1991/92, the latest period for which data are available.

**Table 2**  
**Hops and hop extract: U.S. imports for consumption, by leading sources, crop years 1988/89 to 1992/93**

Source	Crop year beginning Sept. 1—				
	1988/89	1989/90	1990/91	1991/92	1992/93
	<i>Quantity (1,000 kilograms)</i>				
Germany .....	4,069	4,113	5,245	4,665	3,069
The Czech Republic .....	530	344	1,161	1,073	2,076
China .....	0	0	28	2,427	2,056
Poland .....	145	471	272	235	394
Australia .....	2	2	139	167	332
France .....	181	267	254	199	266
Canada .....	44	180	409	349	161
New Zealand .....	13	27	50	22	78
Yugoslavia (former) .....	40	157	187	130	50
Other .....	37	28	68	123	96
Total .....	5,065	5,593	7,816	9,394	8,581
	<i>Value (\$1,000)</i>				
Germany .....	22,690	18,479	24,128	22,204	17,466
The Czech Republic .....	2,551	1,851	6,357	5,245	11,434
China .....	0	0	53	3,838	3,546
Poland .....	533	1,817	821	717	2,054
Australia .....	10	19	405	1,710	1,876
France .....	722	1,108	1,154	1,121	1,476
Canada .....	147	472	1,383	1,480	596
New Zealand .....	54	116	185	121	394
Yugoslavia (former) .....	242	727	729	805	353
Other .....	73	55	124	452	473
Total .....	27,022	24,644	35,339	37,693	39,668

Note.—Data before 1989 are estimated. Total may vary because of rounding.

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

## Foreign Markets

The United States is the third-leading exporter of hops and hop products in the world after Germany and the Czech Republic. In 1991 and 1992 (the latest years for which data are available), the United States accounted for an average of 14 percent of world exports of hops and hop extract, as shown in the following tabulation, compiled from official statistics of the Food and Agriculture Organization of the United Nations (FAO):<sup>1</sup>

Exporter	1991	1992
	—Metric tons—	
Germany .....	18,973	19,086
Czech Republic .....	8,733	11,160
United States .....	7,517	8,373
China .....	8,341	7,641
Former Yugoslavia .....	3,600	3,700
Australia .....	2,125	1,646
United Kingdom .....	1,374	1,944
All other .....	5,836	6,099
<b>Total .....</b>	<b>56,499</b>	<b>59,649</b>

<sup>1</sup> FAO, *FAO Trade Yearbook*, 1992, table 53.

The EU is the largest market for hops; its member countries purchased an average 42 percent of world hop imports in 1991-92. The United States is the second leading market, with a 15-percent market share of world hop imports. Japan had a 12-percent share, and Brazil 5 percent, as shown in the following tabulation:<sup>1</sup>

Importer	1991	1992
	—Metric tons—	
EU-member countries:		
Germany .....	15,445	15,742
Belgium-Luxembourg ...	4,745	2,773
United Kingdom .....	1,632	1,922
Other .....	2,860	4,595
<b>Subtotal .....</b>	<b>24,682</b>	<b>25,032</b>
United States .....	9,858	8,089
Japan .....	5,876	8,372
Brazil .....	3,557	1,800
Former Soviet Union .....	1,900	2,000
Canada .....	1,620	1,524
Czech Republic .....	1,118	1,622
All other .....	9,834	10,131
<b>Grand total .....</b>	<b>58,445</b>	<b>58,570</b>

<sup>1</sup> FAO, *FAO Trade Yearbook*, 1992, table 53.

All leading import markets for hops are also sizable producers of beer and malt beverages.<sup>18</sup>

### U.S. Exports

During 1988/89 to 1992/93, U.S. hops producers exported an average of 42 percent of the volume of their output (table 1); U.S. hops are highly competitive

<sup>18</sup> See the summary on malt beverages (USITC publication 2865), Apr. 1995, for description of the world beer industry.

in foreign markets. U.S. exports of hops and hop extract rose by 77 percent in value to \$103 million in 1992/93 as a result of higher prices and a higher volume of exports (table 3).

In 1992/93, 58 percent of the \$103 million of U.S. exports of hops and hop products consisted of hop extract; 28 percent, of pelletized hops; 8 percent, of unground hops cones; and 6 percent, of ground hops cones. These figures reflected a major shift in the export composition since 1988/89 when ground hops represented 40 percent of total hop product exports. Most of the hops formerly exported as ground hops are currently exported in the form of hop extract or hops pellets. U.S. hops and hop products are exported principally to the EU (32 percent in terms of value in 1992/93), Mexico (12 percent), Canada (8 percent), Brazil (8 percent), and South Korea (6 percent) (table 3).

### Trade Balance

During 1988/89 to 1992/93, the U.S. trade balance in hops and hop products was positive in all 5 years in terms of value, and positive in terms of quantity in 4 years (table 1). In terms of quantity, the U.S. trade balance ranged from a deficit of 0.2 million kilograms in 1991/92 to a surplus of 10.0 million kilograms in 1989/90. In value terms, the annual trade balance ranged from a surplus of \$30 million to a surplus of \$60 million.

## CUT FOLIAGE, FIBROUS SUBSTANCES, AND CHRISTMAS TREES

### Industry Structure

The foliage, fibrous substances, and Christmas trees product group can be neatly divided into the following three product areas: tropical and vegetable fibers (including broomcorn); natural Christmas trees; and cut foliage and branches. Figure 2 shows the leading products in these three groups, and the principal uses of these products.<sup>19</sup>

### Tropical and Vegetable Fibers

Tropical and semitropical vegetable fibers are used chiefly in the manufacture of brushes and brooms, whereas other vegetable fibers (including flax and rice straw) are used chiefly for padding and stuffing. Flax straw is from a temperate-zone plant and is used in the

<sup>19</sup> Domestic shipments of these products are classified under SIC 0139, Field Crops, except Grain; SIC 0811, Timber Tracts (tree farms); and SIC 0119, Cash Grain (flaxseed).



**Table 3**  
**Hops, hop extract, and lupulin: U.S. exports of domestic merchandise, by principal markets, crop years 1988/89 to 1992/93**

Market	Crop year beginning Sept. 1—				
	1988/89	1989/90	1990/91	1991/92	1992/93
<i>Quantity (1,000 kilograms)</i>					
Germany .....	624	1,680	1,960	1,669	2,683
Mexico .....	814	1,194	1,144	647	1,084
Canada .....	1,082	3,700	1,663	1,203	1,330
Brazil .....	2,890	5,811	4,122	2,882	1,559
South Korea .....	13	31	16	35	518
Netherlands .....	187	305	238	220	341
Belgium .....	0	104	241	256	398
United Kingdom .....	190	278	151	308	499
Philippines .....	221	184	400	181	292
Other .....	2,116	2,310	4,569	1,819	3,452
<b>Total .....</b>	<b>8,140</b>	<b>15,601</b>	<b>14,508</b>	<b>9,224</b>	<b>12,160</b>
<i>Value (1,000 dollars)</i>					
Germany .....	2,662	6,061	8,236	11,214	18,466
Mexico .....	14,519	16,926	12,550	9,869	12,559
Canada .....	7,389	15,396	10,118	7,784	8,630
Brazil .....	8,936	14,788	13,648	13,150	8,147
South Korea .....	177	232	77	352	5,663
Netherlands .....	2,558	2,531	2,177	2,434	5,572
Belgium .....	0	1,320	2,118	3,233	4,296
United Kingdom .....	1,150	1,403	943	2,526	3,968
Philippines .....	3,704	2,921	4,806	3,092	3,961
Other .....	16,978	18,259	32,742	17,817	31,432
<b>Total .....</b>	<b>58,073</b>	<b>79,837</b>	<b>87,416</b>	<b>71,471</b>	<b>102,693</b>

Note.—Data before 1989 are estimated; totals may vary because of rounding.  
 Source: Compiled from official statistics of the U.S. Department of Commerce.

**Figure 2**  
**Cut foliage, fibrous substances, and Christmas trees: Description of leading products and uses**

Category	Products	Consumer Use
<b>Tropical fibers and broom corn</b>	Istle Kapok Rice straw and fiber Flax straw	Use in brooms, brushes, padding and stuffing, cigarette paper
<b>Christmas Trees</b>	Scotch and Norway pine Balsam fir Douglas-fir White spruce Black spruce Eastern red cedar	Direct consumer sale (Christmas season)
<b>Cut foliage and branches</b>	Cut evergreen boughs Florists' greens Cut fern leaves Dried corn husks Cut evergreen garlands mosses, lichens	Sales through florists, and associated Christmas tree stands

Source: USITC staff.

United States mostly in making cigarette paper. Rice straw and rice fiber were used in the past as cheap filler in domestically produced brooms when broomcorn was expensive. However, there have been no significant volumes of rice straw and rice fiber imported for many years.

Domestic production of the fibrous vegetable substances covered in this summary consists chiefly of flax straw, palmetto fiber, and sotol. Natural textile fibers that can be spun or woven, such as flax, hemp, jute, coir (coconut), agave, sisal, or kenaf bast fibers, are not included in this summary.<sup>20</sup>

An important tropical fiber is istle or ixtle, usually called Tampico fiber, which is produced in Mexico from the leaves of several uncultivated native cactus plants. Tula and Jaumave istle are used after processing (cleaning, combing, grading), principally as bristles in a variety of high-quality articles ranging from toilet brushes to industrial brushes and brooms. Patent or polished istle, which is made from selected and specially cleaned and polished Jaumave, is mixed with horsehair and used in the production of some painters' dusting brushes.

Most of these various types of straws and fibrous vegetable substances included in this summary are supplied almost entirely by imports. Imports of unspecified crude and processed fibrous vegetable substances were supplied chiefly by Mexico, India, Sierra Leone, and the Malagasy Republic. Chief among the processed substances are palmyra stalks, palmyra fiber, bassine, and processed sotol from Mexico and India. Among the crude fibers of importance are Sierra Leone piassava and raffia from the Malagasy Republic. Mexico accounted for virtually all U.S. imports of istle. There were some flax straw imports from Canada.

Broomcorn is a variety of quick growing sorghum that somewhat resembles the corn plant in appearance. The fibers, which have no commercial use other than in making brooms, are contained in the elongated, many-branched seed head. Broomcorn imports are subject to permit and inspection requirements of the U.S. Department of Agriculture.

During the past two decades, the number of U.S. broomcorn growers has declined markedly, with the *1978 Census of Agriculture* reporting only six U.S. farmers growing broomcorn. These farms together produced less than 570,000 pounds annually. No broomcorn data were reported in the most current *1987 Census of Agriculture*. The virtual disappearance of domestic production is generally attributed to competition from imported broomcorn and to the lower U.S. output of brooms using broomcorn.

<sup>20</sup> These natural fibers are classified under HTS subheadings 5301 to 5305, and included in the summary on textile fibers and waste.

## *Natural Christmas Trees*

Only natural Christmas trees that have the root system cut off are included in this summary. Live trees suitable for planting after being used as Christmas trees are provided for in a separate HTS subheading 0602.99, as "live plants, with soil attached to roots."

Christmas trees were grown during 1989-93 in the United States on 15,000 commercial tree farms in nearly every State, with Oregon, Michigan, Wisconsin, California, Pennsylvania, and North Carolina, being the leaders. About a third of the estimated 15,000 U.S. tree farms sell trees directly to consumers on a "cut and choose" basis, according to the National Christmas Tree Association.

In 1992, slightly over half (52 percent) of U.S. consumers having a Christmas tree used an artificial tree, and under half (47 percent) used a natural Christmas tree, according to a Gallup poll.<sup>21</sup> About 78 percent of U.S. households in 1992 reported Christmas tree use of some type, real, artificial, or both.

The Christmas tree is a traditional form of decorative expression displayed during the Christian religious holidays in December when most households purchase their trees. While many types of conifers are used as Christmas trees, the pines and firs predominate. Of all types, the most popular varieties are Scotch and Norway pine, balsam and Douglas fir, Eastern red cedar, and black spruce and white spruce.

Most Christmas trees are marketed in their natural or unprocessed condition. Some Christmas trees, however, are chemically treated to retain freshness, to prevent the spread of disease or insects, and to decrease the danger of fire.

## *Cut Foliage and Branches*

Included in this summary are evergreen boughs, branches, and parts of trees, shrubs, and bushes, of a kind suitable for ornamental purposes (referred to herein as "florists' greens"). Among the primary types of ornamental crude products imported are the florists' greens, fern leaves (such as leatherleaf, asparagus plumosus, and sprengeri), evergreen boughs for Christmas decoration, palm leaves for religious purposes, and dried corn husks.

Florists' greens generally are small evergreen branches used as backing in floral arrangements, but they also include evergreen boughs and branches for use in Christmas decorations. The principal florists'

<sup>21</sup> The American Christmas Tree Journal, Apr. 1993, p. 33.

greens in order of importance are leatherleaf, asparagus plumosus, holly, sprengeri, pittosporum (a tropical evergreen woody plant), and Ti leaves.<sup>22</sup> Domestic production of leatherleaf is centered in Florida; asparagus plumosus in California; holly in Oregon; sprengeri and pittosporum in Florida; and Ti leaves in various Western States. Domestic wholesalers supplement domestic products with small amounts of huckleberry and fern from Canada.

Domestic florists' greens also meet competition from imported tropical fern-like branches known as camadors (from the chamaedorea palm). These branches enter from Guatemala and Mexico. Although sold mainly in the South Central States, camadors also are sold to a small extent throughout the East Coast.

Evergreens used for Christmas decorations include the branches of balsam, cedar, Douglas fir, and holly. A large part of the production is a byproduct of the Christmas tree industry. Significant quantities of balsam, cedar, and Douglas-fir branches are imported from Canada. Holly is obtained mostly from domestic sources—both wild and cultivated. An evergreen called ruscus is imported in minor volume from Europe for decorative purposes.

Corn husks are imported from Mexico for processing and manufacture into dolls. Many small producers of corn husk dolls, mostly in Texas, import these husks. There is no significant collecting of domestic corn husks.

## U.S. Trade Measures

### Tariffs

Table A-1 shows the column 1 rates of duty, as of January 1, 1994, for tropical fibers, broomcorn, Christmas trees, and cut foliage and branches (including both general and special rates of duty), as well as the rates of duty agreed to under the Uruguay Round or UR of GATT trade negotiations. U.S. duties for these products will generally decline under the UR. Table A-1 also presents U.S. exports and imports for 1993. (Statistical tables are in appendix A). An explanation of tariff and trade agreement terms is shown in appendix B.

The aggregate trade-weighted average rate of duty for dried foliage, fibrous substances, and Christmas trees based on 1993 imports was a 0.2-percent ad valorem equivalent; the average trade-weighted rate of duty of the dutiable products was a 1.3-percent ad valorem equivalent. About 85 percent of the imports entered duty-free either under *HTS* subheadings

<sup>22</sup> Information on the floral industry is presented in the summary on cut flowers (USITC publication 2737, Mar. 1994).

already duty-free or under the various preferential programs such as GSP, NAFTA, and CBERA.

NAFTA, as implemented by the North American Free Trade Agreement Implementation Act (Public Law 103-182, approved Dec. 8, 1993), provided for the elimination of U.S. duties, effective January 1, 1994, on cut foliage and branches, broomcorn, and fibrous vegetable material used in brushes imported from Mexico.

### Nontariff Measures

Few nontariff measures (NTMs) of health and sanitary regulations affect U.S. imports and exports of dried foliage, fibrous substances, and Christmas trees. Imports of fibrous substances are subject to plant quarantine regulations requiring sterilization before entry.

## Foreign Trade Measures

Mexico eliminated its duties on imports of such goods from the United States effective January 1, 1994. The NAFTA became effective for both the United States and Mexico on January 1, 1994. Most countries impose few tariffs and trade measures since these products are raw materials.

## U.S. Market

U.S. imports of fibrous vegetable materials and Christmas trees amounted to \$85 million in 1993, about 8 percent above imports in 1989 (table 4).

Canada and Mexico were the leading U.S. sources of fibrous vegetable materials and Christmas trees, together supplying over two-thirds of U.S. imports during the period.

### Fibrous Vegetable Substances

U.S. flaxseed growers sell as much as 200,000 tons of flax straw annually to manufacturers of cigarette and other fine papers. Flax straw is a byproduct of flaxseed grown mostly in the Dakotas and Minnesota.<sup>23</sup> Palmetto fiber, probably less than 0.5 million pounds annually, is produced in Florida. A small quantity of sotol may be produced in New Mexico and Arizona.

Imports supplied most of the various types of straws and fibrous vegetable substances included in this summary. Broomcorn and istle were the leading fibrous substances imported in 1993, as compiled from official statistics of the U.S. Department of Commerce, and shown in table 5.

U.S. imports supply all but a negligible part of domestic consumption of broomcorn. U.S. consumption of broomcorn declined by about

<sup>23</sup> About 6,000 U.S. farms grew flaxseed in 1987, according to the U.S. Bureau of the Census.

**Table 4**  
**Cut foliage, fibrous substances, and Christmas trees: U.S. imports for consumption, by principal sources, 1989-93**

(1,000 dollars)

Source	1989	1990	1991	1992	1993
Mexico .....	23,872	24,521	26,423	26,056	31,458
Canada .....	29,888	31,603	28,109	26,485	29,134
China .....	4,874	5,320	5,528	6,520	4,347
India .....	1,967	2,465	2,003	2,652	2,526
Italy .....	1,654	2,015	1,945	2,094	2,081
Costa Rica .....	69	177	437	890	1,749
Philippines .....	1,425	1,692	1,557	1,371	1,624
United Kingdom .....	146	469	271	1,027	1,273
The Netherlands .....	879	453	690	1,370	1,206
Thailand .....	1,443	1,202	577	479	1,076
Other .....	12,275	9,486	9,463	9,479	8,618
Total .....	78,491	79,402	77,001	78,424	85,092

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

**Table 5**  
**Cut foliage, fibrous substances, and Christmas trees: U.S. imports and exports, by types, 1993**

Item	U.S. imports	U.S. exports
	—(1,000 dollars)—	
Kapok .....	556	1,810
Vegetable substances for stuffing .....	26	70
Broomcorn .....	13,064	387
Istle .....	5,456	0
Vegetable materials for brooms .....	3,116	803
Canaigre and other vegetable materials for dyeing and tanning .....	815	363
Raw vegetable materials, nesoi .....	11,654	3,221
Mosses, lichens, fresh or dried .....	1,139	10,596
Cut foliage and branches, fresh .....	20,439	66,127
Cut foliage and branches, dried .....	11,788	10,379
Christmas trees .....	17,074	( <sup>1</sup> )
Total .....	85,092	93,756

<sup>1</sup> Not specially provided for; included under "foliage, branches, fresh."

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

two-thirds during the past three decades, from 27,000 tons annually in the 1960s to about 10,000 tons annually in the 1980s. Mexico supplied virtually all U.S. imports of broomcorn. Such imports consist mostly of processed broom corn, which is generally sorted for quality, cut to length, and ready for direct use by U.S. broom manufacturers.<sup>24</sup> Processing has eliminated about one-third of the weight of the broom corn.

### *Christmas Trees and Cut Foliage*

U.S. production of evergreen Christmas trees averaged an estimated 36 million trees annually in

1989-93 (table 6); this is about 20 percent above the 30 million trees produced annually in the early 1980s.

During 1989-93, estimated annual U.S. consumption of Christmas trees rose by 7 percent, averaging 38 million trees annually (table 5). Imports supplied about 6 percent of consumption in the 5-year period. U.S. consumption of Christmas trees declined from the over 40-million trees consumed annually in the 1960s largely as a result of consumers purchasing reusable, artificial trees.

During 1989-93, annual imports of evergreen Christmas trees averaged 2 million trees. Nearly all imports of Christmas trees are from Canada. In 1993, 55 percent of the volume of all such imports were fir trees other than Douglas fir (almost entirely Balsam fir); 42 percent were trees other than fir (believed to be nearly all Scotch pine); and 3 percent were Douglas

<sup>24</sup> U.S. International Trade Commission (USITC), *Broom Corn Brooms: U.S. Producers' Shipments, Imports for Consumption, Exports, and Apparent Consumption*, USITC publication 1835, Apr. 1986.

**Table 6**  
**Evergreen Christmas trees: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1989-93**

Year	Production <sup>1</sup>	Exports <sup>1</sup>	Imports	Apparent consumption	Ratio (percent of imports to consumption)
<i>Quantity (1,000 trees)</i>					
1989 .....	33,100	100	3,236	36,200	9
1990 .....	33,700	100	2,685	36,300	7
1991 .....	37,600	100	2,210	39,700	6
1992 .....	36,900	100	1,990	38,800	5
1993 .....	36,900	100	11,993	238,800	5
<i>Value (1,000 dollars)</i>					
1989 .....	860,000	(3)	22,164	(3)	(3)
1990 .....	876,000	(3)	22,624	(3)	(3)
1991 .....	978,000	(3)	19,507	(3)	(3)
1992 .....	959,000	(3)	17,266	(3)	(3)
1993 .....	959,000	(3)	17,074	(3)	(3)
<i>Unit value</i>					
1989 .....	<sup>4</sup> \$26.00	-	\$6.85	-	-
1990 .....	<sup>4</sup> 26.00	-	8.42	-	-
1991 .....	<sup>4</sup> 26.00	-	8.83	-	-
1992 .....	<sup>4</sup> 26.00	-	8.68	-	-
1993 .....	<sup>4</sup> 26.00	-	8.57	-	-

<sup>1</sup> Estimated by the staff of the U.S. International Trade Commission. Exports are not separately reported.

<sup>2</sup> Estimated at same level as 1992.

<sup>3</sup> Not available.

<sup>4</sup> Retail value of an average 6-foot tree, estimated by the staff of the U.S. International Trade Commission.

Note.—Production is derived from consumption less imports plus exports. *American Christmas Tree Journal*, Apr. 1993, p. 33.

Source: Compiled from consumption data of the National Christmas Tree Growers Association, and from official statistics of the U.S. Department of Commerce, except as noted.

firs. Bulkiness, perishability, and transportation costs tend to preclude other countries from supplying live Christmas trees to the United States.

U.S. imports of cut floral greens and branches amounted to \$32 million in 1993, of which Canada supplied 30 percent and Mexico, about 16 percent.

### U.S. Exports

U.S. exports of cut foliage, fibrous vegetable materials and Christmas trees were valued at \$94 million in 1993, a 70-percent increase from 1989 export levels (table 7). The EU, Canada, and Mexico were the leading U.S. markets, purchasing over 85 percent of U.S. exports during 1989-93.

U.S. exports of fibrous vegetable substances (except Christmas trees and cut branches and foliage) amounted to \$28 million in 1993, and went to a large number of countries, including Canada, Germany,

Venezuela, and the Dominican Republic. The leading exports were raw vegetable materials used in dyeing or tanning operations, and mosses and lichens. The United States also exported vegetable materials to make brooms. The United States exports small quantities of broomcorn, mostly to Canada.

Statistics on U.S. exports of Christmas trees are not separately reported, but exports are believed to be small, probably not exceeding 100,000 trees annually. Such exports are believed to go to Canada, the Caribbean countries, and Mexico.

Cut foliage, cut branches, and florists' greens are sold throughout the year by florists, and, during the Christmas season, sold as part of Christmas decorations, and related sales of Christmas trees. In 1993, U.S. exports of dried and fresh foliage and branches, some of which were Christmas trees, amounted to \$77 million (table 5).

**Table 7**  
**Cut foliage, fibrous vegetable substances, and Christmas trees: U.S. exports of domestic merchandise, by principal markets, 1989-93**

(1,000 dollars)

Market	1989	1990	1991	1992	1993
The Netherlands .....	16,368	17,453	18,223	21,449	31,354
Germany .....	17,368	18,095	22,811	21,364	23,272
Canada .....	6,398	11,678	11,363	11,968	12,349
Mexico .....	5,121	2,909	5,763	7,715	6,884
Belgium .....	967	1,294	2,076	4,698	6,577
Japan .....	3,541	3,514	3,076	3,570	2,904
United Kingdom .....	409	442	543	982	1,860
Algeria .....	0	0	0	0	1,801
Switzerland .....	1,160	1,532	1,487	1,460	1,501
Italy .....	500	689	694	1,461	799
Other .....	3,261	4,636	4,714	4,781	4,493
Total .....	55,111	62,243	71,480	79,448	93,756

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

## NATURAL GUMS, LACS, BALSAMS, RESINS OF NATURAL ORIGIN, AND MUCILAGES:

### Industry Profile

This summary includes natural gums, lacs, balsams, resins of natural origin, and mucilages or thickeners of natural origin. The United States produces few of these crude natural products, except for pine gum, although it does process many of the imported raw or unprocessed products into high-value processed products. Some synthetic domestic products are competitive with these crude imported products, but the synthetic products are not included herein. The natural and synthetic gums, resins, and mucilages form a group of products called "water-soluble polymers" or "hydrocolloids" (figure 3). Only the natural products derived from plants are included in this summary,<sup>25</sup> and the principal products are described below.<sup>26</sup>

The processing of water-soluble gums into a variety of processed products is carried out by about one-half dozen U.S. firms, mainly in and around New York City and in Delaware.<sup>27</sup> The processed gum products are generally covered elsewhere in the *HTS*.

U.S. sales of natural gums, together with those of starches, seaweeds, animal derivatives, and other unmodified natural water-soluble polymers

<sup>25</sup> Gums that are synthetic, semisynthetic, microbial, and animal water-soluble polymers are included in a number of other summaries.

<sup>26</sup> These products are classified under SIC 2099 (Food Preparations, not elsewhere classified (n.e.c.)), SIC 0849, Forest Product n.e.c. and SIC 0919, Miscellaneous Marine Products.

<sup>27</sup> "Sells Exudate Gums," *Chemical Marketing Reporter (CMR)*, Mar. 23, 1992, p. 5.

("hydrocolloids") amounted to about \$500 million annually in recent years, according to an industry study.<sup>28</sup> U.S. sales of these hydrocolloids grew in the early 1990s at an estimated 4 percent annually, with sales of pectin increasing at a 6-percent annual rate. U.S. sales of all (including synthetic, semisynthetic, and natural) water-soluble polymers are believed to have totaled \$3 billion in 1992-93, according to another trade estimate.<sup>29</sup>

### *Lacs and Resins*

There are several types of lacs included here: shellac, stick lac, button lac, and other lacs (referred to collectively as lac), all of which are traded in dry rather than liquid form. Lacs are the only commercial resins of animal origin; lacs are the secretion of the lac insect found only in India and Thailand. The better known liquid shellac varnish—shellac dissolved in alcohol—is not included herein.

Natural varnish resins, which are occasionally referred to as gums, are included in this summary. These natural varnish resins include copals and damars (including East Indias); copals and damars are used principally in varnishes and other surface coatings. Other natural resins are benzoin (gum benjamin), frankincense (olibanum), myrrh, and guaiac resin (lignum vita); these are used primarily as scenting agents and in medicinals.

### *Gum Arabic, Tragacanth, Karaya, and Locust Bean Gum*

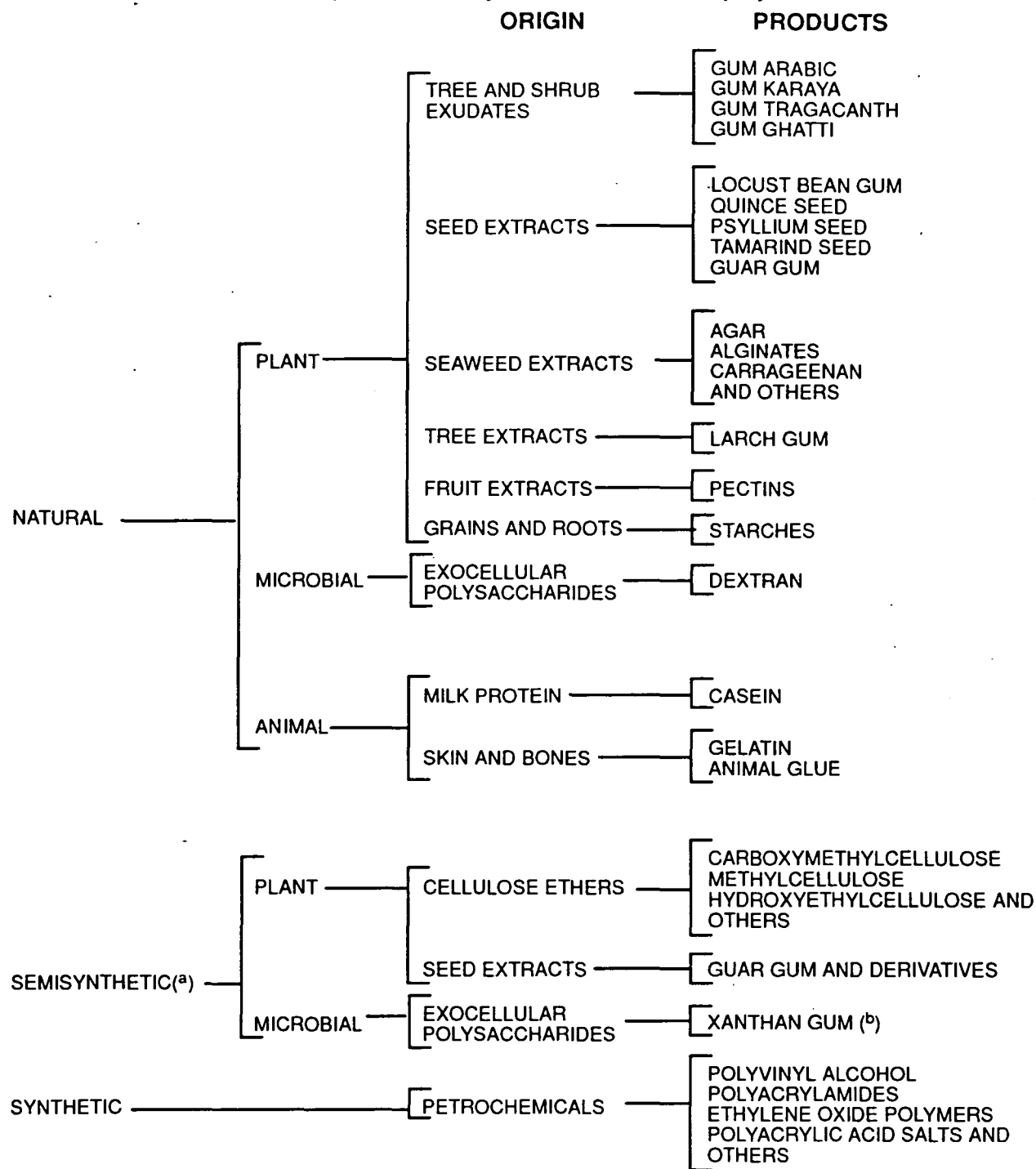
The so-called water-soluble gums, as well as a miscellaneous group of minor resins and latex gums obtained as tree and shrub exudates or from plant

<sup>28</sup> Alice Naude, "Food Additives, '94 Thickeners, the Next Generation," *CMR*, June 27, 1994, p. SR-16.

<sup>29</sup> "Taste Is King," *CMR*, July 12, 1993, p. SR-22.

**Figure 3**

**Classification of natural, semisynthetic, and synthetic water-soluble polymers.**



<sup>a</sup> Natural-based, but highly derivatized and commercially significant products.

<sup>b</sup> Although xanthan gum is sourced from a natural product (grain), it is classified as a semisynthetic polymer due to its manufacture by fermentation in a chemical plant. There is disagreement by some industry sources regarding this classification.

Source: SRI, Inc.; reprinted with permission.

seeds, are also included. The principal water-soluble gums considered are arabic, tragacanth, karaya, and larch (obtained from trees and bushes). Uses of all water-soluble gums tend to overlap to some extent; two of the most important uses are as a processing agent in the manufacture of paper and in extraction of petroleum or natural gas. The gums also are used in lithography, beer, confectionery, salad dressings, ice cream, cheese spreads, dietary foods, polishes, toothpastes, denture powders, cosmetics, and pharmaceuticals. Fewer than six firms do most of the processing and primary distribution of gums in the United States.

Gum arabic, also known as gum senegal or acacia gum, is collected as a secretion from several species of the acacia tree that grows in the region extending from the African Sahara to India. Raw gum arabic is imported and processed domestically by fewer than six companies into either spray-dried or powdered gum arabic. Gum arabic is used mainly as a sugar crystallization inhibitor, an emulsifier in soft drinks and confections, a foam stabilizer in beer, and a flavor-extract emulsifier. Gum arabic is being used in the United States increasingly in meal replacement beverages to provide dietary fiber; outside the United States, gum arabic is used mainly as a soft-drink emulsifier.<sup>30</sup> In certain applications, gum arabic may be substituted for guar gum.

Gum tragacanth, the most expensive of the gums included, is sold mainly in the form of flakes and ribbons, the latter being the form in which it oozes from the plant. It is used as an emulsifier in cigar paper, toothpaste, and pharmaceuticals, a stabilizer in ice cream, and a thickener in jams and jellies.

Gum karaya is obtained from a tree that grows throughout India; it is used mainly in pharmaceuticals, particularly in denture adhesives and bulk laxatives. Some use is reported in textile printing, long-fiber paper, and as a food stabilizer.

Locust bean gum, also known as tragasol, carobseed gum, or tragon gum, is obtained from the endosperm of the bean of a honey locust tree that grows primarily in the Mediterranean area. The sweet pod containing this bean is known as St. John's bread. Locust bean imports have been small (less than \$0.5 million annually) in recent years. Locust bean gum is used mainly as a food stabilizer in ice cream, cheese, and sauces; some use also occurs in textiles, paper, and mining.

Included under the residual provision in the *HTS* for natural gums and resins are a number of minor water-soluble gums, minor latex-type gums, and

<sup>30</sup> Naude, "Food Additives," *CMR*, June 27, 1994, p. SR-17; and Joy Lepree, "Gum Arabic. . . .," *CMR*, Dec. 12, 1994, p. 16.

miscellaneous natural resins. Among the minor water-soluble gums are tamarind, ghatti, shiraz, mesquite, larch, and talca or talha gum. These gums are similar to the principal water-soluble gums and are substitutable for them in many uses. Tamarind gum is derived from the seed of a tree found throughout much of the tropical world but cultivated commercially mainly in India. This gum is used in the United States in paper sizing and in explosives manufacture. A small quantity of larch gum (to some extent similar to gum arabic) is produced domestically, primarily for use in lithography. The other minor water-soluble gums are all imported.

### *Cashew Nut Shell Liquid*

Cashew nut shell liquid is extracted from the cellular structure of the shell of the cashew nut and obtained as a byproduct of cashew nut shelling. Imports supply all U.S. consumption. Resins derived from cashew nut shell liquid are used in the manufacture of automobile brake linings and clutch facings, plastic tapes, acid and alkali resistant adhesives, synthetic rubber, lubricants, paint, varnish, and lacquer.

### *Pine Gum*

Pine gum, obtained from pine and certain other living trees, is processed into gum naval stores, the most important products of which are turpentine (also called spirits of turpentine) and rosin. Rosin and turpentine are not herein considered.<sup>31</sup> Pine gum is collected principally in the United States in Georgia and Florida. U.S. production has fallen dramatically over the past decade, and U.S. production data on pine gum have not been reported since 1980. U.S. imports and exports of pine gum have generally been minimal because of the difficulty of handling and transporting the product. One imported commodity entering as "pine gum" is "Venice turpentine," an expensive oleoresin obtained from larch trees in the Tyrol region of Austria and Italy, and used as a medicine.

### *Mucilages*

Also included are vegetable, seed, and seaweed derivatives termed "mucilages" that are used principally in food as thickeners or in the manufacture of textiles, paper, cosmetics, and certain pharmaceuticals. The chief commercial products included herein are carrageenan, pectin, and guar gum.

### *Seaweed, Carrageenan, and Agar-Agar*

There are a number of seaweeds and other marine plants prepared for use as human food or as an

<sup>31</sup> See the summary on miscellaneous chemical specialties covering the wood chemicals.



ingredient in such food. Gelidium, dulse, and laver are harvested commercially in waters along the coasts of Spain, Portugal, western Mexico, and Japan; dulse is also harvested commercially along the shores of Northern Europe and the Canadian Maritime Provinces. The principal use for laver is its being an ingredient in Japanese and Chinese food. Many other seaweeds—mostly similar to laver—and other marine plants are also used in oriental-type foods. Dulse (a variety of laver) is a food in Europe, the Canadian Maritime Provinces, and, to some extent, along the New England Coast. Kelp is used for food in oriental dishes on a minor scale.

Of the seaweeds that are processed, kelp, gelidium, and carrageen are commercially important. Kelp abounds throughout the world in various forms. The type utilized most in the United States is harvested off the coast of Southern California and the adjacent coast of Mexico; it is processed into salts—ammonium alginate and sodium alginate. Most of the remaining kelp production is dried and ground into kelp meal, used as an ingredient in animal feeds and in fertilizers. Small quantities of kelp are also used in special diet foods. Gelidium, in addition to being used directly as human food, is utilized in crude, ground, or pulverized form as a source of agar-agar (*HTS* subheading 1302.31). Furcelleria is a seaweed that grows in the Baltic Sea; when processed, it yields a product called furcelleran, which has chemical characteristics similar to those of carrageenan.

Carrageen, or Irish moss, is a bush-type seaweed ranging from yellowish green to blackish purple in color. It is found in abundant quantities in rocky areas along the North Atlantic coast of the United States and Canada, and along the coasts of Ireland, the United Kingdom, France, Chile, and a number of other cold water areas of the world. The moss is pulled from rocks with a hand rake or is gathered from the beach, and then washed and dried. It takes about 4 pounds of wet moss to make 1 pound of dry moss. Most dried carrageen is used for the extraction of carrageenan. In addition, some pulverized carrageen is used as a clarifying agent by breweries.

Carrageenan, the thickening and gelling extract derived from carrageen and related seaweeds, has about the same consistency as mucilage. The three most important uses of carrageenan are as a stabilizer in chocolate milk to help prevent the cocoa or chocolate particles from settling, a stabilizer in ice cream, and an ingredient in toothpaste. Carrageenan is also used in processed cheese, sherbets, cake icings, pie fillings, salad dressings, fruit sirups, and candy; food use accounts for three-quarters of total consumption. Pharmaceuticals and cosmetics are the other uses of carrageenan. Carrageenan, sodium

alginate made from kelp, and agar-agar made from gelidium compete with each other as well as with the water-soluble gums from trees and seeds.

Agar, a colloidal substance obtained from gelidium (a red algae) contains a variety of different polysaccharide copolymers and derivatives. After extraction from the seaweed, the agar gel is frozen and subsequently thawed, cleaned, and bleached. The freeze-thaw process is a means of separating impurities in ice which can then be washed away upon melting.<sup>32</sup> The commercial use of agar is based on its gel-forming characteristics. The two commercial grades of agar are "technical" and "bacteriological," with the latter grade being most common. The technical grade is used in food products, such as a mucilage or emulsifier in icings; in medicine as a component in laxatives, pills, capsules, pharmaceutical preparations, and dental impression materials. The bacteriological grade agar is a culture medium for bacteria. Because of its high cost, agar has been replaced in most food uses (except food icings) by other gums; its main use is as a bacteriological media.

Two types of seaweed, carrageen and kelp, are harvested within the territorial waters of the United States. U.S. vessels harvest kelp off the California and Mexican coasts; carrageen is harvested in Maine; and small quantities of seaweed in Alaska. On a tonnage basis, the production of raw kelp is by far the leading seaweed harvested. U.S. harvesting of carrageen has declined with the closing of domestic processors, and as processors imported more raw carrageen.

There are believed to be only two firms in the United States that process kelp products. One of the two firms is believed to produce agar-agar from imported gelidium, using dried gelidium from Mexico as well as gelidium-type seaweed from Latin America and Asia.

One U.S. firm in Maine supplies all domestic production of carrageenan. Carrageenan production is concentrated worldwide among the coastal countries of the North Atlantic, Chile, and some Asian Pacific Rim countries, particularly the Philippines.

The sole domestic producer also imports carrageenan from its company-owned production facilities in Denmark and Ireland. U.S. imports of carrageenan are much less concentrated than domestic production; at least 14 firms, including the domestic producer, are believed to import carrageenan.

### *Pectin*

Most pectin is obtained domestically from citrus peels by dilute-acid extraction. Pectin is principally a thickening, emulsifying, or gelling agent in jams,

<sup>32</sup> Kirk-Othmer, *Encyclopedia of Chemical Technology*, 1980, vol. 12, p. 47.

jellies, and other food products, including low-calorie fats, yogurt, and fruit drinks. For most food applications, a standard blend of dry pectin with 25 to 35 percent glucose is used. The product is used to a lesser extent as an ingredient in cosmetics and pharmaceutical products. Pectinates and pectates are derived from pectin by chemical processing, and are used in applications similar to those of pectin.

In the early 1980s, there were three domestic producers of pectin in the United States; two plants in California and one in Florida. Thereafter, the two producers in California closed their plants, citing burdensome environmental and waste treatment costs, among other factors.<sup>33</sup>

The one company with a plant in Florida remained the only U.S. pectin producer until 1992, when it closed the plant citing excess inventories, and the availability of another plant in Denmark that was "more up-to-date, bigger, and more efficient than the U.S. plant."<sup>34</sup> This company is also the leading world producer of pectin, producing pectin in Denmark and Germany for subsequent sale in the U.S. market.<sup>35</sup>

About 80 percent of pectin in the United States is marketed in bulk quantities to industrial consumers, and the remainder is sold in retail-sized containers. About 90 percent of pectin made in the United States is consumed by producers of jams and jellies, and many of the remaining sales go to pharmaceutical firms.<sup>36</sup> Pectin is sold as a commodity item, with price often a primary factor in the sales.

## Guar Gum

Guar gum is the leading natural gum used in the United States. Most imports of guar gum are in the crude form, rather than in fully processed guar gum; crude guar gum consists of the unground endosperm of the guar seed (the portion remaining after removal of the hull and germ).

Guar plants are drought resistant, annual legumes, grown principally in India and Pakistan, and in the United States in Texas and Oklahoma. The seed of the

guar plant is valued primarily for its endosperm.<sup>37</sup> The endosperm, called splits by the trade, is virtually 100 percent crude guar gum, and accounts for about 40 percent of the weight of the seed. The remainder of the seed is mostly protein and is used as animal feed. The guar plant itself can be used as a forage for cattle and as a green manure (a crop left unharvested and then plowed under to enrich the soil). The green seed pods can be used as a vegetable for human consumption.

Guar gum is closely related in characteristics and use to locust bean gum and gum arabic, although differences between the two gums sometimes preclude direct substitution. Guar gum has a particular advantage over other gums in being soluble in cold water. The principal use of guar gum is in the treatment of petroleum wells, and in food, paper, textiles, pharmaceuticals, and explosives.

Guar gum or chemically modified guar gum is mixed with water to form a "drilling mud" which is injected into older petroleum wells to replace natural geological pressure, which drops as the petroleum is pumped out. This process allows recovery of additional petroleum.

Guar gum has enjoyed increasing popularity among U.S. food manufacturers as a food stabilizer (for example, in ice cream) because it is a "natural" ingredient unlike the synthetic organic substitutes (such as sodium carboxymethylcellulose (CMC)).

During 1989-93, there were two leading firms producing guar gum in the United States that used both domestic<sup>38</sup> and imported guar seed to make both guar gum and guar-derivative products.<sup>39</sup> A number of other firms produced guar derivative products (which are not included in the summary) out of guar gum purchased either from domestic producers or from foreign sources.

## U.S. Trade Measures

### Tariffs

Table A-1 shows the column 1 rates of duty, as of January 1, 1994, and the rates of duty under the Uruguay Round for natural gums, lacs, balsams, resins of natural origin, and mucilages. Generally, U.S. rates of duty will decline under the UR for these articles (including both general and special rates of duty). Table A-1 also provides U.S. exports and imports for 1993. (Statistical tables are in appendix A). The aggregate trade-weighted average rate of duty for natural gums, resins, and mucilage products, based on

<sup>37</sup> Guar seed is classified under HS subheading 0713.90.50, and further described in the summary on dried vegetables.

<sup>38</sup> In 1987, there was U.S. production of 5 million pounds of guar seed on 79 farms, most of which were in Texas, according to the U.S. Census Bureau. In 1982, U.S. production of guar seed was 99 million pounds.

<sup>39</sup> "Guar Gum Suppliers," *CMR*, Aug. 9, 1993, p. 20.

<sup>33</sup> "Pectin Shortage Is Prevailing," *CMR*, May 10, 1980, p. 19; and "Pectin Prices Are Falling," *CMR*, July 25, 1983, p. 21.

<sup>34</sup> "Hercules Will Close Out U.S. Production of Pectin," *CMR*, May 4, 1992, p. 3. *Petition to USTR to Grant GSP Eligibility for Pectin* (public version), Case No. 87.17, May 29, 1987; and *CMR*, p. 21, July 25, 1983.

<sup>35</sup> Case No. 87-17, Pectin, before USTR; letter from Grinstead de Mexico (petitioner) to USTR, Dec. 9, 1987, and "Pectin Supplies Tighten," *CMR*, June 4, 1990, p. 17; and "Pectin Market Business," *CMR*, Feb. 4 1991, p. 16.

<sup>36</sup> "Pectin Shortage Is Prevailing," *CMR*, May 10, 1980, p. 19.

1993 imports, was 1.6 percent ad valorem equivalent; the average trade-weighted rate of duty for the dutiable products was 5.1 percent ad valorem equivalent. About 70 percent of the imports entered duty-free either under *HTS* subheadings already duty-free or under the various preferential programs such as GSP, NAFTA, and CBERA.

NAFTA, as implemented by the North American Free Trade Agreement Implementation Act (Public Law 103-182), approved December 8, 1993, provided for the elimination of U.S. duties, effective January 1, 1994, on natural gums and resins imported from Mexico. Canada has had no import duties on these U.S. products for a number of years.

### Nontariff Measures

There are few NTMs of health and sanitary regulations that affect U.S. imports of gums, resins, and mucilages. The Food and Drug Administration enforces U.S. laws on use of food and drug ingredients, including labeling and advertising claims.

### Foreign Trade Measures

Mexico eliminated its duties on imports of all such goods (except certain seaweed and carrageenan) from the United States effective January 1, 1994. Mexico is obligated to phase out its 10-percent duty on certain U.S. seaweed ("algas") and carrageenan under *HTS* subheadings 1212.20 and 1302.39 over a 5-year period (1994-99).

Canada imposes no tariffs on imports of gums, resins, and mucilages from the United States and other most-favored-nation countries.

### U.S. and Foreign Markets

Reversing a long-term downward trend, U.S. consumption of natural gums, resins, lacs, and mucilages rose during 1989-93. In this period, imports accounted for a majority of U.S. consumption of these crude natural products, except for that of larch gum. During 1989-93, the total volume of imports rose by 57 percent to about 155,000 metric tons, and the value of imports rose by 27 percent to \$239 million (table 8).

**Table 8**  
**Natural gums, lacs, resins, and mucilages: U.S. imports for consumption, by types, 1989-93**

Commodity	1989	1990	1991	1992	1993
<i>Quantity (metric tons)</i>					
Lacs	5,618	4,537	4,288	3,696	5,221
Gum arabic	6,250	9,304	8,313	5,802	5,508
Balsams	113	104	140	135	140
Cashew nut shell liquid	7,770	10,502	7,625	13,220	11,602
Tragacanth gum	1,531	1,257	394	56	57
Karaya gum	760	361	400	352	395
Guar gum	37,284	45,531	41,397	33,549	62,280
Locust bean gum	2,558	2,384	3,187	2,528	2,451
Locust beans	62	52	22	850	1,383
Pectin and pectates	2,890	2,747	3,309	3,503	3,848
Mucilages and thickeners, including carrageenan	1,840	2,041	2,496	3,349	3,781
Seaweed and algae	21,945	31,611	44,978	54,961	47,518
Agar-agar	987	978	1,147	1,166	1,138
Other natural gums and resins	8,870	9,300	12,237	9,917	9,464
Total	98,478	120,708	129,932	133,083	154,789
<i>Value (1,000 dollars)</i>					
Lacs	7,858	6,348	6,795	8,692	16,505
Gum arabic	18,356	16,421	20,043	18,185	17,088
Balsams	1,020	1,091	1,158	1,256	917
Cashew nut shell liquid	2,478	3,225	2,444	2,060	1,542
Tragacanth gum	1,994	2,687	1,101	820	636
Karaya gum	3,504	1,762	1,779	1,070	1,188
Guar gum	23,522	31,270	25,759	25,105	33,823
Locust bean gum	11,283	11,953	18,898	15,712	16,396
Locust beans	265	237	123	346	732
Pectin and pectates	25,999	27,564	33,627	36,768	37,685
Mucilages and thickeners, including carrageenan	16,356	21,200	22,690	25,786	31,217
Seaweed and algae	31,859	27,190	27,393	25,455	26,974
Agar-agar	19,742	22,663	26,391	24,544	22,660
Other natural gums and resins	23,939	20,383	21,434	21,354	31,963
Total	187,910	193,757	209,512	206,807	239,327

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

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

A 25,000 metric-ton increase in U.S. imports of guar gum, and a 25,000-ton rise in seaweed and algae accounted for most of the volume increase. A \$12 million rise in the value of pectin imports, a \$15 million rise in carrageenan and thickeners, a \$10 million rise in guar gum, and a \$9 million increase in lac imports accounted for most of the \$51-million increase in total imports. India and EU-member countries supplied about 55 percent of the value of U.S. imports in 1993 (table 9).

U.S. exports of natural gums, resins, and mucilages remained relatively flat during 1989-93, averaging about 18,000 metric tons annually, valued at \$100 million (table 10). U.S. exports of these products tend to be processed natural gums, lacs, resins, and mucilages, whereas the imports tend to be the crude (unprocessed), and thus lower valued products (on a per kilogram basis). On a volume basis, exports

increased little during the period. In 1993, Japan, Canada, South Korea, and Mexico were the leading U.S. markets for natural gums, resins, and mucilages, purchasing about 54 percent of the \$104 million in U.S. exports (table 11).

The increase in U.S. consumption of natural gums was bolstered by higher demand for natural foods, low fat-containing foods, and products considered to be more environmentally benign. For example, a number of fat replacements in processed food have been developed over the past decade from natural gums and starches. Tighter environmental regulations in the form of a higher volume of recycled newspapers, and the reduced use of phosphate detergents also boosted U.S. industrial demand for natural water-soluble polymers, including the natural gums.<sup>40</sup>

<sup>40</sup> "Water-Soluble Polymers," *CMR*, June 21, 1992, p. 5.

**Table 9**  
**Natural gums, lacs, resins, and mucilages: U.S. Imports for consumption, by principal sources, 1989-93**

Source	1989	1990	1991	1992	1993
<i>Quantity (metric tons)</i>					
India .....	28,171	29,205	30,126	25,209	48,739
Denmark .....	2,658	2,495	2,316	2,114	2,525
Spain .....	2,550	2,214	2,547	2,462	2,923
Germany .....	1,196	1,482	1,493	1,860	2,129
France .....	2,284	2,306	2,825	3,067	3,562
Japan .....	795	631	620	638	542
United Kingdom .....	3,226	1,403	2,574	1,987	2,084
Mexico .....	2,542	16,786	34,476	42,737	37,419
Morocco .....	657	384	596	953	904
Ireland .....	11	6	164	476	823
Other .....	54,389	63,796	52,189	51,579	53,140
Total .....	98,478	120,708	129,932	133,083	154,789
<i>Value (1,000 dollars)</i>					
India .....	20,457	21,907	18,058	19,369	35,099
Denmark .....	25,308	27,912	26,099	23,285	26,196
Spain .....	16,112	17,599	22,555	16,246	17,610
Germany .....	7,512	9,337	13,486	16,118	16,610
France .....	9,208	8,950	10,051	13,392	16,475
Japan .....	14,696	10,110	11,097	11,452	13,098
United Kingdom .....	12,549	6,793	11,452	10,341	10,675
Mexico .....	5,692	6,571	9,480	12,251	9,535
Ireland .....	58	57	1,369	5,304	9,471
Morocco .....	5,094	3,878	8,001	8,292	9,309
Total other .....	71,224	80,644	77,865	70,123	75,252
Total world .....	187,910	193,757	209,512	206,807	239,327

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

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

**Table 10**  
**Natural gums, lacs, resins and mucilages: U.S. exports of domestic merchandise, by types,**  
**1989-93.**

Commodity	1989	1990	1991	1992	1993
<i>Quantity (metric tons)</i>					
Locust beans .....	14	137	54	44	155
Lacs .....	1,411	2,176	809	997	741
Gum arabic .....	658	782	1,605	830	793
Other natural gums, resins, and balsams .....	2,022	2,404	3,313	4,708	3,104
Other vegetable saps and extracts .....	3,749	5,001	5,010	3,919	3,347
Pectin and pectates .....	52	159	118	119	186
Seaweed and algae .....	1,436	969	1,222	1,183	1,568
Agar-agar .....	1,400	414	287	214	601
Mucilages and thickeners from locust bean and guar seed .....	1,832	2,916	3,209	3,660	3,904
Other mucilages and thickeners .....	4,931	5,550	3,241	2,369	1,519
<b>Total .....</b>	<b>17,506</b>	<b>20,509</b>	<b>18,869</b>	<b>18,869</b>	<b>15,918</b>
<i>Value (1,000 dollars)</i>					
Locust beans .....	68	412	194	155	417
Lacs .....	3,034	3,542	1,943	2,481	2,206
Gum arabic .....	3,335	3,896	6,855	3,770	3,629
Other natural gums, resins, and balsams .....	12,024	8,302	10,072	11,082	8,566
Other vegetable saps and extracts .....	19,329	27,590	37,422	33,681	37,912
Pectin and pectates .....	387	1,130	922	1,159	1,243
Seaweed and algae .....	6,394	9,904	13,131	11,876	13,582
Agar-agar .....	1,255	807	1,425	825	1,015
Mucilages and thickeners from locust bean and guar seed .....	6,293	10,760	10,616	15,285	18,350
Other mucilages and thickeners .....	33,072	31,002	32,060	19,190	16,977
<b>Total .....</b>	<b>85,190</b>	<b>97,345</b>	<b>114,640</b>	<b>99,505</b>	<b>103,898</b>

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

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

The leading natural gums traded are lacs and balsams, guar gum, gum arabic, locust bean gum, cashew nut shell liquid, karaya gum, and tragacanth gum, and are separately discussed below. The other miscellaneous water-soluble gums and resins that are aggregated together in *HTS* subheadings, are also separately discussed below.

### *Lacs and Balsams*

U.S. imports supply all domestic consumption of shellac, stick lac, seed lac, button lac, and other lacs. Consumption amounted to about 4,000 metric tons annually during 1989-93 (see table 8, lacs), about one-half the amount imported during 1978-82. The decline in consumption is largely attributable to increased competition from synthetic resins of lesser cost. With lower consumption, there has been less processing of the crude, imported lac in the United States. Seed lac, all of which requires further

processing, accounted for most of the lac product imports during 1989-93.

U.S. imports of balsams averaged about 126 metric tons, valued at \$1 million, during 1989-93. Domestic production and U.S. exports of balsams are small consisting of styrax production from the sweet gum tree in the southeastern States, and of Oregon balsams in the Pacific Northwest. Most imported balsams, as well as the small domestic output, are further refined by a few firms mainly in the New York City area.

### *Guar Gum*

U.S. consumption of guar gum grew rapidly during the 1970s to an average 70,000 metric tons in 1978-82, fueled largely by expanded use of guar gum in petroleum and natural gas recovery. With the end of the "oil boom" in the 1980s, the U.S. demand for guar gum fell around 40 percent to an estimated 45,000 tons

**Table 11**  
**Natural gums, resins, and mucilages: U.S. exports of domestic merchandise, by principal markets, 1989-93**

Market	1989	1990	1991	1992	1993
	<i>Quantity (metric tons)</i>				
Japan .....	2,312	3,693	3,824	1,322	1,935
Canada .....	3,028	3,160	2,598	2,611	3,169
South Korea .....	268	288	424	893	787
Mexico .....	2,150	2,374	2,391	3,417	2,460
Hong Kong .....	158	232	372	289	305
Denmark .....	425	732	388	268	588
Algeria .....	52	0	86	137	290
Venezuela .....	224	276	459	525	448
Netherlands .....	1,217	1,115	981	792	867
Argentina .....	67	139	253	284	254
Other .....	7,659	8,050	7,090	7,505	4,814
<b>Total .....</b>	<b>17,560</b>	<b>20,509</b>	<b>18,866</b>	<b>18,043</b>	<b>15,917</b>
	<i>Value (1,000 dollars)</i>				
Japan .....	17,715	24,120	27,435	11,593	20,145
Canada .....	10,480	14,244	12,416	12,968	15,499
South Korea .....	1,521	3,840	8,578	15,477	12,826
Mexico .....	7,891	9,471	10,542	9,321	7,289
Hong Kong .....	1,856	1,979	5,564	5,835	5,525
Denmark .....	2,525	4,205	2,607	1,410	3,541
Algeria .....	552	0	874	1,459	3,072
Venezuela .....	1,499	2,080	3,473	3,411	2,914
Netherlands .....	5,295	3,436	2,619	3,143	2,900
Argentina .....	736	793	1,702	2,192	2,713
Other .....	38,599	35,792	30,153	57,092	27,475
<b>Total .....</b>	<b>88,669</b>	<b>99,960</b>	<b>105,963</b>	<b>123,901</b>	<b>103,899</b>

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

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

annually during 1989-93. However, by 1993, increased consumption of guar gum in food once again augmented domestic consumption; sharply lower supplies of locust bean gum, a substitute, also encouraged rising consumption of guar gum. Imports accounted for 95 percent of estimated domestic consumption of guar gum in 1989-93.

During 1989-93, U.S. imports of guar gum declined from 37,000 metric tons in 1989 to 34,000 tons in 1992, but then rose sharply to 62,000 tons in 1993, averaging 44,000 tons annually (table 8). In 1993, imports of guar gum were valued at \$34 million.

India and Pakistan supplied over 90 percent of U.S. guar gum imports in 1989-93. To retain the valuable seed byproducts for animal feed, Pakistan and India generally prohibit the export of the seed, thereby requiring internal processing of the seed into gum. Most of the Indian and Pakistani guar gum consists of the endosperm of the seed or so-called crude splits.

U.S. exports of guar gum are not separately reported, but are included with locust bean gum. Exports of these two products totaled \$18 million in

1993 (see table 10, mucilages and thickeners); two thirds of exports of the two gums were sold to Japan, Canada, the EU, and Algeria.

### *Gum Arabic*

Gum arabic imports in 1989-93 averaged about 7,000 metric tons annually, valued at \$18 million (table 8); the Sudan supplied 58 percent of the imports, and France, 32 percent. Gum arabic imports declined about 20 percent from the average 9,000 metric tons imported annually in the 1970s and early 1980s, a result of sharply lower production of gum arabic in Sudan and higher gum arabic prices. The substitution of less expensive, and more abundant, synthetic gums has reduced the market for gum arabic.

### *Locust Bean Gum and Locust Beans*

During 1989-93, annual U.S. imports of locust bean gum (also called "carob gum") averaged 2,600 metric tons, valued at \$15 million (table 8); this volume of imports is roughly the same as in the late 1970s and early 1980s. Although substitution of guar gum, and synthetic gums such as CMC, may have

diminished use of locust bean gum, increased U.S. demand for natural food ingredients supported locust bean gum sales. Domestic processing of imported locust (carob) beans into locust bean gum accounted for only a minor part of domestic consumption of the gum, according to trade sources. Spain supplied about 63 percent of the value of U.S. imports of locust bean gum in 1989-93; Italy, 11 percent; and Morocco, 11 percent.

U.S. imports of locust beans averaged about \$340,000 (474 metric tons) annually during 1989-93. Spain, Morocco, and Italy together supplied nearly 90 percent of U.S. locust bean gum and locust bean imports during these years.

### *Cashew Nut Shell Liquid*

U.S. imports of cashew nut shell liquid remained largely unchanged during 1989-93 at an annual average of 10,000 metric tons, valued at \$3 million. This is about the same quantity as was imported during the late 1970s and early 1980s. U.S. consumption of cashew nut shell liquid remained roughly constant in such uses as a friction modifier in the manufacture of brake linings, industrial belting, and clutches. Nearly all imports of cashew nut shell liquid entered from Brazil, where large amounts of edible cashew nuts are also produced.

### *Miscellaneous Gums and Resins*

U.S. imports of karaya gums in 1989-93 averaged about 454 metric tons, valued at \$2 million, only about one-tenth of the import level during the late 1970s and early 1980s. Imports of karaya gum declined sharply from prior years because of substitution of synthetics in its specialized medical uses, denture powders, and colostomy adhesives.

Tragacanth gum imports also dramatically fell from 1,531 metric tons in 1989 to 57 metric tons in 1993 (table 8). Iran is the leading world exporter of tragacanth gum, and the curtailing of U.S.-Iranian trade (the U.S. trade embargo) was partly responsible for the sharp drop in U.S. imports. Relatively high prices have also encouraged U.S. industrial users to turn to synthetics.

Other gum and resin products imported are gum damar, tamarind seed powder, gum ghatti, crude glucomannan powder (a dietary supplement), tuna gum, kauri gum, spruce gum, gutta percha, and raw balata resin. Annual U.S. imports of these miscellaneous gums and resins averaged 10,000 metric tons, valued at \$24 million during 1989-93. In terms of value, Japan and China were the leading suppliers of these gums in 1993.

U.S. exports of the miscellaneous gums and resins reported under two export Schedule B subheadings for

"other natural gums and resins," and "other vegetable saps and extracts" rose to nearly 6,500 metric tons in 1993, valued at \$46 million in 1993 (table 9). Exports, which are believed to consist of high-valued, processed or refined gums and resins, and gum derivatives, went mainly to South Korea, Japan, Hong Kong, Mexico, and Canada, which together purchased more than 70 percent of the \$46 million of U.S. exports in 1993. Among the products exported are gum mixtures, chewing gum base, myrrh extract, food stabilizers composed of natural gums, and gum derivatives from vegetable gums. The gum derivatives are sold under a variety of patented trade names.

### *Pectin*

Official U.S. data on U.S. consumption of pectin are not available; however, trade reports placed U.S. annual consumption of pectin in recent years at 3 million to 3.5 million kilograms. U.S. demand has been increasing as new food uses for pectin have expanded.<sup>41</sup>

U.S. imports of pectin and pectic substances during 1989-93, were believed to have supplied all but a small fraction of domestic consumption. U.S. imports of pectin averaged 3 million kilograms, valued at \$32 million, annually (table 8). U.S. exports of pectin, mostly transshipments, have amounted to about 0.1 million kilograms, valued at \$1 million, annually during these years (table 10).

### *Seaweed, Carrageenan, and Agar-Agar*

During 1989-93, the quantity of all seaweed (mainly kelp) harvested in the United States ranged from 72,000 to 118,000 metric tons (wet weight) annually, and averaged 84,000 metric tons.<sup>42</sup> In 1993, the value of the 84,000 tons of U.S. seaweed harvested was \$2.0 million, according to the NMFS.

U.S. imports of seaweed and algae more than doubled from 22 million to 48 million kilos during 1989-93, although the value declined by 15 percent from \$32 million to \$27 million, during the period (table 8). U.S. imports of mucilages and thickeners, including carrageenan, also more than doubled in volume to 3,781 metric tons, and their value rose by 90 percent to \$31 million in 1993. On average during 1989-93, Japan supplied 30 percent of the value of U.S. imports of seaweed and algae; Chile, the Philippines, and South Korea, each 11 percent; and Canada, 7 percent. U.S. imports of mucilages, including carrageenan, came mainly during this period from Denmark (56 percent), Ireland (12 percent), France (11 percent), and the Philippines (7 percent) (table 9).

<sup>41</sup> CMR, June 4, 1990, and Feb. 4, 1991.

<sup>42</sup> U.S. International Trade Commission (USITC), telephone interview with the National Marine Fisheries Service (NMFS), U.S. Department of Commerce, Nov. 30, 1993.

The imported seaweed products include both edible seaweed (used in Japanese and Chinese cuisine), and crude, ground, or pulverized seaweed used domestically to make carrageenan, agar-agar, and sodium alginate. Japan and South Korea supplied mainly edible seaweed, including dried laver, and canned or bottled edible seaweed. Chile and the Philippines have supplied chiefly carrageenan, gelidium, and other agar-agar-type seaweed, and Canada supplied mainly carrageenan.

U.S. exports of seaweed and algae averaged 1.3 million kilograms (valued at \$11 million) annually during 1989-93 (table 10). During the 5 years, the leading markets for U.S. seaweed and algae were Hong Kong (17 percent), India (12 percent), Taiwan (11 percent), Canada (9 percent), and Denmark (8 percent).

U.S. imports of agar annually averaged 1,083 metric tons, valued at \$23 million, during 1989-93 (table 8). Agar is a high value product (having an average import unit value of \$23 per kilogram during the 5 years), being marketed mainly in bulk in drums to firms producing culture media. Lower priced food gums, such as guar gum (for example, with an import unit value of \$0.50 per kilogram during the same

period), have largely displaced use of agar in most foods. U.S. exports of agar averaged about 0.5 metric tons during the period (table 9). Morocco, Spain, and Chile together supplied about three-quarters of U.S. agar imports during 1989-93.

## BOTANICAL PRODUCTS FOR PERFUMERY, FLAVORING, AND PHARMACY: CRUDE, FRESH, OR DRIED

### Industry Structure

Many natural plants, plant leaves and parts, and extracts are used for herbs and perfumes, flavoring, insecticides, and medicines (figure 4). The leading items traded internationally are licorice root and licorice extract, ginseng, vanilla beans, psyllium seed husks, pyrethrum, and herbs (mint leaves, basil, and sage).<sup>43</sup>

<sup>43</sup> Domestic shipments are classified under SIC number 0139, Field Crops, not elsewhere classified; SIC 2087, Flavoring Extracts And Flavoring Sirups; SIC 2099, Food Preparations, n.e.c., and SIC 2833, Medicinal Chemicals And Botanical Products.

**Figure 4**  
**Botanical products for perfumery, flavoring, and pharmacy, crude, fresh, or dried: Classification of leading products and use**

Category	Products	Consumer Use
<b>Herbs</b>	Mint leaves Sage Basil Other herbs Ginseng	Prepared herb sales Herbal teas Herbal products for perfumery
<b>Flavoring</b>	Vanilla beans Licorice roots and extract Chicory	Foods (ice cream) Flavorings Cigarettes Coffee flavoring
<b>Natural insecticides</b>	Pyrethrum Rotenone Derris root	Natural insecticide products for plants, animals, and humans
<b>Medical</b>	Poppy straw extract Crude vegetable substances Psyllium seed husks	Various medicines, both over-the-counter and prescribed
<b>Other</b>	Inulin Apricot/peach kernels	Starch and edible-nut paste (macaroons)

Source: USITC staff.



### *Licorice Root and Licorice Extract*

Licorice root consists of the dried roots and rhizomes (underground stems) of the licorice plant, *Glycyrrhiza glabra*, and related species. The licorice plant grows in a "licorice belt," which includes countries of the Mediterranean Basin, Asia Minor, and Asia. The roots are dug when the plant is 3 to 5 years old, usually in the spring and autumn when the ground is soft. Enough root is left in the ground to renew itself in another 3 to 5 years. The fresh cut roots ordinarily are taken to buying stations, where they are dried for several months, cleaned, and pressed into bales for export.

Virtually all of the licorice root processed in the United States is used for the production of licorice extract. A small quantity is shredded and ground into a powder for use in flavoring snuff and pharmaceuticals. Licorice root is marketed in the United States in whole, shredded, and powdered forms.

In the manufacture of licorice extract, the root is shredded and ground into coarse particles, and the licorice extracted by boiling the particles in kettles of water. The water is removed, and the licorice extract is drawn off as a heavy, dark paste, some of which is molded on cooling into blocks. The paste is also processed further into a more convenient powder or granular form of extract, as well as into a confectioner's grade of pure licorice syrup.

In the United States, licorice extract is used principally to flavor tobacco products—mainly chewing tobacco, snuff, and tobacco for use in filter-tip cigarettes. It is also used as a flavoring in beverages (root beer), pharmaceuticals, and confectionery. In Europe, where licorice candy is more popular than in the United States, a larger share of licorice extract production is consumed in confectionery products than in this country.

### *Ginseng*

Crude ginseng (*Panax quinquefolius*, L.) is the leading product in this section in terms of trade. The root of the ginseng plant, crude ginseng, because of its medicinal properties, is used as a crude drug or herbal tea in various processed forms such as granules, capsules, and liquid or dried extracts or concentrates. This summary covers crude, unprocessed ginseng as well as processed ginseng in herbal tea packets, medicinal pastes or liquids. American ginseng differs from Asian ginseng in its medical uses; the American variety tends to sell for four or five times the price of the more abundant Asian variety.<sup>44</sup>

<sup>44</sup> USDA, FAS, "Ginseng—the Root of Happiness," prepared by Steve Shnitzler, *Horticultural Products Review*, Oct. 1993, p. 20.

Ginseng grows wild, but also is grown commercially on farms in many parts of the United States; 1,800<sup>45</sup> U.S. growers, almost all of which are located in Wisconsin, cultivate and grow ginseng.<sup>45</sup> Ginseng has been harvested in the United States from wild plants since the early part of the 19th century, when trade with China and the Orient first created commercial domestic interest in the plant.

### *Vanilla Beans*

Vanilla beans are the cured and full-grown unripe fruit, or pod, of a climbing orchid plant native to Mexico. The dark-brown, cured vanilla pods are usually 8 inches or more in length, are oily in appearance, and have the characteristic vanilla odor. They contain 12 percent or more of extractable aromatic constituents, about one-quarter of which is vanillin. Natural vanilla extract consists of the extract from vanilla beans dissolved in an alcoholic solution, frequently containing about 35 percent ethyl alcohol by weight. Such extracts are provided for in chapter 33 of the *HTS*. Vanilla extract is consumed as a household and industrial food flavoring, primarily for ice cream and confectionery, though some is used to flavor liqueurs and beverages, and in perfumery.

Because it contains other aromatic substances as well as vanillin and has a distinctive flavor preferred by its users, natural vanilla extract commands a price several times that of synthetic vanillin, which is generally made from lignin, a woodpulp byproduct. A product known as vanilla-vanillin consists of a blend of vanilla extract and synthetic vanillin. The Food and Drug Administration (FDA)'s Standards of Identity for Ice Cream and Frozen Desserts (21 CFR 135.10) require vanilla ice cream to be labeled "artificial vanilla," if less than 50 percent of the vanilla flavoring used was natural vanilla.

### *Tonka Beans*

Tonka beans are the seeds of tonka trees, which are indigenous to tropical South America. The fruit is about the size of a small mango. The dried fruit yields a single kidney-shaped seed or bean approximately 1-1/2 inches long.

Before shipping, the dried tonka beans are soaked in rum. Through this processing, called crystallization, small crystals of a substance known as coumarin form on the outside of the beans.<sup>46</sup> Coumarin is the substance principally responsible for the vanilla-like aroma that makes the bean desirable for use principally in flavoring smoking tobacco. Some tonka beans are also used in the manufacture of perfumes, confectionery, bitters, liqueurs, artificial vanilla extract,

<sup>45</sup> Ibid.

<sup>46</sup> Also provided for under chapter 33 of the *HTS*.

and other products. In the United States, however, the use of coumarin, or commodities containing coumarin in food products, has in effect been prohibited under FDA Regulations since 1954 (21 CFR 189.13) because of the toxic properties attributable to coumarin.

### *Other Plants and Plant Parts for Flavoring, Pharmacy, or Insecticides*

Other plants and plant parts used in flavoring, perfumery, and pharmacy are substances with medical or insecticidal properties (psyllium seed husks, crude pyrethrum, crude cube or derris root, and poppy straw extract); herbs (basil and sage); and apricot and peach kernels. Coca leaves, a controlled drug, are discussed under a separate summary.<sup>47</sup>

#### **Psyllium Seed Husks**

Psyllium seed (*Plantago ovata forskal*), also known as blond psyllium or Indian Plantago Seed, is used as a source for a medication, sodium psylliate. The epidermis or husk of psyllium seed is used as a natural mucilage (laxative) or gum.

Psyllium seed husks are used in the leading U.S. natural laxative that is sold "over-the-counter" (OTC).<sup>48</sup> Psyllium seed husks are used as a fiber source in breakfast cereals in the United States as well. The seed husks may have other medicinal properties; however, in 1990, the FDA disallowed commercial claims that U.S. food companies made concerning the effect of psyllium seed husks on lowering blood cholesterol.

#### **Natural Insecticides**

Certain natural insecticide products are derived from pyrethrum or rotenone, and found naturally in certain species of plants found primarily in South America and Africa. Products containing these insecticides are imported into the United States in either a crude form, such as roots, leaves, stems, and flowers, or in an advanced form, such as an extract or powder. Domestic consumers use these products to obtain a concentrated form of these insecticides that goes into the manufacture of household and agricultural insecticide preparations. These insecticides have a high toxicity to insects and low toxicity to humans and warm-blooded animals.

The leading natural insecticide included in this digest is pyrethrum, a common name for dried flowers of a perennial herb grown mainly in Kenya and Tanzania. Pyrethrum is generally used for household

<sup>47</sup> See the summary on medicinal chemicals, except antibiotics.

<sup>48</sup> "Psyllium Seed Competition," *CMR*, Apr. 27, 1992, p. 18.

applications, indoor use (i.e., restaurants and food-processing plants), and pet applications because of its high toxicity to insects and high degree of safety to humans and animals.

Rotenone is the active ingredient found in the cube and derris roots. Cube root is native to South America. Derris root, also known as tube or tube root, contains approximately the same percentage of rotenone as cube root, and is obtained from a woody vine cultivated in many parts of the tropical world. Both these roots are imported into the United States and used in powdered form to control insects on plants and domestic animals.

There are no known U.S. producers of either the crude or advanced forms of these natural insecticides. Domestic firms import different forms of these natural insecticides for further processing to obtain insecticide concentrates that are then used in their formulated products.

#### **Poppy Straw Extract**

In the United States, the importation, exportation, manufacture, distribution, and dispensing of narcotic substances, including coca leaves, opium and poppy straw extract, are regulated by the Drug Enforcement Administration (DEA) under the Controlled Substances Act.

Poppy straw extract is a concentrated mixture of opium alkaloids, and used to produce opiate type drugs. The extract is obtained by solvent extraction from dried and crushed parts of the poppy plant. Poppy straw extract is generally used in analgesics or in the treatment of diarrhea.

#### **Herbs**

This section covers most herbs (aromatic leaves, stems, and flower heads), whether in a crude (unmanufactured) or processed form. Spices, such as thyme, cloves, cinnamon, and bay leaves, are classified under *HTS* subheadings 0906 to 0910, and described in a separate summary on spices. In general, herbs are used as seasoning or garnishment for foods. Retail-packaged, herb teas and herb infusions comprising mixed herbs are also classified under *HTS* subheading 2106.90.61 as an edible preparation.<sup>49</sup>

Herbs are prepared for use by grinding, chopping, or crushing, or by cleaning and packaging the whole leaves, stems, or flower heads. All of the herbs covered here are available in whole form after cleaning and packaging. In addition, basil and tarragon are sold in the chopped form; laurel leaves are crushed or cracked; marjoram, rosemary, and savory are ground; and mint, parsley, and sage are available in the rubbed (crushed) and ground forms. Only three herbs are specifically provided for in the *HTS*: mint, basil and sage.

<sup>49</sup> See the separate summary on coffee and tea (Apr. 1994).

Mint leaves are the leaves of an herbaceous perennial grown commercially mainly in the U.S. Pacific Northwest. Only two species of mint are used as important food adjuncts: spearmint (*Mentha spicata*), and peppermint (*Mentha piperita*). Both impart a sweet, tangy taste and a cool aftertaste. They are used to flavor lamb, mint jelly, chewing gum, confections, mint juleps, and sauces for meat and fish. Sizable quantities of mint are used to produce mint oil, an essential oil, which is the form most commonly used commercially.<sup>50</sup>

Basil embodies the leaves and tender shoots of *Ocimum basilicum*, an annual of the mint family. It is used in soups, meat pies, and for seasoning vegetables. Basil's flavor is sweet and warm with a pungent undertone.

Sage is one of the most popular flavoring or seasoning herbs in the United States. It is the dried leaves of *Salvia officinalis*, a member of the mint family. The taste is warm, somewhat astringent, and a little bitter. Large quantities are used by the meat-packing industry.

The other leading herbs are marjoram, parsley, rosemary, savory, and tarragon. They are not specifically provided for in the *HTS*.

#### Apricot and Peach Kernels

Apricot and peach kernels are byproducts of fruit drying, canning, and freezing. Because there is little or no production or trade in peach kernels, no further mention is made of this item, although it is provided for *eo nomine* in the *HTS*. Some apricot kernels are used as oilseeds to extract an oil used in pharmaceutical preparations; this apricot kernel oil is similar to almond oil. Most apricot kernels, however, are used for other edible purposes.

Apricot kernels are either sweet or bitter, depending on the variety of fruit. All of the domestic output and practically all of the imports consist of bitter kernels containing hydrocyanic acid (a poisonous material). This acid is readily removed in processing, leaving a product with little or no bitterness.

Bitter kernels are used primarily to make kernel paste, which is a mixture of ground apricot kernels and sugar (provided for under *HTS* subheading 2008.19) and macaroon paste, a mixture of ground apricot kernels, ground almonds and sugar. Both of these pastes are low-priced substitutes for almond paste (also found under *HTS* subheading 2008.19) and are used, as is almond paste, in pastries,

<sup>50</sup> Mint oil is provided for separately under subheading 3303.00 of the *HTS*; see separate summary on essential oils.

macaroons, and marzipan confectionery. Apricot kernels generally sell at about half the price of ungraded almonds.

Sweet kernels are naturally free of hydrocyanic acid and are used principally as a substitute for almonds in topping Chinese-style almond cookies.

#### Inulin

A type of starch, inulin, is also included in this summary. Inulin, a minor starch, is extracted from Jerusalem artichokes, dahlia roots, and chicory roots, and, when hydrolyzed by boiling in water, forms fructose (levulose). The other leading starches are not included in this summary, but included elsewhere.<sup>51</sup> Inulin is used in culture media as a fermentative agent for bacteria, and for kidney evaluation.<sup>52</sup> There is little U.S. trade in inulin; U.S. imports of inulin amounted to \$38,000 (11,000 kilos) in 1993.

### U.S. Trade Measures

#### Tariffs

Table A-1 shows the column 1 rates of duty, as of January 1, 1994, for articles in this section (including both general and special rates of duty) and U.S. exports and imports for 1993. Table A-1 also sets out the U.S. rates of duty agreed to under the GATT Uruguay Round of trade negotiations. Generally, U.S. duty rates for these articles will decline under the Uruguay Round. The aggregate trade-weighted average rate of duty for these botanical products, as based on 1993 imports, was an ad valorem equivalent of 0.6 percent; the average trade-weighted rate of duty for the dutiable products was 4.7 percent ad valorem equivalent. Over 90 percent of the imports entered free of duty in 1993 either under *HTS* subheadings unconditionally free of duty or under the various preferential programs such as GSP, NAFTA, and CBERA.

NAFTA, as approved by the North American Free Trade Agreement Implementation Act (Public Law 103-182, approved December 8, 1993), provided for the elimination of U.S. duties effective January 1, 1994, on botanical products for perfumery, flavoring and pharmacy (classified in *HTS* chapter 12) imported from Mexico.

#### Nontariff Measures

The FDA and the Drug Enforcement Administration regulate the importation and exportation of narcotic substances, including poppy straw extract, under the Controlled Substances Act.

<sup>51</sup> See the summary on milled grains, malts, and starches.

<sup>52</sup> Claus and Tyler, *Pharmacognosy*, 5th ed., 1968, p. 74.

Under this authority, DEA issues permits for imports and exports, and registers persons and companies to manufacture, distribute, and dispense controlled substances. The FDA also regulates commercial claims and labeling of cosmetic, drug, and food products made from botanicals. The U.S. Department of the Interior and the USDA regulate ginseng trade under the 1977 Convention on International Trade in an Endangered Species because excessive harvesting of the wild ginseng plant is believed to be endangering its existence. USDA permits are needed to export domestic ginseng; furthermore, most State Governments require permits for harvesting, and license dealers of ginseng. The U.S. Department of the Interior criminally prosecutes violators for the unlawful harvesting or sale of ginseng.

The FDA inspects imported herbs and other botanicals, and may reject import entry because of damage or contamination. Pursuant to the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 381), apricot kernels containing hydrocyanic acid must be entered under bond for removal of such acid.

### Foreign Trade Measures

Mexico eliminated its duties on imports of botanical products for perfumery, flavoring or pharmacy from the United States, effective January 1, 1994. The NAFTA became effective for both the United States and Mexico on January 1, 1994. Canada imposes no duties on such goods from the United States, except for apricot or peach kernels which were dutiable at 5.1 percent in 1993. This duty will be eliminated by January 1, 1998, under the NAFTA.

### U.S. and Foreign Markets

U.S. consumption (as measured by imports) of botanical products for perfumery, flavoring, and pharmacy, a diverse group of crude vegetable products, rose irregularly by about 6 percent annually during 1989-93. Imports accounted for the majority of domestic consumption for many of these products. During 1989-93, the total volume of imports averaged about 58,000 metric tons annually, valued at \$208 million (table 12). A 4,000-metric-ton increase in U.S. imports of herbs, and a 10,000 metric-ton increase in the volume of licorice roots accounted for most of the increased imports. However, there are significant differences in the markets for these crude flavoring materials, and the leading types are described below. China, Madagascar, Indonesia, India, and Kenya were the leading suppliers of these crude botanical products,

together accounting for 57 percent of U.S. imports in 1993 (table 13).

U.S. exports of botanical products for perfumery, flavoring, and pharmacy averaged about 17,000 metric tons, valued at \$135 million, during 1989-93 (table 14). There was no discernible trend during the period, with the annual volume of exports fluctuating between 14,000 and 21,000 metric tons during the 5 years. Hong Kong was the leading market for these U.S. products, accounting for 55 percent of U.S. exports during the 5 years. Germany, Japan, and Canada were the next largest markets, with a combined 19-percent share of U.S. exports during 1989-93 (table 15).

### Licorice

Licorice root is not grown commercially in the United States. There are at least two or three firms that domestically process licorice root into licorice extract, glycyrrhizin, or other such byproducts. There is also further processing or refining of the imported licorice extract into various products. Domestic processors sell most of their output to the tobacco industry; smaller amounts go to the confectionery and pharmaceutical industries as well.

Virtually all licorice root processed in the United States is used in the production of licorice extract. Domestic consumption of licorice extract was extremely variable during the period, averaging an estimated 3,700 metric tons annually during 1989-93 or about one-third of the average during the early 1980s (table 16). A decline in the output of chewing tobacco and cigarettes, in which the extract has been mainly used, was the leading factor behind the reduced licorice extract use.

During 1989-93, U.S. production of licorice extract averaged an estimated 4,300 tons annually (table 16); this level of output is about one-half the level during 1978-82. The lower production levels have been attributed to reduced domestic demand and import competition.

Annual U.S. imports of licorice root rose from 4 million kg in 1989 to 16 million kilos in 1990-91, and then declined to 14 million kg in 1993 (table 14). Pakistan, Syria, and China were the principal sources of licorice root in that period. Some of the reported Pakistani-origin licorice root is believed to have originated in Afghanistan. In 1993, U.S. imports of licorice root amounted to \$10 million.

U.S. imports of licorice extract averaged 5 million kg annually during 1989-92; imports were valued at \$23 million in 1993 (table 12). China and France each supplied about one-third, and Israel, about one-fifth of the value of U.S. imports during the period.

**Table 12**  
**Botanical products for perfumery, flavoring, and pharmacy: U.S. imports for consumption, by type,**  
**1989-93**

Commodity	1989	1990	1991	1992	1993
	<i>Quantity (1,000 metric tons)</i>				
Herbs:					
Mint leaves .....	110	180	254	383	317
Sage .....	2,044	1,656	2,264	2,415	1,843
Basil .....	1,992	1,831	2,138	2,153	2,449
Products for herb teas, not including mint .....	1,976	2,347	1,645	2,453	3,338
Other plant products for herbs and perfumery .....	9,080	11,563	14,129	13,683	11,152
Subtotal .....	15,202	17,577	20,430	21,087	19,099
Other botanicals:					
Vanilla beans .....	1,107	975	1,308	1,262	1,332
Licorice roots .....	3,826	16,538	16,084	13,131	13,987
Licorice extract .....	5,772	5,685	2,525	3,546	6,262
Ginseng .....	476	576	627	748	763
Pyrethrum extract .....	367	357	390	346	320
Psyllium seed husks .....	10,546	9,900	10,327	14,527	9,793
Poppy straw extract .....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )
Crude vegetable substances for medicaments .....	2,122	1,366	980	1,337	1,311
Extracts of vegetable substances for medicaments .....	1,111	976	1,038	888	705
Tonka beans .....	10	9	5	5	6
Apricot, peach kernels .....	371	330	656	370	432
Inulin .....	( <sup>2</sup> )	17	7	11	10
Other vegetable substances, including chicory root .....	7,183	16,583	5,358	3,695	2,820
Grand total .....	48,093	70,889	59,735	60,953	56,840
	<i>Value (1,000 dollars)</i>				
Herbs:					
Mint leaves .....	553	1,426	1,808	848	852
Sage .....	6,833	4,742	4,656	5,568	4,500
Basil .....	2,470	2,657	2,929	3,039	3,474
Products for herb teas not including mint .....	5,562	5,252	5,943	8,469	8,124
Other plant products for herbs and perfumery .....	18,015	31,719	43,878	32,391	32,298
Subtotal .....	33,433	45,796	59,214	50,315	49,248
Other botanicals:					
Vanilla beans .....	46,125	47,758	69,044	65,700	63,483
Licorice roots .....	2,120	12,685	12,032	8,908	10,108
Licorice extract .....	17,385	21,861	11,991	14,934	23,257
Ginseng .....	11,631	13,912	13,761	14,481	12,554
Pyrethrum extract .....	16,490	19,781	24,509	21,510	21,392
Psyllium seed husks .....	22,026	24,090	21,479	26,048	16,668
Poppy straw extract .....	5,925	4,441	1,650	4,033	5,267
Crude vegetable substances for medicaments .....	4,340	3,432	4,044	5,732	5,683
Extracts of vegetable sub- stances for medicaments .....	9,185	7,052	7,995	4,409	5,173
Tonka beans .....	40	41	41	30	35
Apricot, peach kernels .....	558	540	1,025	658	716
Inulin .....	2	6	8	47	38
Other vegetable substances, including chicory roots .....	1,505	2,737	2,832	3,156	3,366
Grand total .....	170,767	204,135	229,625	219,960	216,987

<sup>1</sup> Quantity data are not reported for poppy straw extract.

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

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

Table 13

Botanical products for perfumery, flavoring, and pharmacy, crude, fresh, or dried: U.S. imports for consumption, by principal sources, 1989-93

(1,000 dollars)

Source	1989	1990	1991	1992	1993
China .....	18,008	23,975	24,410	30,369	39,316
Madagascar .....	24,652	28,526	36,366	34,788	32,441
Indonesia .....	11,228	12,819	20,142	18,536	19,769
India .....	23,434	24,709	23,128	27,712	18,785
Kenya .....	11,314	13,765	16,547	14,035	14,226
Comoros .....	7,502	4,208	8,877	9,898	9,396
France .....	10,955	13,258	7,029	7,656	7,266
Germany .....	2,905	4,225	5,282	6,559	7,199
Australia .....	2,499	1,902	3,258	6,344	6,790
Hong Kong .....	6,823	4,855	5,170	6,811	6,444
Other .....	51,446	71,890	79,417	57,253	55,356
Total .....	170,767	204,135	229,625	219,960	216,987

Note.—Because of rounding, figures may not add to the total shown.

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

During this period, annual exports of licorice extract averaged 6 million kilograms and showed no discernible trend (table 14). U.S. licorice extract is exported to many countries; in 1993, the EU purchased about half of U.S. exports; and Japan about one-tenth. U.S. exports of licorice root averaged less than 0.2 million kilograms annually during 1989-93.

### Ginseng

U.S. production of ginseng, derived both from commercial farms and from the harvesting of wild plants, averaged an estimated 950 metric tons annually during 1989-93 (table 17). This average level is sharply above the 200 metric tons produced annually in the early 1980s. In 1993, about 90 percent of the volume of ginseng was cultivated (grown on commercial farms), and 10 percent was harvested wild. U.S. production of ginseng fell during 1989-93 by about one-third as ginseng production on commercial farms has declined.

Less than 5 percent of U.S.-grown ginseng is consumed domestically, with almost all production being exported. U.S. consumption of ginseng (including the weight of imported packaged ginseng teas) during 1989-93 averaged about 700 metric tons annually. Imported packaged ginseng contains other ingredients, and thus sells at prices much lower than those for domestic ginseng. Imported ginseng was valued at \$16 per kilo in 1993, compared to \$102 per kilo for U.S. ginseng exports, for example. The high cost of domestic ginseng tends to sharply restrict domestic consumption.

U.S. imports of ginseng averaged annually \$13 million during 1989-93, small in relation to the value of domestic production or exports (table 12). Imports,

supplied chiefly by China, South Korea, and Hong Kong, may include some previously exported U.S. ginseng that has been sorted, repackaged, or mixed with ginseng or herbs from foreign countries in herbal tea form or as ginseng extract. U.S. imports of ginseng extract amounted to about \$4 million annually during 1989-93.

U.S. exports of ginseng go mainly to Hong Kong, which took 90 percent of the average 900 metric tons (valued at \$83 million) exported annually during 1989-93 (table 14). Crude U.S. ginseng is widely sought in Asia for its supposed or real medicinal properties, and commands a high price. In 1993, 9 percent of the 785 metric tons of U.S. ginseng exported were wild, and 91 percent were cultivated. Wild ginseng exports sold in 1993 for \$311 per kilogram, and cultivated ginseng exports for \$80 per kilo.

### Vanilla Beans and Tonka Beans

Vanilla bean imports, which supply all U.S. consumption, averaged 1.2 million kg annually, valued at \$58 million, during 1989-93 (table 12). During these 5 years, Madagascar supplied 54 percent of the vanilla bean imports; Indonesia, 28 percent; and the Republic of Comoros, 14 percent. Madagascar produces "Bourbon vanilla," a premium grade product, and has dominated world trade in vanilla beans for decades.<sup>53</sup> Average annual U.S. imports during 1989-93 were 71 percent above the 0.7 million kilos imported in 1978-82; heightened U.S. demand for natural ingredients in food such as ice cream provided a strong U.S. market for vanilla beans.

<sup>53</sup> "Bourbon Vanilla Keeps Top Spot," *CMR*, Oct. 11, 1993, p. 7.

**Table 14**  
**Botanical products for perfumery, flavoring, and pharmacy: U.S. exports of domestic merchandise, by types, 1989-93**

Commodity	1989	1990	1991	1992	1993
	<i>Quantity (1,000 metric tons)</i>				
Herbs:					
Herbal teas .....	731	209	427	535	337
Other plant products for herbs and perfumery .....	2,762	4,013	4,471	5,944	7,071
Total .....	3,493	4,222	4,898	6,479	7,408
Other botanicals:					
Vanilla beans .....	227	686	393	248	31
Licorice roots .....	145	141	152	152	245
Licorice root extract .....	6,346	4,651	4,848	6,094	5,563
Ginseng:					
Cultivated .....	1,070	998	586	755	715
Wild .....	92	68	61	100	70
Total .....	1,162	1,066	647	855	785
Crude vegetable substances for medicaments .....	1,724	1,435	1,829	2,244	2,480
Pyrethrum extract .....	64	66	118	170	106
Apricot, peach kernels .....	49	268	48	190	123
Other vegetable substances used for flavorings .....	7,857	1,010	1,236	1,206	2,287
Grand total .....	21,067	13,545	14,169	17,638	19,027
	<i>Value (1,000 dollars)</i>				
Herbs:					
Herbal teas .....	3,650	962	1,340	2,147	1,828
Other plant products for herbs and perfumery .....	9,983	12,856	14,651	19,224	21,069
Total .....	13,633	13,818	15,991	21,371	22,897
Other botanicals:					
Vanilla beans .....	1,043	2,367	1,385	1,105	1,325
Licorice roots .....	567	669	1,194	997	1,853
Licorice root extract .....	17,695	17,763	22,301	23,328	23,047
Ginseng root:					
Cultivated .....	54,300	69,756	62,060	80,102	57,427
Wild .....	18,876	12,115	13,584	24,452	21,770
Total .....	73,176	81,871	75,644	104,554	79,197
Crude vegetable substances for medicaments .....	5,208	5,792	6,744	8,143	8,019
Pyrethrum extract .....	707	708	1,093	1,850	1,126
Apricot, peach kernels .....	153	379	55	419	486
Other vegetable substances used for flavorings .....	3,633	2,086	3,109	2,297	3,485
Grand total .....	115,815	125,451	127,514	164,065	141,434

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

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

Table 15

Botanical products for perfumery, flavoring, and pharmacy, crude, fresh, or dried: U.S. exports of domestic merchandise, by principal markets, 1989-93

(1,000 dollars)

Market	1989	1990	1991	1992	1993
Hong Kong .....	63,656	74,030	68,336	94,562	68,633
Germany .....	8,689	9,442	10,517	13,824	11,717
Japan .....	6,140	5,357	6,006	6,569	9,892
Canada .....	7,526	8,324	7,812	9,810	9,955
Taiwan .....	5,166	4,719	4,320	6,111	5,149
Singapore .....	1,929	2,081	3,157	2,761	4,829
Mexico .....	2,813	1,293	2,425	1,709	2,686
United Kingdom .....	1,080	1,550	1,801	2,076	2,356
Australia .....	2,395	1,997	2,245	1,520	2,040
Netherlands .....	2,610	1,881	1,861	2,702	2,006
Other .....	13,811	14,777	19,034	22,420	22,171
Total .....	115,815	125,451	127,514	164,065	141,434

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

Table 16

Licorice extract: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1989-93

Year	Production <sup>1</sup>	Exports <sup>2</sup>	Imports	Apparent consumption <sup>3</sup>	Ratio (percent) of imports to consumption <sup>3</sup>
<i>Quantity (metric tons)</i>					
1989 .....	1,338	6,345	5,772	765	100
1990 .....	5,788	4,651	5,685	6,822	83
1991 .....	5,629	4,848	2,525	2,991	84
1992 .....	4,596	6,094	3,546	2,048	100
1993 .....	4,895	5,563	6,262	5,595	100
<i>Value (1,000 dollars)</i>					
1989 .....	(4)	17,695	17,385	(4)	(4)
1990 .....	(4)	17,763	21,861	(4)	(4)
1991 .....	(4)	22,301	11,991	(4)	(4)
1992 .....	(4)	23,328	14,934	(4)	(4)
1993 .....	(4)	23,047	23,257	(4)	(4)
<i>Unit value (per kilo)</i>					
1989 .....	-	\$2.78	\$3.84	-	-
1990 .....	-	3.81	3.84	-	-
1991 .....	-	4.60	5.43	-	-
1992 .....	-	3.83	4.21	-	-
1993 .....	-	4.14	3.71	-	-

<sup>1</sup> Estimated by the staff of the U.S. International Trade Commission as 35 percent of licorice root imports.

<sup>2</sup> Exports includes re-exports of imported licorice extract after processing.

<sup>3</sup> Consumption does not reflect inventory changes.

<sup>4</sup> Not available.

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



Table 17

Ginseng: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1989-93

Year	Production <sup>1</sup>	Exports <sup>1</sup>	Imports	Apparent consumption	Ratio (percent imports to consumption)
<i>Quantity (metric tons)</i>					
1989	1,220	1,163	476	530	90
1990	1,120	1,065	576	630	91
1991	710	677	627	660	96
1992	900	855	748	790	95
1993	820	785	763	800	95
<i>Value (\$1,000 dollars)</i>					
1989	(2)	73,176	11,631	(2)	(2)
1990	(2)	81,871	13,912	(2)	(2)
1991	(2)	75,644	13,761	(2)	(2)
1992	(2)	104,544	14,481	(2)	(2)
1993	(2)	79,197	12,554	(2)	(2)
<i>Unit value (per kilo)</i>					
1989	-	\$62.92	\$24.43	-	-
1990	-	76.87	24.15	-	-
1991	-	111.73	21.95	-	-
1992	-	122.27	19.35	-	-
1993	-	101.65	16.45	-	-

<sup>1</sup> Commission staff estimated production of 105 percent of reported exports.<sup>2</sup> Not available.

Note.—The import quantity is believed to include the weight of other materials, and is thus not strictly comparable to that of exports or domestic production.

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

Imports likewise supply all U.S. consumption of tonka beans. During 1989-93, U.S. annual imports of tonka beans averaged 7,000 kilos, with a value of \$37,000 (table 12). Imports of tonka beans during this period were only about 10 percent of the average levels in the late 1970s and the early 1980s as synthetic flavorings made inroads into the U.S. market for tonka beans. Venezuela and Trinidad-Tobago were the leading suppliers of tonka beans.

### *Psyllium Seed Husks*

In 1993, U.S. imports of psyllium seed husks amounted to \$17 million (table 12). Annual U.S. imports of psyllium seed husks fluctuated during 1989-93 between 10 to 15 metric tons, valued between \$17 million and \$26 million. India supplied over 99 percent of U.S. imports during this period. U.S. consumption of the seed husks remained relatively stable in the traditional use in natural laxative preparations. Although U.S. breakfast cereal manufacturers began adding psyllium seed husks for bulk in certain products in the late 1980s, U.S. consumption rose only modestly.<sup>54</sup> In 1990, the FDA disallowed commercial advertising claims made for other supposed health benefits of psyllium seed husks, thereby dampening expanded use in food

<sup>54</sup> "Psyllium Seed Competition," *CMR*, Apr. 27, 1992, p. 18.

### *Pyrethrum*

Pyrethrum enters U.S. trade either in crude form or more commonly as an extract or powder. U.S. imports of pyrethrum extract have been stable during 1989-93, averaging annually about 350,000 kilograms, valued at \$21 million (table 12). This import level is close to the average level of 300,000 kilos imported annually during 1979-83. Kenya supplied 67 percent of U.S. pyrethrum extract imports during 1989-93; Australia and Tanzania followed with 11- and 10-percent shares, respectively. U.S. demand for natural insecticides like pyrethrum remained stable during the 1980s and early 1990s because of their low toxicity to humans and animals and their biodegradability.

### *Herbs*

Crude imported herbs are processed into herb preparations and herbal teas in the United States. U.S. production of the crude herbs covered in this summary is limited to mint leaves, basil, anise, parsley, thyme, and dill.<sup>55</sup>

<sup>55</sup> USDA reported U.S. production in 1992 of the following fresh herbs: anise, basil, chives, cilantro, cipolinos, dill, dry eschallot, horse-radish, mint, parsley root, thyme, and watercress. USDA, *Vegetables and Specialties*, July 1992, p. 70.

In 1987 (the most recent year for which data are available), the U.S. Department of Commerce reported that U.S. production of all herbs (except mint leaves used for oil) amounted to 4.5 million kilos. There were 866 farms in that year producing herbs on 5,700 acres, with California supplying about 60 percent of the total, and Wisconsin, 11 percent (some of this output was ginseng). Most of the herbs grown (except mint) are consumed in their fresh state, rather than being dried.

In 1987, farmers grew mint leaves for reduction into essential oils (spearmint and peppermint oils) on about 96,000 acres on 724 farms.<sup>56</sup> Mint production amounted to about 6 million pounds (in mint-oil equivalent weight) in that year, an 18-percent increase from the 5 million pounds grown in 1982. However, most of the mint grown in the United States is used to produce mint oil, although some dried mint goes to produce an herbal tea or is packaged for direct spice use by consumers.

Total herb consumption rose during 1989-93, owing to increased U.S. population, a heightened interest in cooking with herbs, and increased use in herbal tea. U.S. imports of herbs rose by 26 percent during 1989-93 from 15,000 to 19,000 metric tons, and averaged 19,000 metric tons annually (table 12).<sup>57</sup> U.S. sales of packaged herbal and specialty teas rose rapidly during the 1980s and early 1990s, and are reported to have exceeded \$50 million in 1991, supplied chiefly by one U.S. company.<sup>58</sup>

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<sup>56</sup> U.S. Bureau of the Census, *1987 Census of Agriculture*, table 31.

<sup>57</sup> These import data exclude imports of retail-packaged mixed herbal teas and mixed herb preparations (imported under HTS subheading 2106.90) that totaled 1,369 metric tons, valued at \$11 million, in 1993.

<sup>58</sup> *Food and Beverage Marketing*, Dec. 1991, p. 10.

With the exception of the herbs known to be grown domestically, imports supply virtually all crude herbs consumed in the United States. There are many different types of herbs imported, but only three herbs, mint, sage, and basil, are specially provided for in the HTS. These three herbs in 1993 accounted for 18 percent of the total \$49 million of herb imports (table 12). Most herbs enter the United States in a crude form, and then are processed and packaged. China and the EU were the leading suppliers of herbs during 1989-93.

U.S. exports of herbs averaged 5,000 metric tons annually, valued at \$18 million, during 1989-93 (table 14).<sup>59</sup> These exports were mainly unpackaged herbs and herb teas made from imported herbs. The EU, Canada, and Japan purchased the majority of these exports during the 5 years.

### *Apricot and Peach Kernels*

California fruit-processing plants obtain apricot kernels from cracked apricot pits. There is believed to be only one producer in the United States of apricot kernels; thus, production data are not available because of confidentiality concerns. U.S. imports of apricot and peach kernels averaged 400,000 kilos, valued at \$700,000 annually during 1989-93. Australia and China supplied over 90 percent of U.S. imports during the 5 years.

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<sup>59</sup> Exports of retail-packaged mixed herb teas and mixed herb preparations totaled an additional 8,555 metric tons, valued at \$55 million, in 1993, as reported under Schedule B item 2106.90.60.

**APPENDIX A**  
**STATISTICAL TABLES**

-Table A-1

Miscellaneous vegetable substances: *Harmonized Tariff Schedule* subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1995; U.S. exports, 1993; and U.S. Imports, 1993

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1995		Bound duty, Uruguay Round <sup>2</sup>	U.S. exports, 1993	U.S. imports, 1993
		General	Special <sup>1</sup>			
<i>— Million dollars —</i>						
	Foliage, branches and other parts of plants, without flowers or flower buds, and grasses, mosses and lichens, being goods of a kind suitable for bouquets or for ornamental purposes, fresh, dried, dyed, bleached, impregnated or otherwise prepared:					
0604.10.00	Mosses and lichens .....	Free	( <sup>3</sup> )	Free	11	1
	Other:					
0604.91.00	Fresh .....	Free	( <sup>3</sup> )	Free	66	37
	Evergreen Christmas trees:					
.20	Douglas-fir .....			Free	( <sup>4</sup> )	( <sup>5</sup> )
.40	Fir except Douglas-fir .....			Free	( <sup>4</sup> )	10
.60	Other .....			Free	( <sup>4</sup> )	7
.80	Other .....					
0604.99	Other .....				10	12
.30	Dried or bleached .....	Free	( <sup>3</sup> )	Free	( <sup>4</sup> )	10
.60	Other .....	10.3%	Free (A,E,IL,J,MX) 3.3% (CA)	7.0%	( <sup>4</sup> )	2
0905.00.00	Vanilla beans .....	Free	( <sup>3</sup> )	Free	1	63
1108.20.00	Inulin .....	5.3%	Free (A,E,IL,J,MX) 1.7% (CA)	2.6%	( <sup>5</sup> )	( <sup>5</sup> )
	Hop cones, fresh or dried, whether or not ground, powdered or in the form of pellets; lupulin:					
1210.10.00	Hop cones, neither ground nor powdered nor in the form of pellets .....	16¢/kg	Free (A,CA,E,IL,J,MX)	13.2¢/kg	10	20
1210.20.00	Hop cones, ground, powdered or in the form of pellets; lupulin .....	16¢/kg	Free (A,CA,E,IL,J,MX)	13.2¢/kg		
.20	Hop cone pellets .....				25	4
.40	Other .....				2	2
	Plants and parts of plants (including seeds and fruits), of a kind used primarily in perfumery, in pharmacy or for insecticidal, fungicidal or similar purposes, fresh or dried, whether or not cut, crushed or powdered:					
1211.10.00	Licorice roots .....	Free	( <sup>3</sup> )	Free	2	10
1211.20.00	Ginseng roots .....	Free	( <sup>3</sup> )	Free		
.20	Cultivated .....			Free	57	9
.40	Wild .....			Free	22	( <sup>5</sup> )
	Other:					
	Mint leaves:					
1211.90.20	Crude or not manufactured .....	Free	( <sup>3</sup> )	Free	( <sup>4</sup> )	( <sup>5</sup> )

See footnotes at end of table.

Table A-1—Continued

Miscellaneous vegetable substances: *Harmonized Tariff Schedule* subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1995; U.S. exports, 1993; and U.S. imports, 1993

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1995		Bound duty, Uruguay Round <sup>2</sup>	U.S. exports, 1993	U.S. imports, 1993
		General	Special <sup>1</sup>			
	Plants and parts of plants (including seeds and fruits), of a kind used primarily in perfumery, in pharmacy or for insecticidal, fungicidal or similar purposes, fresh or dried, whether or not cut, crushed or powdered—Continued					
	Other—Continued					
	Mint leaves—Continued					
1211.90.40	Other .....	4.8% <sup>6</sup>	Free (A,CA,E,IL,J,MX)	4.8%		
.20	Herbal teas and herbal infusions (single species, unmixed) .....				(4)	(5)
.40	Other .....				(4)	(5)
1211.90.60	Tonka beans .....	6.6¢/kg	Free (A,CA,E,IL,J,MX)	6.6¢/kg	(4)	(5)
1211.90.80	Other .....	Free	(3)	Free		
	Substances having anesthetic, prophylactic or therapeutic properties and principally used as medicaments or as ingredients in medicaments:					
.20	Psyllium seed husks .....				(4)	17
.30	Other .....				8	6
.40	Basil .....				(4)	3
.50	Sage .....				(4)	5
	Other:					
.80	Herbal teas and herbal infusions (single species, unmixed) .....				2	8
.90	Other .....				21	32
	Locust beans, seaweeds and other algae, sugar beet and sugar cane, fresh or dried, whether or not ground; fruit stones and kernels and other vegetable products (including unroasted chicory roots of the variety <i>Cichorium intybus sativum</i> ) of a kind used primarily for human consumption, not elsewhere specified or included:					
1212.10.00	Locust beans, including locust bean seeds .....	Free	(3)	Free	(5)	1
1212.20.00	Seaweeds and other algae .....	Free	(3)	Free	14	27
1212.30.00	Apricot, peach or plum stones and kernels .....	3¢/kg	Free (E,IL,J,MX) 0.9¢/kg (CA)	1.5¢/kg	(5)	1
	Other (except sugar beets and sugar cane):					
1212.99.00	Other .....	Free	(3)	Free	3	3

— Million dollars —

Table A-1—Continued

Miscellaneous vegetable substances: *Harmonized Tariff Schedule* subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1995; U.S. exports, 1993; and U.S. imports, 1993

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1995		Bound duty, Uruguay Round <sup>2</sup>	U.S. exports, 1993	U.S. imports, 1993
		General	Special <sup>1</sup>			
— Million dollars —						
	Lac; natural gums, resins, gum-resins and balsams:					
1301.10.00	Lac .....	Free	( <sup>3</sup> )	Free	2	17
.20	Seed lac .....		( <sup>4</sup> )	4		
.40	Bleached shellac .....				( <sup>4</sup> )	3
.60	Other .....				( <sup>4</sup> )	10
1301.20.00.00	Gum Arabic .....	Free	( <sup>3</sup> )	Free	4	17
1301.90	Other .....				9	10
1301.90.40	Turpentine gum (oleoresinous exudate from living trees) .....	1.3%	Free (A,CA,E,IL,J,MX)	1.3%	( <sup>4</sup> )	( <sup>5</sup> )
1301.90.90	Other .....	Free	( <sup>3</sup> )	Free		
.10	Balsams .....				( <sup>4</sup> )	1
.30	Tragacanth .....				( <sup>4</sup> )	1
.40	Karaya .....				( <sup>4</sup> )	1
.90	Other .....				( <sup>4</sup> )	7
	Vegetable saps and extracts; pectic substances, pectinates and pectates; agar-agar and other mucilages and thickeners, whether or not modified, derived from vegetable products:					
	Vegetable saps and extracts:					
1302.12.00	Of licorice .....	5.6%	Free (A,CA,E,IL,J,MX)	3.8%	23	23
1302.13.00	Of hops .....	\$1.80/kg	Free (E,IL,J) 59.4¢/kg (CA) \$1.188/kg (MX)	89¢/kg	60	( <sup>5</sup> )
1302.14.00	Of pyrethrum or of the roots of plants containing rotenone .....	Free	( <sup>3</sup> )	Free	.1	21
1302.19	Other .....				38	55
	Ginseng; substances having anesthetic, prophylactic or therapeutic properties:					
1302.19.20	Poppy straw extract .....	Free	( <sup>3</sup> )	Free	( <sup>4</sup> )	5
1302.19.40	Other .....	1.4%	Free (A,CA,E,IL,J,MX)	1%	( <sup>4</sup> )	9
.20	Ginseng .....				( <sup>4</sup> )	4
.40	Other .....				( <sup>4</sup> )	5
1302.19.90	Other .....	Free	( <sup>3</sup> )	Free	( <sup>4</sup> )	27
.20	Cashew nut shell liquid .....				( <sup>4</sup> )	2
.40	Other .....				( <sup>4</sup> )	25
1302.20.00	Pectic substances, pectinates and pectates .....	Free	( <sup>3</sup> )	Free	1	38

See footnotes at end of table.

Table A-1—Continued

Miscellaneous vegetable substances: *Harmonized Tariff Schedule* subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1995; U.S. exports, 1993; and U.S. imports, 1993

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1995		Bound duty, Uruguay Round <sup>2</sup>	U.S. exports, 1993	U.S. imports, 1993
		General	Special <sup>1</sup>			
— Million dollars —						
	Mucilages and thickeners, whether or not modified, derived from vegetable products:					
1302.31.00	Agar-agar .....	2.5%	Free (A,CA,E,IL,J,MX)	1.4%	1	23
1302.32.00	Mucilages and thickeners, whether or not modified, derived from locust beans, locust bean seeds or guar seeds .....	Free	( <sup>3</sup> )	Free	18	50
.20	Guar .....				( <sup>4</sup> )	34
.40	Locust bean .....				( <sup>4</sup> )	16
1302.39.00	Other .....	4.7%	Free (CA,E,IL,J)	Free	17	31
.10	Carageenan .....		3% (MX)	3.2%	( <sup>4</sup> )	13
.90	Other .....				( <sup>4</sup> )	3
	Vegetable materials of a kind used primarily as stuffing or as padding (for example, kapok, vegetable hair and eel-grass), whether or not put up as a layer with or without supporting material:					
1402.10.00	Kapok .....	Free	( <sup>3</sup> )	Free	2	1
	Other:					
1402.91.00	Vegetable hair .....	0.5¢/kg	Free (CA,E,IL,J,MX)	0.5¢/kg	( <sup>5</sup> )	( <sup>5</sup> )
1402.99.00	Other .....	Free	( <sup>3</sup> )	Free	( <sup>5</sup> )	( <sup>5</sup> )
	Vegetable materials of a kind used primarily in brooms or in brushes (for example, broomcorn, piassava, couch grass and istle), whether or not in hanks or bundles:					
1403.10.00	Broomcorn ( <i>Sorghum vulgare</i> var. <i>technicum</i> ) .....	\$9.99/t	Free (CA,E,IL,J,MX)	\$4.95/t	( <sup>5</sup> )	13
1403.90	Other:					
1403.90.20	Istle .....	Free	( <sup>3</sup> )	Free	( <sup>4</sup> )	5
1403.90.40	Other .....	4.6%	Free (A,CA,E,IL,J,MX)	2.3%	( <sup>4</sup> )	3
1404	Vegetable products not elsewhere specified or included:					
1404.10.00	Raw vegetable materials of a kind used primarily in dyeing or tanning:					

See footnotes at end of table.

Table A-1—Continued

Miscellaneous vegetable substances: *Harmonized Tariff Schedule* subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1995; U.S. exports, 1993; and U.S. imports, 1993

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1995		Bound duty, Uruguay Round <sup>2</sup>	U.S. exports, 1993	U.S. imports, 1993
		General	Special <sup>1</sup>			
— Million dollars —						
.20	Ganaigre, chestnut, curupay, divi-divi, eucalyptus, gall nuts, hemlock, larch, mangrove, myrobalan, oak, quebracho, sumac, tara, urunday, valonia, wattle and other materials of a kind used primarily in tanning . . . .	Free	( <sup>3</sup> )	Free	( <sup>4</sup> )	( <sup>5</sup> )
.40	Other . . . . .	Free	( <sup>3</sup> )	Free	( <sup>4</sup> )	1
1404.90.00	Other . . . . .	Free	( <sup>3</sup> )	Free	3	12

<sup>1</sup> Programs under which special tariff treatment may be provided, and the corresponding symbols for such programs as they are indicated in the "Special" subcolumn, are as follows: Generalized System of Preferences (A); North America Free-Trade (NAFTA), goods of Canada (CA); NAFTA, goods of Mexico (MX); Caribbean Basin Economic Recovery Act (E); United States-Israel Free Trade Area (IL); and Andean Trade Preference Act (J).

<sup>2</sup> Bound rates of duty were obtained from the Office of the U.S. Trade Representative, *Uruguay Round, Draft Uruguay Round Tariff Schedules of the United States, Vol. 1, Agriculture*.

<sup>3</sup> Not applicable since the column 1 rate of duty is free.

<sup>4</sup> Not separately reported.

<sup>5</sup> Less than \$500,000.

Source: U.S. exports and imports compiled from official statistics of the U.S. Department of Commerce.



**Table A-2**  
**Miscellaneous vegetable substances: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, by selected countries and country groups, 1989-93**

(Million dollars)

Item	1989	1990	1991	1992	1993
<b>U.S. exports of domestic merchandise:</b>					
Hong Kong .....	66	76	74	101	75
Germany .....	34	46	46	64	52
Canada .....	40	40	39	43	46
Netherlands .....	26	25	25	33	44
Japan .....	28	34	37	24	36
Mexico .....	30	27	31	30	30
South Korea .....	2	4	12	20	16
United Kingdom .....	9	9	9	11	14
Brazil .....	20	12	18	13	10
Belgium .....	4	4	7	10	10
All other .....	85	84	93	113	102
<b>Total .....</b>	<b>345</b>	<b>362</b>	<b>392</b>	<b>462</b>	<b>436</b>
EU .....	83	98	106	134	135
<b>U.S. imports for consumption:</b>					
Hong Kong .....	9	7	6	8	7
Germany .....	29	40	40	42	36
Canada .....	35	39	32	32	34
Netherlands .....	1	2	2	3	3
Japan .....	16	11	12	12	14
Mexico .....	31	33	39	40	44
South Korea .....	10	9	10	10	9
United Kingdom .....	13	8	13	12	14
Brazil .....	4	4	4	4	3
Belgium .....	5	1	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )
All other .....	310	361	397	381	404
<b>Total .....</b>	<b>463</b>	<b>515</b>	<b>555</b>	<b>544</b>	<b>568</b>
EU .....	110	117	115	129	133
<b>U.S. merchandise trade balance:</b>					
Hong Kong .....	57	69	68	93	68
Germany .....	5	5	6	21	17
Canada .....	5	1	7	11	12
Netherlands .....	25	23	24	30	41
Japan .....	12	23	26	12	22
Mexico .....	-1	-6	-8	-10	-14
South Korea .....	-7	-5	2	10	7
United Kingdom .....	-4	1	-4	-2	( <sup>1</sup> )
Brazil .....	17	8	13	9	7
Belgium .....	-2	3	7	10	10
All other .....	-225	-277	-304	-268	-302
<b>Total .....</b>	<b>-118</b>	<b>-153</b>	<b>-163</b>	<b>-82</b>	<b>-132</b>
EU .....	-27	-19	-9	5	2

<sup>1</sup> Less than \$500,000.

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

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

**Table A-3**  
**Miscellaneous vegetable substances: U.S. exports of domestic merchandise, by principal markets, 1989-93**

*(1,000 dollars)*

Market	1989	1990	1991	1992	1993
Hong Kong .....	66,034	76,200	74,389	101,250	75,001
Germany .....	33,607	45,554	45,643	63,710	52,490
Canada .....	39,655	39,672	39,127	42,827	46,271
The Netherlands .....	26,624	25,116	25,259	33,294	43,789
Japan .....	28,350	33,747	37,285	23,827	35,569
Mexico .....	29,941	27,128	31,088	29,572	29,942
South Korea .....	2,167	4,216	11,624	20,021	15,975
United Kingdom .....	8,817	8,854	8,775	10,655	13,716
Belgium .....	3,516	3,586	7,350	10,361	10,458
Brazil .....	20,098	12,421	17,626	12,784	10,099
Other .....	86,654	85,125	94,303	114,103	102,882
<b>Total .....</b>	<b>345,463</b>	<b>361,619</b>	<b>392,469</b>	<b>462,404</b>	<b>436,192</b>

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

**Table A-4**  
**Miscellaneous vegetable substances: U.S. imports for consumption, by principal sources, 1989-93**

*(1,000 dollars)*

Source	1989	1990	1991	1992	1993
India .....	45,858	48,451	43,148	49,733	56,409
China .....	25,790	32,449	39,102	43,057	50,434
Mexico .....	31,059	33,128	39,258	40,923	43,635
Germany .....	28,575	40,404	39,528	42,348	35,956
Canada .....	34,999	39,088	32,395	31,760	34,444
Madagascar .....	24,785	28,688	36,684	35,154	33,023
France .....	21,651	23,419	18,385	22,967	26,432
Denmark .....	25,320	27,870	26,185	23,290	26,222
Indonesia .....	12,716	15,294	23,794	20,438	21,339
Kenya .....	12,923	14,825	17,623	15,005	15,813
Other .....	199,958	211,096	238,916	219,817	223,930
<b>Total .....</b>	<b>463,274</b>	<b>514,712</b>	<b>555,018</b>	<b>544,492</b>	<b>567,637</b>

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

**APPENDIX B**  
**EXPLANATION OF TARIFF AND TRADE AGREEMENT TERMS**

The *Harmonized Tariff Schedule of the United States* (HTS) replaced the Tariff Schedules of the United States (TSUS) effective January 1, 1989. Chapters 1 through 97 incorporate the internationally adopted Harmonized Commodity Description and Coding System through the 6-digit level of product description and have U.S. product subdivisions at the 8-digit level. Chapters 98 and 99 contain special U.S. classifications and temporary rate provisions, respectively.

Duty rates in the *general* subcolumn of HTS column 1 are most-favored-nation (MFN) rates, many of which have been eliminated or are being reduced as concessions resulting from the Uruguay Round of Multilateral Trade Negotiations. Column 1-general duty rates apply to all countries except those enumerated in HTS general note 3(b) (Afghanistan, Azerbaijan, Cuba, Kampuchea, Laos, North Korea, and Vietnam), which are subject to the rates set forth in column 2. Albania, Armenia, Belarus, Bosnia, Bulgaria, the People's Republic of China, Croatia, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan are accorded MFN treatment. Specified goods from designated MFN-eligible countries may be eligible for reduced rates of duty or for duty-free entry under one or more preferential tariff programs. Such tariff treatment is set forth in the *special* subcolumn of HTS column 1 or in the general notes. If eligibility for special tariff rates is not claimed or established, goods are dutiable at column 1-general rates. The HTS does not enumerate those countries as to which a total or partial embargo has been declared.

The *Generalized System of Preferences* (GSP) affords nonreciprocal tariff preferences to developing countries to aid their economic development and to diversify and expand their production and exports. The U.S. GSP, enacted in title V of the Trade Act of 1974 for 10 years and extended three times thereafter, applies to merchandise imported on or after January 1, 1976 and before the close of July 30, 1995. Indicated by the symbol "A" or "A\*" in the *special* subcolumn, the GSP provides duty-free entry to eligible articles the product of and imported directly from designated beneficiary developing countries, as set forth in general note 4 to the HTS.

The *Caribbean Basin Economic Recovery Act* (CBERA) affords nonreciprocal tariff preferences to developing countries in the Caribbean Basin

area to aid their economic development and to diversify and expand their production and exports. The CBERA, enacted in title II of Public Law 98-67, implemented by Presidential Proclamation 5133 of November 30, 1983, and amended by the Customs and Trade Act of 1990, applies to merchandise entered, or withdrawn from warehouse for consumption, on or after January 1, 1984. Indicated by the symbol "E" or "E\*" in the *special* subcolumn, the CBERA provides duty-free entry to eligible articles, and reduced-duty treatment to certain other articles, which are the product of and imported directly from designated countries, as set forth in general note 7 to the HTS.

Free rates of duty in the *special* subcolumn followed by the symbol "IL" are applicable to products of Israel under the *United States-Israel Free Trade Area Implementation Act* of 1985 (IFTA), as provided in general note 8 to the HTS.

Preferential nonreciprocal duty-free or reduced-duty treatment in the *special* subcolumn followed by the symbol "J" or "J\*" in parentheses is afforded to eligible articles the product of designated beneficiary countries under the *Andean Trade Preference Act* (ATPA), enacted as title II of Public Law 102-182 and implemented by Presidential Proclamation 6455 of July 2, 1992 (effective July 22, 1992), as set forth in general note 11 to the HTS.

Preferential or free rates of duty in the *special* subcolumn followed by the symbol "CA" are applicable to eligible goods of Canada, and those followed by the symbol "MX" are applicable to eligible goods of Mexico, under the *North American Free Trade Agreement*, as provided in general note 12 to the HTS, implemented effective January 1, 1994 by Presidential Proclamation 6641 of December 15, 1993.

Other special tariff treatment applies to particular *products of insular possessions* (general note 3(a)(iv)), goods covered by the *Automotive Products Trade Act* (APTA) (general note 5) and the *Agreement on Trade in Civil Aircraft* (ATCA) (general note 6), *articles imported from freely associated states* (general note 10), *pharmaceutical products* (general note 13), and *intermediate chemicals for dyes* (general note 14).

The *General Agreement on Tariffs and Trade 1994* (GATT 1994), annexed to the Agreement Establishing the World Trade Organization, replaces an earlier agreement (the GATT 1947 [61 Stat. (pt. 5) A58; 8 UST (pt. 2) 1786]) as the

primary multilateral system of disciplines and principles governing international trade. Signatories' obligations under both the 1994 and 1947 agreements focus upon most-favored-nation treatment, the maintenance of scheduled concession rates of duty, and national (nondiscriminatory) treatment for imported products; the GATT also provides the legal framework for customs valuation standards, "escape clause" (emergency) actions, antidumping and countervailing duties, dispute settlement, and other measures. The results of the Uruguay Round of multilateral tariff negotiations are set forth by way of separate schedules of concessions for each participating contracting party, with the U.S. schedule designated as Schedule XX.

Officially known as "The Arrangement Regarding International Trade in Textiles," the *Multifiber Arrangement* (MFA) provides a framework for importing and exporting countries to negotiate bilateral agreements limiting textile and apparel shipments, or for importing countries to take unilateral action in the absence or violation of an agreement. These agreements establish quantitative limits on textiles and apparel of cotton, other vegetable fibers, wool, man-made fibers or silk blends in an effort to prevent or limit market disruption in the importing countries—restrictions that would otherwise be a departure from GATT provisions. The United States has bilateral agreements with many supplying countries, including the four largest suppliers: China, Hong Kong, the Republic of Korea, and Taiwan.

