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A LAC TECH Report

THE U.S. MARKET FOR GARLIC

Prepared for USAID/Honduras

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THE U.S. MARKET FOR GARLIC

Summary:

This study of the U.S. market for garlic was done at the request of USAID/Honduras, on behalf of a vegetable growers cooperative.

U.S. production of garlic has been increasing steadily, to an estimated 297 million pounds in 1992. Imports also are increasing, to an estimated 51 million pounds in 1992. Mexico is by far the dominant supplier with Argentina in second place. The best "market window" seems to be in January and February, although Argentina and Chile can supply during these months.

The U.S. imported 4,330 metric tons of dehydrated garlic in 1991. China was by far the dominant supplier, with Mexico in second place.

Specifications and standards for garlic quality and condition are extensive. These are presented in Appendix I of this report.

The average Customs Value of garlic imported to the U.S. was \$0.44 per pound in 1990 and \$0.56 in 1991. Prices this year are said to be slightly higher. In early November, the terminal market price in Miami for California jumbo white garlic was about \$0.70 per pound. The average Customs Value for dehydrated garlic imports in 1991 was \$0.515 per pound.

The U.S. has a over a thousand producers of garlic but only a few major importers. Both producers and importers sell through normal fresh produce channels, with the advantage that handling is simpler than for many produce items because the product is not highly perishable. Imported garlic is normally packed in thirty pound pasteboard cartons.

Import regulations on garlic are not abnormally severe, however, many shipments are detained. The most common causes are insect filth and damage, mold, and decomposition. Careful inspection of shipments is advisable.

It is very difficult to forecast future supplies or prices. At present, we do not see conditions which would cause either supply or prices to be radically different in 1993 than in the current year.

Honduras should attempt to sell very large, high quality fresh garlic to a major importer on the U.S. east coast and to ship as early as possible each year. It should be willing to cooperate with the importer in promoting sales.

Introduction:

In September, 1992, the Agriculture Office of USAID/Honduras asked LAC TECH to carry out a study of the U.S. market for garlic. The vegetable growers cooperative of Siguatepeque is developing garlic as an export crop and has about twelve acres planted. They would like more market information to use in making decisions relevant to maximizing their returns.

LAC TECH determined that this study was important enough to USAID/ Honduras to justify carrying it out. Since few countries in the LAC region export garlic, however, the time spent on collection of primary (original) data had to be severely limited. According to the FAO Production Yearbook for 1989, in Latin America only Brazil, Mexico, and Argentina have more than 4,000 hectares planted in garlic. Among AID-assisted LAC countries, the Dominican Republic, Haiti, Honduras, Bolivia, Ecuador, and Peru are listed as minor producers.

Fresh garlic is considered a vegetable, while dried garlic is classified as a spice. This report deals with the product in both its fresh and dried forms.

Although this report does not deal with production or productivity, yields per hectare and average quality have great effects on profitability. For comparison, one California grower has reported current yields of 20,000 pounds per acre and a pack-out rate of nearly 90%.

Market Size and Suppliers:

SUPPLY AND CONSUMPTION: Table I, which follows, shows U.S. production, imports, exports, and per capita consumption of garlic by year from 1970 to 1992 (estimated). The following is a summary of the key information in this table:

- U.S. production is increasing steadily, to an estimated 297 million pounds in 1992.
- Imports also are on an upward trend, to 51 million pounds in 1992.
- Exports have been increasing rapidly, to 32 million pounds in 1992.
- Estimated per capita use since 1979 has varied from 0.7 to 1.4 pounds per person. It may be about 1.2 pounds per person in 1992. Per capita use is calculated as production plus imports less exports divided by population. It does not consider changes in stocks.

Table I
U.S. SUPPLY AND UTILIZATION
(1970 - 1992)

Year	Supply			Utilization		
	Production 2/	Imports 3/	Total	Exports 3/	Total	Per capita use
	Million pounds					Pounds
1970	72.8	19.6	92.2	--	92.2	0.4
1971	48.1	14.8	62.9	--	62.9	0.3
1972	66.3	17.4	83.7	1.7	82.0	0.4
1973	89.7	22.0	111.7	1.4	110.2	0.5
1974	117.0	23.8	140.8	1.4	139.4	0.7
1975	140.4	21.7	162.1	3.7	158.3	0.7
1976	92.4	17.8	110.2	5.1	105.0	0.5
1977	114.4	21.2	135.6	6.6	129.0	0.6
1978	156.0	28.3	184.3	20.7	163.5	0.7
1979	184.6	48.5	233.1	12.1	221.0	1.0
1980	197.6	23.9	221.5	11.2	210.3	0.9
1981	165.0	19.3	184.3	20.3	164.0	0.7
1982	169.6	27.9	197.6	14.1	183.5	0.8
1983	234.4	28.7	263.2	16.4	246.7	1.1
1984	173.8	38.4	212.2	14.1	198.1	0.8
1985	242.0	34.5	276.5	11.0	265.5	1.1
1986	177.5	40.5	218.1	17.2	200.9	0.8
1987	268.5	38.7	307.2	12.5	294.8	1.2
1988	261.9	38.1	300.0	17.0	283.0	1.2
1989	262.1	44.5	306.6	25.5	281.2	1.1
1990	341.3	54.6	395.9	35.9	360.0	1.4
1991f	288.0	53.2	341.2	35.6	305.6	1.2
1992f	297.0	50.8	347.8	32.3	315.5	1.2

-- = Not available. f = ERS forecast.

1/ Price data is not available.

2/ Sources: National Agricultural Statistics Service, USDA (1970-81). After 1981, production is from the Calif. County Agric. Commissioners report (1982-90).

3/ Sources: Bureau of the Census, U.S. Dept. of Commerce and Statistics Canada.

Dried garlic and garlic flour trade not adjusted to fresh weight basis (no factors).

Most of the U.S. domestic garlic supply is grown in California.

According to a five year annual summary of data from the Agricultural Marketing Service, in 1991 the U.S. imported 41.5 million pounds of fresh garlic. Note that this is considerably less than the 53.2 million pounds shown in Table I. The suppliers, by percentage, are shown in Table II.

Table II

COUNTRIES SHIPPING GARLIC TO THE U.S. IN 1991

Mexico	57%
Argentina	19%
China	8%
Chile	7%
Taiwan	7%
Peru, Spain, Uruguay	<u>2%</u>
TOTAL	100%

Source: Calculated from the AMS 5-Year Annual Summary

Although the percentages by country fluctuate from year to year, the list of supplying countries has changed very little in the past five years. Import duty on fresh garlic is zero or very low for all supplying countries and so has little influence on sources for the U.S. market.

Mexico and other Latin American suppliers are said to be improving in both quality and consistency. This is helping to increase year-round demand for fresh garlic. The quality from China is said to be down because of difficulties with harvesting and transportation.

Some suppliers to the U.S. market are said to be focussing more on other areas such as the Caribbean and Europe. This tends to open the U.S. market to new suppliers.

SEASONALITY: The bulk of production in California is from May through September. California ships from about June through December, however, California producers are experimenting with controlled atmosphere storage to let them market domestically grown garlic as much as ten months of the year.

In general, in 1991 Argentina and Chile shipped to the U.S. from January through May, and Mexico shipped from February through July. Taiwan was in the market from July through September and China in August and September. Guatemala shipped small quantities in April and May.

There are substantial year-to-year fluctuations in percentages imported by month. In both 1989 and 1990 the largest quantity was imported in June, followed by May and April.

Table III shows imports of fresh garlic to the USA in 1991, by month:

Table III

U.S. IMPORTS OF FRESH GARLIC IN 1991 BY MONTH

January	8%
February	7%
March	13%
April	14%
May	20%
June	15%
July	9%
August	9%
September	5%
Oct./Nov./Dec.	1%
TOTAL	100%

Source: Calculated from the AMS 5-Year Annual Summary

DEHYDRATED GARLIC SHIPMENTS: According to U.S. Spice Trade for April, 1992, U.S. imports of dehydrated garlic totaled 3,196 metric tons in 1989, 6,272 MT in 1990, and 4,329 MT in 1991. China is overwhelmingly the dominant supplier, providing 86% of the imports in 1991. Mexico is the second place supplier. Guatemala shipped 89 tons of dehydrated garlic to the U.S. in 1989, but shipments dropped to near zero in 1990 and increased only a little in 1991.

U.S. exports of dehydrated garlic were about 3,500 MT in 1989, 3,600 MT in 1990, and 3,200 MT in 1991.

Market Grades and Prices:

GRADES: Garlic is classified first by size. U.S. Number 1 grade bulbs must be at least 1.5 inches in diameter, with a tolerance of 5 percent. Other factors that influence the determination of quality are maturity, color (preferably very white), compactness, plumpness, brightness and staining, damage by tops, shape, second growths, sheathing, roots, sunburn, sunscald, curing, dampness and mold, sprouts, shattered cloves, waxy breakdown, yellow or brown areas, and decay.

Garlic from California this year was especially high in quality. There was, in fact, too little poor quality California garlic to supply the processing market.

Annex I, Garlic, Shipping Point and Market Inspection Instructions, gives detailed information on the determination of quality of garlic.

PRICES, FRESH: According to Foreign Agricultural Trade of the United States, Calendar Year 1991 Supplement, the average customs value of fresh garlic imported to the U.S. in 1991 was \$1,222.57 per metric ton or \$0.555 per pound. In 1990 the corresponding figure was \$964.86 per metric ton or \$0.438 per pound. The price per supplier varied, with Argentina and Chile receiving a much higher price per kilogram than Mexico, China, or Taiwan.

According to a report by the PROEXAG project in Central America, in the years 1984 through 1989 the New York spot prices for garlic from Mexico varied from \$0.50 to \$1.75 per pound. Table IV, which follows, shows the spot prices on selected dates for each of the six years. Note that the "colossal" size is usually \$0.10 per pound higher than the "jumbo" size. Note also that the dates on which prices are highest vary. In 1984 the best price was reported in June, while in 1985 the best price was reported in April.

Table IV
NEW YORK SPOT PRICES
FOR GARLIC FROM MEXICO

(Cents Per Pound)

SEMANA	1984		1985		1986		1987		1988				1989			
	Bajo	Alto	Bajo	Alto	Bajo	Alto	Bajo	Alto	COLOSSAL		S.JUMBO		COLOSSAL		S.JUMBO	
									Bajo	Alto	Bajo	Alto	Bajo	Alto	Bajo	Alto
ABR-1	0.80	1.00	0.90	1.50			0.70	1.40								
ABR-3	0.65	1.00	0.75	1.40	1.20	1.25	1.00	1.40				1.10				
MAY-2	0.60	0.90	0.55	1.30	1.40	1.45	0.70	1.35				1.40	1.35			
MAY-4	0.60	0.90	0.65	1.40	1.35	1.45	0.70	1.35	0.80	0.90	0.70	0.75	1.40		1.35	
JUN-2	0.60	1.10	0.80	1.40	1.35	1.40	0.70	1.40	0.80	0.90	0.70	0.80	1.75		1.65	
JUN-3	0.60	1.10	0.80	1.40	1.35	1.40	0.60	1.40	0.70	0.80	0.60	0.70	1.20	1.40	1.10	1.30
JUL-3	0.70	1.00	0.60	1.30	1.20	1.30	0.40	1.10	0.70	0.50	0.60	0.80	0.10	0.80	0.90	
AGO-3		0.80	1.00	1.10	1.25	0.14	1.10	0.90	1.00	0.60	0.70	1.10	1.20		0.80	
AGO-4		0.80	1.00	1.10	1.25	0.14	1.10	0.90	1.00	0.60	0.70		1.10			
SEP-1	0.60	0.85	0.80	1.00	1.10	1.25			0.90	1.00	0.60	0.70	1.10			
OCT-1	0.55	0.85	0.70	1.00	0.60	0.70			0.80	0.90	0.70	0.80				
OCT-2	0.55	0.85	0.70	1.00	0.60	0.70			0.80	0.90	0.70	0.80				
NOV-1		0.70	1.00	0.60	0.70	0.60	0.90									
NOV-2				0.60	0.70		0.90									

Prices for most of this year have somewhat higher than in the same time periods the past several years. This is said to be due to decreased imports from Mexico, combined with increased domestic and foreign demand. The foreign demand was helped by a poor crop in Spain, which is a large producer of garlic.

Thirty pound cartons of California white jumbo garlic were being sold in the Miami terminal market for \$22 to \$24 on November 6, 5 and 4, and \$20 to \$21 on November 3 and 2. This is equal to about \$0.70 per pound. On November 18, California jumbo was \$24-25 and colossal \$28-30 per carton.

PRICES, DEHYDRATED: Calculations from U.S. Spice Trade for April, 1992 show average import prices per metric ton of dehydrated garlic as follows: \$1,226 in 1989, \$1,368 in 1990, and \$1,134 (\$0.515 per pound) in 1991. In 1991 Canada, France, Germany, Taiwan, and Thailand received prices per ton that were much higher than the average. This, however, is because they shipped very small quantities of dehydrated garlic to the U.S., mostly packaged and branded for the final consumer.

Market Structure:

Garlic is marketed by California growers through normal consumer and institutional distribution channels. Growers, such as Crinklaw Farms in King City, California, sell to terminal markets, wholesalers, institutional buyers, and major supermarket chains. Wholesalers, such as Service Foods in Carson, California, sell to institutional buyers and store chains and will often ship smaller quantities than growers will.

Processors, such as Ful-Flav-R food Products in Oakland, California, normally sell to industrial users and packagers for the consumer trade. Some of the forms of processed garlic are fresh ground and minced garlic, dehydrated flakes, spread, puree, pickled cloves, powder, granules, frozen cloves, and juice.

A number of companies import fresh and processed garlic. Annex II is a list of importing firms, taken from the Directory of United States Importers for 1992. The importers of fresh garlic listed are the A&D Christopher Ranch in California, Bolner's Fiesta Products in Texas, Boricus Empaque in Puerto Rico, Pisciotta Fruit and Vegetable Company in Missouri, A.J. Trucco in New York, and Ventre Packing Company in New York. Importers of dehydrated garlic listed are Battaglia Processing company in Illinois, William E. Martin & Sons in New York, Spiceco in New Jersey, and Ventre Packing Company in New York. Several other importers of vegetables buy fresh garlic, and several other importers of spices buy dehydrated garlic.

Some import brokers are active in the fresh garlic trade. They generally work like other produce brokers, clearing shipments through U.S. Customs and sending boxes on to their customers. The payments received, less costs and commissions, are paid or credited to the exporters.

Handling and Shipping:

Garlic bulbs should be cleaned and separated by quality. Normally, bulbs showing damage, dirt, or staining should not be shipped to the U.S. It is better to not mix colors (white or purple), varieties, of which there are about 300, or qualities in the same pallet.

In the domestic trade, fresh garlic is often shipped in open mesh sacks. Imported garlic is usually in cartons, or crates holding 5, 10, or 30 pounds. A common form of packing in the import trade is in 30 pound pasteboard boxes, palletized for ease of handling. Distributors repack in smaller sizes for some supermarket customers, often in net bags in western states and cellophane-covered boxes in eastern states.

General instructions on handling agricultural produce apply in most cases to fresh garlic. For information, in this regard, Annex III presents selected pages from the Tropical Products Transport Handbook. Note in this annex that there is no USDA marketing order for garlic, garlic should be kept at from 0 to 2 degrees celsius and at from 65-75% relative humidity, it is not highly susceptible to injury from chilling or freezing, it loses moisture slowly, and under optimal conditions it can be stored for from 6 to 7 months.

Regulations and Enforcement:

Fresh and dehydrated garlic are admissible to the U.S. from virtually every country in the LAC region. Also, the list of agricultural chemicals that can be used on fresh garlic is quite broad. Annex IV to this report, Agricultural Chemicals Acceptable on Garlic, lists the herbicides, insecticides, fungicides, and other chemicals that may be used, along with their tolerances in parts per million and the minimum number of days before harvest that they may be used.

It is not unusual for garlic and garlic products to be detained by the U.S. Food and Drug Administration. In 1990, for example, fresh garlic shipped from Mexico and Spain was detained and various forms of processed garlic were detained. Garlic from Mexico was on automatic detention by FDA during part of the 1992 crop season; this reduced imports by raising the cost to importers.

Annex V to the report, FDA Detentions of Garlic Shipments, shows the lists of detentions by year from 1990 through September of 1992.

Annex VI, Comparative Summary Table of Standard Requirements, gives information on requirements for the EEC market. This annex is mentioned here because the table pertains to commercial requirements, classification, sizing, tolerances by weight, and packaging and presentation. Thus, it cuts across various sections in this report.

Forecast of Future Conditions:

The relatively strong prices in 1992 would logically encourage more farmers to plant garlic. The cost of production in California is said to be from \$0.50 to \$0.60 per pound, so that farm-gate prices above this level should lead to larger plantings. There is, however, a shortage of high-quality seed in the U.S. because of a poor year for seed production in Oregon. The seed crop in Nevada was normal.

One forecast is that next year's California crop will be about the same as or slightly less than the crop in 1992. Prices, then, will depend on conditions in other countries. If the Spanish crop recovers strongly, Mexico overcomes its phytosanitary problems, and China overcomes its marketing problems, garlic prices should fall slightly from 1992 levels. A strong recovery in the world economy would boost prices somewhat, but very few economists are predicting such a recovery.

There is also a feeling among some growers that the image of garlic is improving and that this will help increase future sales. Its benefits for health are becoming more widely recognized. At least one company is selling odorless garlic capsules for their supposed medicinal benefits. There is a fresh garlic association, with 1,200 members, that constantly seeks favorable publicity for the product.

Suggested Marketing Strategies:

Based on the information contained in this report, and general impressions obtained through secondary and some primary research, we believe Honduran exporters should concentrate on producing large size, very high quality garlic. Information relative to improving quality through improved production and handling can be found in some of the publications listed in Annex VII, Publications on Garlic, identified through the AGRICOLA and AGRIS information services.

The Honduran product can be packed in attractive, pre-printed, 30 pound pasteboard cartons, palletized, and shipped to importers in the U.S. Gulf Coast where Hondurans typically have commercial contacts. Alternatively, shipments can be made directly from San Pedro Sula to a port in the mid-Atlantic states, as they are farthest from the U.S., Mexican, and Chilean producing areas. Many ports such as Savannah, Georgia and Charleston, South Carolina are eager to follow the examples of Miami and Philadelphia in attracting the Latin American fresh product trade.

Honduran exporters should avoid shipping in the months of March through September, when first Mexico and then California dominate the market. October through February appear to be the most attractive months. As Honduran exporters are now planning to ship in February and March, they should try to accelerate planting and the ageing/drying process to be able to ship a month earlier.

If possible, sales should be made to importers who sell to better supermarket chains and other buyers of high quality fresh garlic. Perhaps the best way to identify such importers is to have a representative of COHORSIL visit supermarket buyers, show them samples, and ask them which importers they prefer to deal with for garlic and related products. The importers thus identified can then be approached directly.

Honduran exporters should be prepared to give promotional support by helping their importer(s) with the cost of advertising in specialized publications such as The Packer and exhibiting annually at the Produce Marketing Association or United Fresh Fruit and Vegetable Association trade shows. When the product thus becomes better known, it will be easier to sell and should command a slightly higher price.

We do not recommend that the Honduran exporters attempt to enter the U.S. market for dehydrated garlic because of the difficulty of competing on price with China. This situation may change, however, if China someday loses its Most Favored Nation status with regard to U.S. import duties. This is possible given the change in government in the USA.

It may be that Honduran firms can identify and produce one of the many other processed garlic products for the United States market. Such a venture, of course, should be the subject of a feasibility study including careful financial analysis.

ANNEXES

Annex I

SHIPPING POINT AND MARKET INSPECTION INSTRUCTIONS

(From USDA/AMS/Fruit and Vegetable Division)

These inspection instructions are specifically developed and designed by the Fresh Products Branch to assist officially licensed inspectors in the interpretation and application of the U.S. Standards for Grades of Garlic. CFR - Section 51.3880.

These instructions do not establish any substantial rule not legally authorized by the official grade standards and supersede any previously issued inspection instructions.

Refer to the General Inspection Instructions and the Fresh Fruit and Vegetable Inspection Certificate (FV-300) Handbook for additional information pertaining to date, inspection point, carrier, condition of carrier, lading, etc. not covered in these instructions.

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Appendix - U.S. Standards for Grades of Garlic	

(1) Sampling

Representative Sampling. Too much emphasis cannot be placed on the importance of the inspector obtaining representative samples from loads or lots of garlic. Accurate certification is possible only if the samples examined are truly representative of the entire lot or accessible portion of the load or lot.

All parts of a lot should receive the same attention in sampling regardless of the difficulty involved in reaching the more inaccessible layers or parts of a load or lot.

Size of Sample. As the tolerances of the U.S. Standards for Garlic are determined on the basis of weight, and due to the large number of garlic bulbs found per pound, the size of the samples to be selected may usually be smaller than that recommended for most other vegetables. When garlic is in 50 pound sacks, it is suggested that on a lot of carload size, 10 samples consisting of 10 pounds each be examined. When garlic is in 25 to 30 pound crates, lugs or cartons, 100 ounces (6¼ pounds) shall be used as the sample. Each bulb should be felt carefully for soft cloves or sunken areas. These may be laid out for cutting later. In selecting the samples, the containers should be emptied, or the contents otherwise exposed, so that the samples may be so selected that they are representative of the entire contents of the container. This should include portions of any pockets of mold or decay and shattered cloves that have settled to the bottom of the container. However, before a lot is put out of grade on account of defects in only one sample exceeding the tolerance, the size of the sample from that container should be at least doubled and if time permits, the entire contents should be examined.

(2) Application of Tolerances

The contents of individual packages in the lot, based on sample inspection, are subject to the following limitations provided that the average for the entire lot is within the tolerances specified for the grade:

For a tolerance of 10 percent or more, individual packages in any lot may contain not more than one and one-half times the tolerance specified, EXCEPT when packages contain 15 specimens or less, individual packages may contain not more than double the tolerance specified.

For a tolerance of less than 10 percent, individual packages in any lot may contain not more than double the tolerance specified, PROVIDED that at least one defective and one off-size specimen may be permitted in any package.

(3) Heading on Notesheet

Detailed instructions pertaining to date, inspection point, place of inspection, kind of carrier, lading, etc., which are not covered by these instructions may be found in the General Inspection Instructions and the Fresh Fruit and Vegetable Inspection Certificate (FV-300) Handbook. Additional information and instructions may be given by your supervisor.

(4) Products Inspected

The following information shall be given.

- Commodity, Type
- Type of Container
- Distinguishing Marks
- State of Origin (if marked)
- Quantity Inspected

Commodity, Type. Garlic is classified according to color and not according to variety. There are two types of garlic based on color: white garlic, and purple garlic (sometimes called red garlic). The type should be reported in connection with the commodity under the "Product" heading as "Garlic, white" or "Garlic, purple." Requests received for certification of a lot as to "Creole" or "Chilean" type should be refused. When inspecting the large bulb garlic commonly referred to as "Elephant Garlic," this term should be shown in parenthesis after the color. Inspection of this type of garlic should be no different than the smaller size garlic.

Containers. Garlic is generally packed in lugs, cartons and crates. Occasionally, it is shipped in open mesh sacks.

Distinguishing Marks. Whenever a container is labeled, printed, tagged or crayon marked with a brand or grade, it shall be reported under the "Brands/Marks" heading. This also includes shipper's name and address, lot numbers, varieties, sizes or weight. If the containers bear no brand, grade or any other marking, it should be stated, "No Brand."

State of Origin. The inspector should not make a positive statement on their own authority, but when container markings list the State or country of origin, it should be quoted. This policy is necessary because some firms may use one mark on the same product, they may pack in two or three States and the inspector can certify only to the marks and has no means of knowing in what State or country the

garlic was grown. (If packages are not marked or the garlic is in bulk, refer to the General Inspection Instructions.)

Quantity Inspected. The number of containers in an inspection lot shall always be reported. The count of large lots certified in a warehouse or on a platform may be reported on the authority of the applicant or his representative. However, it is advisable in such instances for the inspector to make a rough check to determine that substantially the number of containers reported from the lot are present.

Small lots (100 containers or less) that can be counted with accuracy should be reported as inspector's count.

(5) Temperature of Product

Refer to the General Inspection Instructions and the Fresh Fruit and Vegetable Inspection Certificate (FV-300) Handbook. Due to the seriousness of "heating" of garlic, it is important to exercise thoroughness and care in taking temperatures.

(6) Condition of Pack

Fill of crates, cartons or lugs should be described by the use of the terms well filled, fairly well filled, or slack. The term "slack" must be qualified by the amount of slackness in inches or fractions thereof. When the product is in bulk or sacks, the "Pack" heading should be blocked out on the notesheet.

Determining and Reporting Net Weight. Net Weight is reported as a narrative statement on the face of the certificate. Weight may be certified without making an inspection for quality and/or condition.

When requested to certify as to specified or marked weight on lots of garlic, the procedures as described in the General Inspection Instructions must be followed.

(7) Size

The U.S. No. 1 grade for garlic specifies that the bulbs must be not less than 1½ inches in diameter unless otherwise specified. There is no maximum size specified in the grade, however, the applicant may specify one.

The tolerance for garlic that varies from the size specified is 5 percent. There is no additional tolerance for oversize, so if a maximum size is specified in

connection with the grade, the oversize as well as the undersize garlic will be scored against the 5 percent size tolerance.

Frequently imported garlic is designated as: Flor, Primera, Segunda Tercera or Grossa, Media or Piccola. These terms supposedly indicate minimum or minimum and maximum sizes. We do not attempt to certify on the basis of these terms. If a request to do so is received from the applicant, it should be stated in inches, for the different designations.

Sometimes the applicant may ask that the inspection be made on the basis of the metric system of measurement. When this is the case, they should be advised that our sizing equipment is calibrated in inches so we are unable to report size by the metric system of measurement. However, we can report size to the nearest equivalent fraction of an inch, reporting in $\frac{1}{4}$ inch variations.

Determining Number of Cloves per Bulb. The applicant may request a range in the number of cloves per bulb. It will be necessary, when reporting such a range, to cut at mid-section at least 40 bulbs taken from various containers. The range in count of cloves should be reported under the "Other" heading on the FV-300 certificate, and under the "Size, Count" heading on the FV-184 certificate, thus: "From 5 to 15 cloves per bulb." When the range in number of cloves per bulb is reported, the fact that it was requested by the applicant should be stated under the "Remarks" heading.

(8) Quality and Condition

Statements pertaining to maturity, color, compactness, well filled and fairly plump, brightness and staining, amount and kind of Quality defects, curing, dampness and mold, and amount of decay are shown under the appropriate headings. Those factors noted with an asterisk (*) shall be reported as Condition factors on market certificates.

Maturity. The U.S. Standards for Grades of Garlic requires garlic to be "mature and well cured." This means that it has reached the stage of development at which the garlic is firm and is sufficiently dried so as not to be soft and spongy. Garlic that is not well cured, is apt to sweat in transit or storage resulting in mold growth. (See Curing.)

Color. The terms "white" or "purple" will be sufficient to describe the color of the two types of garlic. A mixture of colors is objectionable if they occur to any appreciable extent. For example: a red garlic clove in a lot of white garlic would be scoreable as dissimilar varietal characteristics. The same would apply for a white

garlic clove in a lot of red garlic. If there is a sufficient mixture of color of bulbs showing splashes of red or purple readily noticeable on casual examination, the lot would not meet grade because it does not show similar varietal characteristics. No percentage of U.S. No. 1 quality may be stated in this event.

Compactness. Compact bulbs are those in which the cloves are not spreading apart but fit closely together for practically their entire length. If bulbs show cloves that are spread, they would be scoreable as not compact. If they are spread due to being poorly sheathed, score them as poorly sheathed.

Well Filled and Fairly Plump means that each clove contains a kernel inside its outer husk or covering that is fairly plump and is not shriveled. If during casual examination you feel a clove you suspect as being shriveled, peel the clove. If the clove is shriveled, score as not well filled and fairly plump.

Brightness and Staining. The grade requires that a lot of garlic be free from damage by dirt and staining. Dirt is seldom a problem. Occasionally, there is a considerable amount of caked mud that adheres very tightly to the root end of the bulbs. This is usually caked so tightly that it cannot be shaken or pulled off. When present on only a small percentage of bulbs, it should be scored against the 10% tolerance. When affecting a large percentage of bulbs, it should be reported in general terms, i.e. "Many bulbs damaged by caked dirt at root ends," and the lot would be reported as failing to grade.

Staining is quite common on garlic. The terms used to describe brightness and staining are:

- Bright
- Fairly Bright
- Dull
- Slightly Stained
- Materially Stained
- Badly Stained

"Bright" means that the general appearance of the individual bulb is bright and the lot is generally free from dirt, staining, and discoloration caused by weathering.

"Fairly bright" means that the individual bulbs have some slight staining or discoloration caused by weathering or other means, but the appearance of the lot is fairly bright.

"Dull" means that the general appearance of the lot is unattractive, lacking luster and brightness. Lot may or may not be "slightly stained."

"Slightly stained" means that the individual bulb has considerable staining or discoloration caused by weathering or other means but not sufficient in severity to score the bulb against the grade.

"Materially stained" means that there is sufficient staining or discoloration caused by weathering or other means to materially affect the appearance of the individual bulb.

"Badly stained" means that there is sufficient staining or discoloration caused by weathering or other means to seriously affect the appearance of the individual specimen.

The U.S. Standards for Garlic in connection with the definition of damage by dirt or staining contains a detailed guide to be used in scoring a lot as damaged by dirt or staining. When staining or dirt is involved in an inspection, the inspector should study this guide carefully. Remember, in scoring a lot on this factor, individual stained bulbs should not be scored as quality defects. Scoring should be done on the basis of the appearance of the lot as a whole being damaged. The contents of individual containers may show about twice as much staining as is permitted for the entire lot as long as the average appearance of the entire lot does not exceed that described in the guide for scoring a lot damaged by dirt or staining, i.e. 15% materially stained and 5% badly stained, and the staining on the remainder of the bulbs does not approach that which is considered materially stained.

Soil-staining is a brown or yellowish discoloration that frequently occurs around the base of the bulb. It is not considered as serious as discoloration caused by sunburn. It should be scored under the definition of "damage by dirt and staining."

Brightness and the degree of staining should be described by the use of general terms if the lot is clearly in or out of grade. In other instances, the exact or approximate percentage of materially stained, and the percentage of badly stained bulbs should be reported.

No percentage of U.S. No. 1 quality may be certified if a lot is out of grade due to excessive dirt and/or staining, damaging its appearance.

Staining(*) that is a result of heating or mold growth should be reported as a condition defect on the certificate.

Damage by Tops. Loose garlic should have tops trimmed to less than 2 inches in length, although some tops may be a little longer. When tops materially longer than 2 inches are so numerous as to affect the appearance of the lot as a whole, the lot should be considered as damaged in much the same manner as a lot damaged by dirt and staining.

As a guide, a lot having more than 20% of the bulbs with tops over 2 inches in length would be considered as damaged. This percentage should be reduced if the tops are very long. For example, no more than 10% of bulbs should have tops longer than 5 inches. When a lot is out of grade account excessive tops, no percentage of U.S. No. 1 quality may be stated.

Shape. There is no requirement as to shape in the garlic standards. While one or more cloves may distort the shape of the bulb, it meets U.S. No. 1 requirements if they are covered by the outer sheath.

Second Growth, called "side growth" by some dealers, is one of the more common defects of garlic. It consists of small secondary cloves that are put out at the base of the bulb. If they are not covered by the outer sheath, the bulb should be scored as a defect. These secondary cloves often become loosened in transit and move to the bottom of the container.

Poorly Sheathed. Bulbs which are not fairly well enclosed in an outer sheath should be scored as grade defects regardless of whether this is due to shattered cloves or other causes. When over 10% of the surface of the bulb is exposed, the bulb should be scored as poorly sheathed.

Roots. Occasionally a lot of garlic may be encountered that shows excessively long, heavy roots. Usually these are trimmed off by the packer but if not, they should be scored on the basis of affecting the appearance of the lot as a whole. They should not be scored individually as defects. When excessive roots affect the appearance to the same degree as excessive tops, the appearance of the lot would be considered damaged.

Sunburn. It appears as a yellowish discoloration affecting as much of the surface of the bulb as has been exposed to the sun. There is no injury to the tissue and only the surface is discolored. Sunburn which does not affect the appearance of the lot should not be scored. Do not score individual bulbs as defects on account of sunburn. Sunburn should be judged on the same basis as staining and should be scored when it affects the appearance of the lot as a whole.

Sunscald. Sunscald appears as a softening of the tissues as a result of excessive heat from the sun. Any amount would be scoreable.

Curing.(*) Garlic is required to be well cured which means that bulbs must be sufficiently dried so they are not soft and/or spongy, and show no internal dampness. If the bulb is soft or spongy, it would be scoreable and reported as "soft and/or spongy."

Dampness and Mold.(*) Dampness and mold on garlic are closely associated as any dampness or wetness invites mold growth. Mold is one of the most serious defects of garlic and may ruin the value of a lot. Once it gets started, it is impossible to get rid of it even after the bulbs have been dried out. Mold is also an open invitation for decay to accompany it. Dampness and mold usually seriously affect shipping quality.

A lot should not be put out of grade only on account of surface dampness, however, the inspector should check such lots extra carefully for mold. Due to the seriousness of this factor, the degree of moisture present should be accurately reported by the use of the following terms: dry, fairly dry, damp, and wet. If the surface of the garlic is described as "wet" it should be put out of grade.

Dampness or mold affecting the cloves of garlic within the sheath should be scored as a quality defect. Such dampness indicates that the bulb was either insufficiently cured or that it was "heated" or both. Mold is sometimes found between the cloves so if there is any question as to the presence of internal mold some suspicious appearing bulbs should be broken open.

Heating occurs in storage or transit on garlic that has been insufficiently cured, or on garlic that has been in cold storage for a long period and is then moved to normal temperatures. "Heating" of garlic in storage usually results in internal dampness of the bulb, mold growth and often staining.

Sprouted Garlic.(*) Garlic bulbs should be scored as damaged when any sprout is visible at the tip of any clove even though it is not visible through the sheath. The length of sprouts and the number per bulb should be reported. Cloves showing internal growth that has not broken through is sometimes called "sprouting" by the trade. This should not be scored as "damage by sprouting."

Shattered Cloves.(*) Shattered cloves may be a result of rough handling in transit, harvesting or storage conditions or to the presence of nematodes at the base of the bulbs. The cloves that have been separated from the bulbs should be scored as shattered cloves. Shattered cloves should be scored as condition defects.

Waxy Breakdown.(*) The early symptoms of Waxy Breakdown appear as light yellow areas in the flesh of the clove. This progresses in storage to the stage where the clove shows a deep yellow or amber color throughout and the clove is

somewhat translucent and sticky or waxy to the touch. The outer dry protective scales of the clove are not affected and often no indication of Waxy Breakdown shows externally until the advanced stage is reached when shrinking of the clove and the amber brown color may become noticeable through the covering scales of the clove. Waxy Breakdown should be scored against the 10% tolerance for total defects and not against the 2% tolerance for decay.

Score as damage, bulbs showing more than 10% of their cloves affected with Waxy Breakdown. *For example:* a bulb with 8 cloves showing one clove with Waxy Breakdown would be scored but a bulb with 30 cloves, only 2 of which were affected, would not be considered damaged. Since Waxy Breakdown is progressive, any degree of its symptoms should be counted.

To determine the presence and percentage of Waxy Breakdown in a lot, the inspector should strip the sheaths from a few bulbs and cut them horizontally through the center. If Waxy Breakdown is found, cut all bulbs in each sample taken (10 pounds or 100 ounce sample) and report like all other condition defects.

Yellow or Brown Areas. (*) Yellow or brown areas affect a part of the clove which is believed to be due to mechanical injury, probably in the harvesting or curing process. The appearance of the cut bulb will be the determining factor in scoring this defect. As a guide, when more than 20% of the cloves show any degree of this type of discoloration, it will be considered damaged.

Decay. (*) Decay of garlic occurs in two forms, both of which are most commonly Blue Mold Rot. The two forms are:

Dry Rot in which the cloves are dry and withered and are often filled with a solid mass of powdery spores.

Soft Rot in which the cloves are soft, yellowish-brown in color, foul smelling and with or without spore or mold growth.

Bulbs affected with either of these types of decay should be scored against the 2% tolerance for decay. When decay in excess of the tolerance is found, it should be described and the stages and aggregate number of cloves affected per bulb should be reported.

Garlic bulbs frequently contain a single clove which is affected with decay although there is no external evidence of this defect. Unless a bulb shows some outward sign of decay, it passes through the usual channels of trade without objection even though it may contain a concealed clove which is affected with decay. Bulbs in the samples should be carefully examined for external indications of decay and when cloves are found that are soft, shrivelled or otherwise suspicious, the bulb

should be cut unless external examination indicates it obviously has decayed cloves.

(9) Grade

Under this heading a clear statement must be made to indicate whether or not the lot(s) meets the requirements of the grade or other specifications on which it was inspected, or the grade marked on the containers. The grade statement must be based on the facts in the preceding headings on the certificate.

Also, when a minimum size other than that in the grade is specified, the minimum size must be stated in connection with the Grade. When a maximum size is specified, it must be stated in connection with the Grade.

(10) Remarks

Under this heading any explanatory or qualifying statements that are necessary to complete the certificate should be made. They may be one or more of the following:

- Restrictions to a lot, load, size or weight.
- Information supplied by the applicant such as carrier number, lot number, designation, etc.
- Cross reference to another certificate number such as in reinspections, appeals, etc.
- Percentage of U.S. No. 1 Quality determined by request.
- Contract specifications.
- Factors not affecting grade at applicant's request.

Inspection Instructions for Peeled Garlic Cloves

The Inspection Service has experienced an increasing number of applications for inspection of peeled garlic cloves. Peeled garlic cloves are usually packed in two quart plastic jars, packed in master shipping containers. Most lots consist of a few containers to 100 or 200.

Presently, the U.S. Standards for Grades of Garlic requires "each bulb shall be fairly well enclosed in its outer sheath." Obviously *peeled* garlic cloves will not meet this requirement. Therefore, definitions of damage DO NOT apply. However, if a factor of quality or condition occurs, it may be described as "affected by." Describe degree and area affected.

Also, peeled garlic cloves shall be inspected on a **count** basis using separate individual samples. Samples should be a minimum of 100 count and there should be a minimum of 5 samples inspected per lot and/or load.

(1) Products Inspected

The following information shall be given under this heading:

- Commodity, Type
- Type of Container
- Distinguishing Marks
- State of Origin (if marked)
- Quantity Inspected

Commodity, Type. The type, based on color, and "Garlic, Peeled" should be reported under the "Product" heading.

Type of Container. Peeled Garlic is generally packed in plastic containers, within master cartons.

For the remaining headings, see paragraphs covering the above factors in the Garlic section.

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(2) Condition

The following shall be reported under this heading:

- Curing
- Dampness and Mold
- Sprouts
- Other Condition Defects
- Decay

Curing and dampness. Since peeled garlic cloves may be packed in "oil" within the plastic container, a "cured and dry" statement would not apply. Therefore, "cured and dry" can only be applied when the peeled garlic cloves are packed "dry," not packed in oil.

For the remaining headings above see paragraphs covering the above factors in the Garlic section and follow the same basic guidelines. However, do not report as damage or serious damage, but rather describe defects.

However, if something occurs which the inspector has not seen before and nothing in the previous sections cover the defect, it is best to describe the defect and the area that it affects.



United States
Department of
Agriculture

Agricultural
Marketing
Service

U.S. Standards for Grades of Garlic

Effective September 4, 1944



UNITED STATES STANDARDS FOR GRADES OF GARLIC

Effective September 4, 1944

Source: 32 FR 8862, June 22, 1967, unless otherwise noted. Redesignated at 42 FR 32514, June 27, 1977 and at 46 FR 63203, Dec. 31, 1981.

Sec.

GRADE

51.3880 U.S. No. 1.

UNCLASSIFIED

51.3881 Unclassified.

APPLICATION OF TOLERANCES

51.3882 Application of tolerances.

DEFINITIONS

51.3883 Similar varietal characteristics.

51.3884 Mature and well cured.

51.3885 Compact.

51.3886 Well filled and fairly plump.

51.3887 Damage.

51.3888 Diameter.

AUTHORITY: The provisions of this subpart issued under secs. 203, 205, 60 Stat. 1087, as amended, 1090 as amended; 7 U.S.C. 1622, 1624.

GRADE

§ 51.3880 U.S. No. 1.

"U.S. No. 1" consists of garlic of similar varietal characteristics which is mature and well cured, compact, with cloves well filled and fairly plump, free from mold, decay, shattered cloves, and from damage caused by dirt or staining, sunburn, sunscald, cuts, sprouts, tops, roots, disease, insects, mechanical or other means. Each bulb shall be fairly well enclosed in its outer sheath. Unless otherwise specified, the minimum diameter of each bulb shall be not less than 1½ inches.

(a) *Tolerances.* In order to allow for variations incident to proper grading and handling, the following tolerances, by weight, are provided as specified:

(1) *For defects.* Ten percent for garlic in any lot which fails to meet the requirements of this grade, including therein not more than 2 percent for garlic which is affected by decay.

(2) *For size.* Five percent for garlic in any lot which fails to meet any specified size.

UNCLASSIFIED

§ 51.3881 Unclassified.

"Unclassified" consists of garlic which has not been classified in accordance with the foregoing grade. The term "unclassified" is not a grade within the meaning of these standards but is provided as a designation to show that no definite grade has been applied to the lot.

APPLICATION OF TOLERANCES

§ 51.3882 Application of tolerances.

The contents of individual packages, based on sample inspection, are subject to the following limitations:

(a) For a tolerance of 10 percent or more, individual packages in any lot may contain not more than one and one-half times the tolerance specified, except that when the package contains 15 specimens or less, individual packages may contain not more than double the tolerance specified: *Provided*, That the average for the entire lot is within the tolerance specified for the grade.

(b) For a tolerance of less than 10 percent, individual packages in any lot may contain not more than double the tolerance specified: *Provided*, That at least one defective and one off-size specimen may be permitted in any package: *And provided further*, That the average for the entire lot is within the tolerance specified for the grade.

DEFINITIONS

§ 51.3883 Similar varietal characteristics.

"Similar varietal characteristics" means that the garlic in any container is of the same color. White and red garlic shall not be mixed in the same container.

§ 51.3884 Mature and well cured.

"Mature and well cured" means having reached that stage of development at which the garlic is firm and sufficiently dried so as not to be soft and spongy.

§ 51.3885 Compact.

"Compact" means that the cloves are not spreading but fit closely together practically the entire length of the individual cloves.

§ 51.3886 Well filled and fairly plump.

"Well filled and fairly plump" means that each clove contains a kernel which is fairly plump and not shriveled.

§ 51.3887 Damage.

"Damage" means any specific defect described in this section; or an equally objectionable variation of any one of these defects, any other defect, or any combination of defects, which materially detracts from the appearance, or the edible or marketing quality of the individual bulb or the lot as a whole. The following specific defects shall be considered as damage:

(a) "Dirt or staining." Any lot of garlic which is dirty or materially stained shall be considered as damaged. As a guide, a lot of garlic shall be considered as damaged by dirt or staining if the appearance is affected by these causes to a greater extent than the presence of 15 percent of bulbs which are materially stained plus 5 percent badly stained. The number of stained bulbs permitted before the lot is considered damaged, will depend on the degree of staining on individual bulbs. If the lot has 15 percent which are materially stained and 5 percent which are badly

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stained, and most of the remainder of lot shows staining of a lesser degree, but approaches that which is considered materially stained, then the lot shall be considered as damaged by staining. If a lot has no badly stained bulbs, and not more than 25 percent materially stained, but most of the lot has little or no staining, it is not considered as damaged by staining. Garlic with adhering or caked dirt which affects the appearance to the same extent as materially stained or badly stained garlic shall be scored in combination with any stained garlic that may be present in the lot.

(b) "Sunburn" means discoloration due to exposure to the sun when there is no injury to the tissue.

(c) "Sunscald" means softening of the tissue due to exposure to the sun.

(d) "Tops." In considering this factor the appearance of the lot of garlic as a whole should be considered. There shall be no requirements as to length of tops of braided garlic. While loose garlic should be trimmed to less than 2 inches there may be some that have been cut with tops a little longer. However, any lot of loose garlic having more than 20 percent of the bulbs with tops over 2 inches in length shall be considered as damaged. This percentage is given only as a guide and it may be reduced if the tops are very long. For example, not more than 10 percent of the bulbs may have tops longer than 5 inches.

§ 51.3888 Diameter.

"Diameter" means the greatest dimension at right angles to a straight line running from stem to root end.

This is a reissue of U.S. Standards for Garlic which were effective September 4, 1944. No substantive change is made in the text of the standards.

Annex II

U.S. IMPORTERS OF GARLIC

(From 1992 Directory of United States Importers)

Garlic, Fresh or Chilled:

A&D Christopher Ranch
305 Bloomfield Avenue
Gilroy, California
Phone 408-847-1100, fax 408-847-5488
Richard DeSmet, Import Manager
Enters through Port of Oakland

Bolner's Fiesta Products Company
426 Menchaca Street
San Antonio, Texas 78207
Phone 512 734-6404
Timothy J. Bolner, Purchasing Agent
Enters through Houston, Los Angeles, New York

Boricua Empaque, Inc.
P.O. Box 1741
San Juan, Puerto Rico 00903
Phone 809 725-0581
Vincente Gonzalez-Villalobos, Vice President
Enters through San Juan

Pisciotta Fruit & Vegetable Company
409 Walnut Street
Kansas City, Missouri 64106
Phone 816 221-6670
Raymond Pisciotta, Vice President
Enters through Houston, Los Angeles, Miami, New York, Philadelphia

A.J. Trucco, Inc.
New York City Terminal Market
Bronx, New York 10474
Phone 212 893-3060
Umberto Caruso, Import manager
Enters through New York

Ventre Packing Company
373 Spencer Street
Syracuse, New York 13204
Phone 315 422-9277
Jacqueline Papai, Import Manager
Enters through New York

Dried Garlic:

Battaglia Processing Company
3048 W. 48th Place
Chicago, Illinois 60632
Phone 313 523-5900
August Battaglia, Import Manager
Enters through Los Angeles, Mobile, New York

William Martin & Sons
93-39 170th Street
Jamaica, New York 11433
Phone 718 291-1300
Janet Arthur, Import Manager
Enters through Baltimore, Los Angeles, New York, Norfolk, San Francisco

Spiceco
900 Passaic Avenue
East Newark, New Jersey 07029
Phone 201 484-3726
Jim Peterkin, Vice President
Enters through New York and Newark

Ventre Packing Company
New York
(as above)

Annex III

SELECTED PAGES FROM TROPICAL PRODUCTS TRANSPORT HANDBOOK

(From USDA, Office of Transportation, Agriculture Handbook No. 668)

Grading Practices

Clean and treat products only as necessary:

- wash off dirt and debris from harvest operations.
- discard bruised, cut, decayed, insect infested, odd sized, immature, or over-ripe items.
- use only officially approved fungicides/bactericides to limit decay on certain products, strictly in accordance with the label instructions.
- use only officially approved wax coatings to reduce moisture loss on certain products, strictly in accordance with the label instructions.
- use only officially approved pesticides or procedures for certain products to eliminate insect pests, strictly in accordance with the label instructions and health and safety regulations.
- remove field heat (precool) as soon as possible after harvest.
- use ethylene gas for certain products to ripen and improve color.

Sort and package produce by size and level of maturity:

- use voluntary grade standards or buyer's specifications.
- place only uniform sizes or amounts in each shipping container.
- place only products with a uniform level of maturity in each container.
- clearly mark the grade, size, weight, or count on the container.

Equipment manufacturers can provide advice on harvesting, washing, sorting, sizing, weighing, waxing, drying, precooling, and packaging equipment suitable for a particular operation. The U.S. Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), and chemical companies can provide the most current information on U.S. regulations for fungicides, bactericides, waxes, and pesticides. Foreign countries that regulate the use of these chemicals also can provide information. APHIS must monitor any necessary quarantine treatments of imported and exported products.

Grade Standards

The USDA Agricultural Marketing Service (AMS) maintains 156 standards covering 85 products as well as inspection instructions. They are listed in Appendix 2. The standards and instructions give guidance on size, color, shape, texture, maturity, cleanliness, and defects. The standards are voluntary except in the case of the products mentioned below.

Under USDA domestic marketing orders only the following items are subject to mandatory grade, size, quality, or maturity regulations:

avocados	kiwifruit	Irish potatoes
dates	limes	prunes
filberts	canned ripe olives	raisins
grapefruit	onions	tomatoes
table grapes	oranges	walnuts

Regulations for imports of the above items must conform to the domestic marketing orders and apply only when the marketing orders are in effect. Shippers and importers must keep abreast of the changing dates and scope of the orders.

Some U.S. State governments and industry trade associations have grade standards or regulations for particular products. Examples are Hawaiian grades for ginger root, papaya, and pineapple; Puerto Rican grades for coconuts; and industry grades for bananas.

Official Inspections

Inspections for grade, condition, size, or maturity may be requested by shippers, receivers, importers, or any other financially interested party. The inspections can be done at the shipping point, receiving market, and in the case of imports, at the port of entry. Regardless of whether the inspection is voluntary or mandatory, licensed federal or federal/state agricultural employees will perform the inspection and issue an official inspection certificate. A fee is charged for these inspections.

All domestic and imported raw or processed fruit and vegetables are subject to inspection by the FDA for illegal pesticide residues or other contamination according to tolerances established by the EPA. These tolerances are called "defect action levels." Products with prohibited or excessive pesticide residues or contamination must be reconditioned, reexported, or destroyed.

All imported fruits, vegetables, plants, cut flowers, and other plant material are subject to inspection by APHIS for harmful insects, diseases, and prohibited items at the U.S. port of entry. APHIS requests 12 hours notice prior to the arrival of the ship, plane, or truck in order to have inspectors on hand. By prior arrangement, APHIS will inspect products in the country of origin under a preclearance program. Fees are charged for this service.

Depending on type of product, insect, or disease, shipments are either released, treated with pesticide and released, destroyed, or reexported. Importers attempting to bring in prohibited items are subject to fines. The U.S. Customs Service assists APHIS in ensuring that agricultural products are properly cleared through the port of entry.

When requested by the receiving country, exports of U.S.-grown fruits, vegetables, plants, or cut flowers are inspected for insects or disease and provided with a phytosanitary certificate by APHIS or U.S. State Departments of Agriculture. AMS provides certifications of grade and quality for fresh products and a verification program for frozen or otherwise processed agricultural products.

Quality control with grading helps growers and shippers to meet the needs of different markets, pass inspections, become reliable suppliers, and receive higher prices for their products. Quality control reduces the risk of financial loss from downgraded or rejected shipments.

Maintain Quality With Effective Packaging

Proper packaging of fruits and vegetables, plants, and cut flowers is essential to maintaining product quality during transportation and marketing. In addition to protection, packaging in the form of shipping containers, serves to enclose the product and provide a means of handling. It makes no sense to ship high quality, high value, perishable products in poor quality packaging which will lead to damage, decay, low prices, or outright rejection of the products by the buyer.

Packaging must withstand:

- rough handling during loading and unloading.
- compression from the overhead weight of other containers.
- impact and vibration during transportation.
- high humidity during precooling, transit, and storage.

Materials

Packaging materials are chosen on the basis of needs of the product, packing method, precooling method, strength, cost, availability, buyer specifications, and freight rates. Importers, buyers, and packaging manufacturers provide valuable recommendations. Materials used include:

- fiberboard bins, boxes (glued, stapled, interlocking), lugs, trays, flats, dividers or partitions, and slipsheets.
- wood bins, crates (wirebound, nailed), baskets, trays, lugs, pallets.
- paper bags, sleeves, wraps, liners, pads, excelsior, and labels.
- plastic bins, boxes, trays, bags (mesh, solid), containers, sleeves, film wraps, liners, dividers, and slipsheets.
- foam boxes, trays, lugs, sleeves, liners, dividers, and pads.

Bins, boxes, crates, trays, lugs, baskets, and bags are considered shipping containers. Baskets, however, are difficult to handle in mixed loads of rectangular boxes. Bags provide limited product protection. The fiberboard box is the most widely used container. Styles include:

- one-piece slotted box in which the glued, stapled, or self-locking flaps (Fig. 1).
- two-piece half slotted box with a cover (Fig. 2).
- two-piece half slotted box with a full telescoping cover, providing strong walls and corners (Fig. 3).
- three-piece Bliss-style box featuring stapled or glued ends providing strong corners (Fig. 4).
- one-piece box with a full telescoping cover (Fig. 5).
- one-piece box with a tuck-in cover (Fig. 6).
- self-locking tray (Fig. 7).
- interlocking box with wire or fiberboard tabs or hardboard end inserts and plastic end caps, providing stacking strength and alignment. (Fig. 8).

A minimum 1896 kPa (275 lb/in²) bursting test strength fiberboard is recommended for boxes intended for export. The strength is needed for the handlings, transport conditions, and high humidity the boxes must endure.

Materials

Fiberboard boxes for products which are packed wet or with ice must be wax-impregnated or coated with water resistant material. The compression strength of untreated fiberboard can be reduced more than one half in conditions of 90 percent relative humidity. In addition to maintaining box strength, wax helps to reduce the loss of moisture from the product to the fiberboard. All glued boxes should be made with a water resistant adhesive.

Holes are provided in most fiberboard boxes to provide ventilation of product heat (respiration) and allow circulation of cold air to the product. Handholds provide a means of handling boxes during loading and unloading. All holes must be designed and placed in a manner that does not substantially weaken the box.

Wood crates are still popular with some shippers due to the material strength and resistance to high humidity during precooling, transit, and storage. Wood crates are constructed in a manner that allows a lot of air circulation around the packed product.

The majority of fiberboard boxes and wood crates are designed to be stacked top to bottom. Compression strength and product protection are sacrificed when boxes or crates are stacked on their ends or sides. Misaligned boxes can lose up to 30 percent of their strength, while cross-stacked boxes can lose up to 50 percent of their top to bottom compression strength.

Various materials are added to shipping containers to provide additional strength and product protection. Dividers or partitions and double or triple thickness sides and ends in fiberboard boxes provide additional compression strength and reduce product damage.

Pads, wraps, and sleeves and excelsior also reduce bruising. Pads also are used to provide moisture as with asparagus; provide chemical treatment to reduce decay as with sulfur dioxide pads for grapes; and absorb ethylene as with potassium permanganate pads in boxes of bananas and flowers.

Plastic film liners or bags are used to retain moisture. Perforated plastic is used for most products to allow exchange of gases and avoid excessive humidity. Solid plastic is used to seal the products and provide for a modified atmosphere by reducing the amount of oxygen available for respiration and ripening. This is done for bananas, strawberries, and tomatoes.

Paper and polystyrene foam liners help to insulate the product from hot or cold temperatures when they are shipped in unrefrigerated air cargo holds. Wet newsprint is used to provide moisture to fresh cut herbs and flowers.

Shippers should check with APHIS prior to utilizing packing materials made out of plant parts such as straw or leaves. Some items are prohibited entry into the United States and other countries. Soil also is restricted.

Methods

Packing methods include:

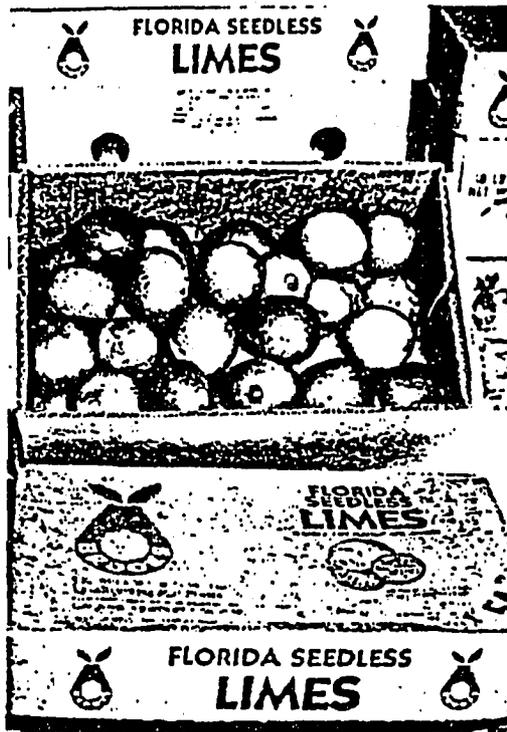
- field packing—products are placed in fiberboard boxes or wood crates during harvesting. Some products are wrapped. The filled containers are then taken to a precooling facility to have the field heat removed.
- shed packing—products are processed or packed indoors or under cover at a central location. The product is brought from the field to the packing shed in bulk in field crates, bins, or trucks. The products are precooled either before or after they are placed in shipping containers.
- repacking—products are taken out of one container, regraded, and placed in another. This is often done to make smaller containers for the retailer or consumer packages.

Types of Packs

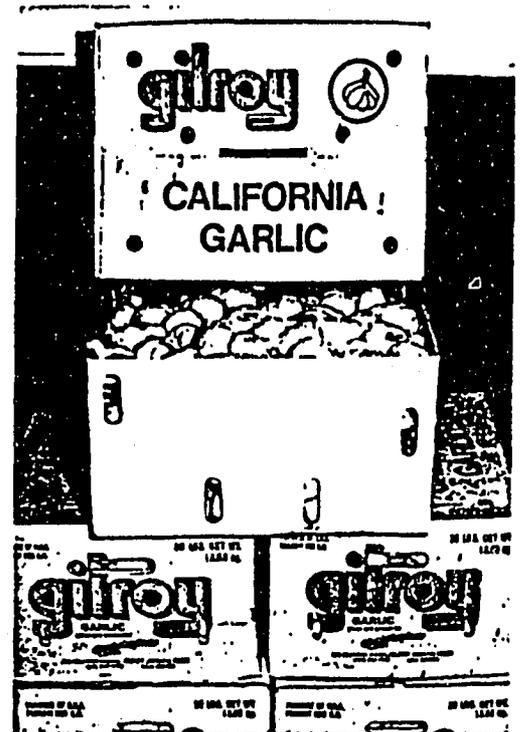
Types of packs include:

- volume fill—products are placed by hand or machine into the container until the desired capacity, weight, or count is reached.
- tray or cell pack—products are placed in molded trays or cells which provide separation and reduced bruising.
- place pack—products are wrapped and carefully placed in the container. This provides reduced bruising and a pleasing appearance.
- consumer pack or prepack—relatively small amounts of product are packaged, weighed, and labeled for retail sale.
- film or shrink wrap—each fruit or vegetable is individually wrapped and sealed in film to reduce moisture loss and decay. The film may be treated with fungicides or other chemicals.
- modified atmosphere—individual consumer packs, shipping containers, or pallet loads of containers are sealed with plastic film or bags. The oxygen level is reduced and the carbon dioxide level is increased. This reduces product respiration and slows the ripening process.

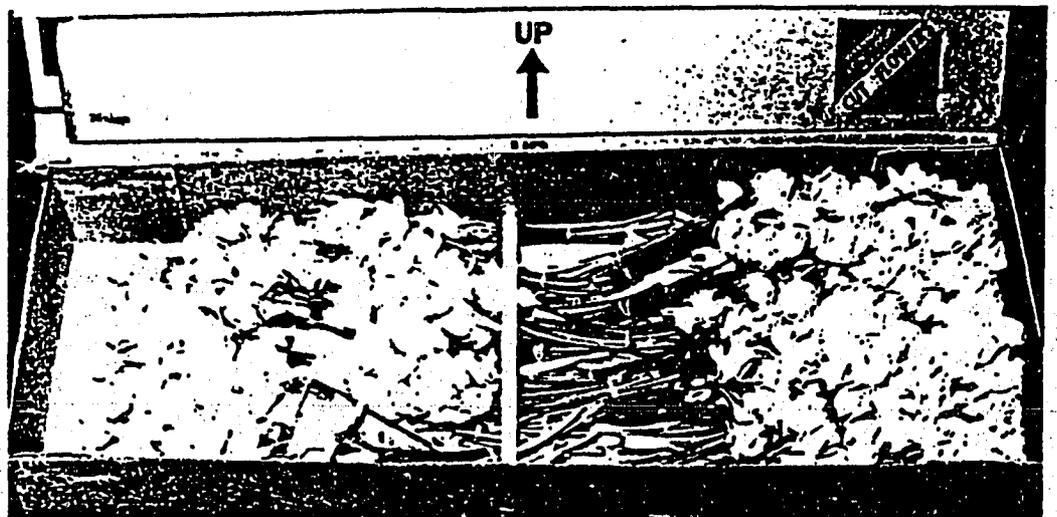
Shipping containers must be sized and filled correctly. Containers which are very wide and weigh more than 23 kg (50 lb) encourage rougher handling, product damage, and container failure. Overfilling causes product bruising and excessive bulging of the sides of the container, which leads to decreased compression strength and container failure. Underfilling also causes product damage. The product is bruised as it moves around inside the shipping container during transport and handling.



Two-piece fiberboard box of limes with cover, volume-filled to 4.5 kg (10 lb).



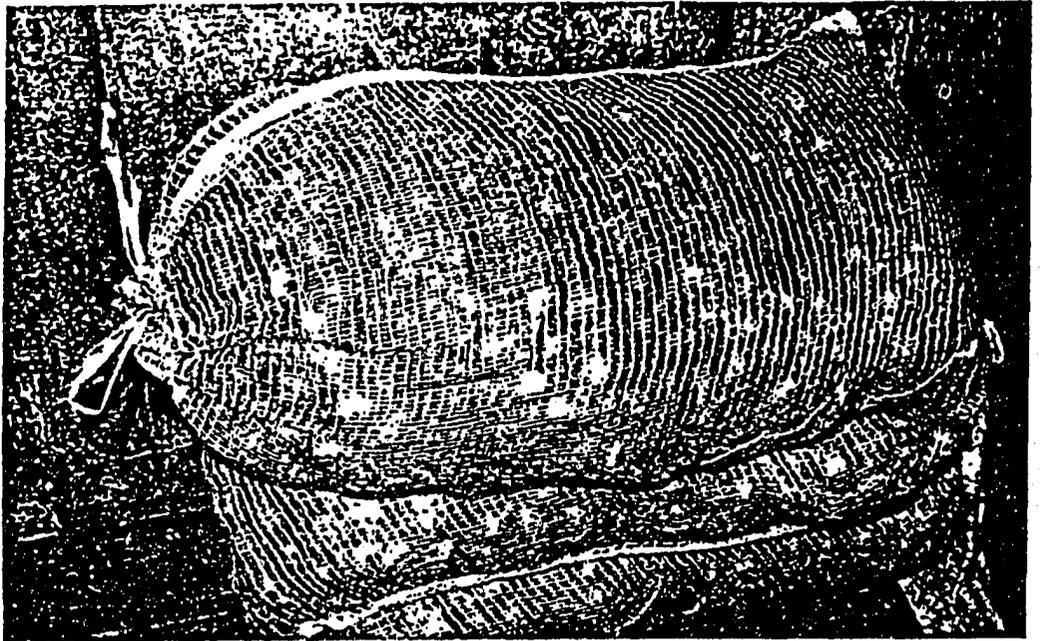
Full telescoping fiberboard boxes of garlic volume-filled to 13.6 kg (30 lb).



FLOWERS RUSH-PERISHABLE
KEEP AWAY FROM EXTREME HEAT OR FROST

Full telescoping box of bunched daffodils held in place with a wood cleat attached to the sides of the box.

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Plastic mesh bags of shallots. The mesh provides the necessary ventilation for this product which is damaged by moisture and high humidity.

garlic is often transported like this



Plastic containers of hydroponic lettuce. The containers which provide protection and a high level of humidity and are labeled with consumer information.

Slipsheets

Slipsheets are used by some shippers because they cost less than pallets. They also eliminate the cost of transporting and returning pallets. A special forklift is needed to transfer slipsheet loads to and from the pallets at the shipper's and receiver's distribution center. If a receiver does not have the proper handling equipment, the packages are unloaded by hand onto pallets for placement in storage. Shipping containers on slipsheets are cross-stacked, film wrapped, or otherwise unitized with cornerboards and strapping.

Slipsheets made of fiberboard or plastic must be strong enough to be clamped and pulled onto the forklift tines or plate for lifting while fully loaded. Fiberboard slipsheets should be wax impregnated when used in wet conditions. Slipsheets used in transportation equipment should have holes for air circulation under the load. The use of slipsheets in refrigerated transportation equipment with shallow floor channels is not recommended due to the need for adequate air circulation under the load.

Labeling and Branding

Labeling of shipping containers helps to identify and advertise the products and assists receivers in storing and retrieving them. Fiberboard boxes can be colorfully preprinted with labels. Other container materials require glued, stamped, or stenciled labeling. Some high quality fruit and vegetables are individually branded for consumer identification with small colorful trademark stickers. Some shippers also provide selection, storage, and recipe brochures for the consumer. All containers should be clearly labeled and branded in the language of the destination country with the following information:

- common name of the product.
- net weight, count, and/or volume.
- brand name as well as name and address of the packer or shipper.
- country of origin.
- size and grade, when standards are used.
- recommended storage temperature.
- special handling instructions.
- name of U.S. approved fungicides or bactericides used in packaging.

Labeling of consumer packages is mandatory under FDA regulations. In addition to the name of product, net weight, and name and address of the manufacturer, packer or distributor; processed items must have all ingredients listed. The U.S. Customs Service requires the outermost container in which the products will ordinarily reach the ultimate U.S. purchaser must be marked to show the country of origin. Packaging helps sell tropical fruits and vegetables, plants, and cut flowers; especially when the shipping containers are attractively labeled and provide the necessary product protection.

Use Recommended Transit and Storage Procedures

Harvesting and packaging of most products should be closely coordinated with transportation to minimize time in transit and storage and maximize product freshness in the hands of consumers. Some products, however, can be consolidated in storage before or after transportation to obtain lower freight rates or higher prices.

During transportation and storage of loads of one product, the temperature and relative humidity should be as close as possible to the recommended levels to achieve the maximum product life. While transport refrigeration unit thermostats are sometimes set higher to avoid freezing injury, storage facilities are better able to control temperature and can provide conditions at the recommended level without damaging the products.

During transportation of refrigerated loads in trailers and van containers, the operation of the refrigeration unit and temperature of the load compartment should be checked regularly by the carrier. Gauges are provided for this purpose on most equipment. Many van containers also are provided with an exterior electronic or mechanical temperature recorder.

Mixed Loads and Storage

Many products are often transported in mixed loads or stored with other products. They must be compatible in terms of:

- recommended temperature.
- recommended relative humidity.
- production of ethylene.
- sensitivity to ethylene.
- production of odors.
- absorption of odors.

The following compatibility and sensitivity tables 4-9¹ take the above factors into account for transit and storage periods of 1 day or more. Compromises are made for temperature and humidity levels. In any of the groups, the more valuable products should determine the transit and storage conditions of the other commodities. Information on the compatibility of many tropical fruit and vegetables is limited to temperature and relative humidity conditions. Separate transit and storage are recommended for bananas, citrus, nuts, potatoes, onions, plants, cut flowers, florist greens, and nursery stock.

¹Sources of information for the compatibility and sensitivity tables are: Debney, Blacker, and Redding (5), Hardenburg, Watada, and Wang (7), Lipton and Harvey (10), Safeway Stores, Inc. (25), Society of American Florists (28).

Table 4: Compatibility groups

Group 1: Fruits and vegetables, 0 to 2°C (32 to 36°F), 90-95% relative humidity. Many products in this group produce ethylene.

apples	grapes (without sulfur dioxide)	parsnips
apricots	horseradish	peaches
Asian pears	kohlrabi	pears
Barbados cherry	leeks	persimmons
beets, topped	longan	plums
berries (except cranberries)	loquat	pomegranates
cashew apple	lychee	prunes
cherries	mushrooms	quinces
coconuts	nectarines	radishes
figs (not with apples)	oranges* (Florida and Texas)	rutabagas
		turnips

*Citrus treated with biphenyl may give odors to other products.

Group 2: Fruits and vegetables, 0 to 2°C (32 to 36°F), 95-100% relative humidity. Many products in this group are sensitive to ethylene.

amaranth*	corn, sweet*	parsley*
anise*	daikon*	parsnips*
artichokes*	endive*	peas*
asparagus	escarole*	pomegranate
bean sprouts	grapes (without sulfur dioxide)	raddichio
beets*	horseradish	radishes*
Belgian endive	Jerusalem artichoke	rhubarb
berries (except cranberries)	kiwifruit	rutabagas*
bok choy	kohlrabi*	salsify
broccoli*	leafy greens	scorzonera
brussels sprouts*	leeks* (not with figs or grapes)	snow peas
cabbage*	lettuce	spinach*
carrots*	lo bok	turnips*
cauliflower	mushrooms	waterchestnut
celeriac*	onions, green* (not with figs, grapes, mushrooms, rhubarb, or corn)	watercress*
celery*		
cherries		

*these products can be top-iced.

Group 3: Fruits and vegetables, 0 to 2°C (32 to 36°F), 65-75% relative humidity. Moisture will damage these products.

garlic	onions, dry
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Group 4: Fruits and vegetables, 4.5°C (40°F), 90-95% relative humidity.

cactus leaves	lemons*	tamarillo
cactus pears	lychees	tangelos*
calmito	kumquat	tangerines*
cantaloupes**	mandarin*	ugli fruit*
clementine	oranges* (Calif. and Arizona)	yucca root
cranberries	pepino	

*citrus treated with biphenyl may give odors to other products.

**can be top-iced.

Chill Sensitivity

Most tropical products are subject to chilling injury when transported or stored at lower than recommended temperatures. This damage often becomes apparent after the products warm up. Products injured may show pitting, discoloration, water soaked areas, decay, and failure to ripen. The following Table 5 lists tropical and other products that sensitive to this injury.

Table 5: Products sensitive to chilling injury

atemoya	guavas	plantain
avocados	haricot vert	pomegranates
babaco	jaboticaba	potatoes
bananas	jackfruit	potted plants
beans	jicama	pummelo
bitter melon	kiwano	pumpkins
black sapote	langsat	rambutan
boniato	lemons	santol
breadfruit	limes	sapodilla
calabaza	malanga	soursop
calamondin	mamey	squash
canistel	mangoes	sugar apple
cantaloupe	mangosteen	sweet potatoes
carambola	melons	tamarillo
chayote	okra	tamarind
cherimoya	olive	taro root
cranberries	oranges (California and Arizona)	tomatillo
cucumbers	papaya	tomatoes
custard apple	passionfruit	tropical flowers
eggplant	pepino	ugli fruit
feijoa	peppers	watermelon
ginger root	pineapples	white sapote
granadilla		yam
grapefruit		

Freeze Sensitivity

Many products are recommended to be transported or stored at temperatures only 1° to 3°C (2-6°F) above their freezing points. Thermostats, however, on some trailers and van containers are set 1° to 3°C (2-6°F) higher than the recommended temperature of 0°C (32°F) for chilled products to avoid freezing. The following Table 6 lists a small number of products according to their sensitivity to freezing. Most tropical products are damaged by chilling injury before they freeze.

Moisture Loss Sensitivity

Most products need to be transported and stored at a high relative humidity. Some products are more susceptible to moisture loss than others. Moisture loss results in wilting and shriveling. To reduce moisture loss, products must be adequately precooled before transit. Some products also are waxed, film-wrapped, package-iced, or top-iced.

Relative humidity during transit and storage must be maintained as much as possible. Table 7 lists products by their moisture loss rate in storage.

Table 6: Products susceptible to freezing injury¹

Most susceptible:		Moderately susceptible:		Least susceptible:
apricots	lettuce	apples	onions (dry)	beets w/o tops
asparagus	limes	broccoli,	oranges	brussels sprouts
avocados	okra	sprouting	parsley	cabbage,
bananas	peaches	cabbage, new	pears	mature or savory
beans, snap	peppers, sweet	carrots w/o tops	peas	dates
berries (except	plums	cauliflower	radishes, w/o tops	kale
cranberries)	potatoes	celery	spinach	kohlrabi
cucumbers	squash, summer	cranberries	squash, winter	parsnips
eggplant	sweetpotatoes	grapefruit		rutabagas
lemons	tomatoes	grapes		salsify
				turnips w/o tops

The most susceptible products will be injured by one light freezing, moderately susceptible products will recover from one or two light freezings, while least susceptible products can be lightly frozen several times. Fresh products that are lightly frozen should not be handled. Thawing should be done at 4°C (40°F).

¹Source: Hardenburg, Watada, and Wang (7).

Table 7: Moisture loss rate of products¹

High Loss Rate:	Medium Loss Rate:	Medium Loss Rate:
apricots	avocados	parsnips*
blackberries	artichokes*	pears
broccoli*	asparagus	peas
cantaloupes*	bananas	peppers
chard*	beets*	pomegranates
cherries	brussels sprouts*	quinces
Chinese vegetables	cabbage*	radishes*
figs	carrots, topped*	rhubarb
grapes	cauliflower,	rutabagas*
green onions*	unwrapped	sweet potatoes
guavas	celeriac*	squash, summer
kohlrabi	celery*	(soft shell)
leafy greens*	coconuts	tangerines
lychees	corn, sweet*	tomatoes
mangoes	cranberries	yams
mushrooms	endive*	
papayas	escarole*	Low Loss Rate
parsley*	grapefruit	apples
peaches	green beans	cauliflower, wrapped
persimmons	leeks*	cucumbers, waxed
pineapples	lemons	eggplant
plums and prunes	lettuce	garlic
raspberries	limes	ginger root
strawberries	nectarines	kiwifruit
cut flowers	okra	melons
vegetables with tops*	oranges	onions, dry
		potatoes
		pumpkins
		squash, winter
		(hard shell)

* can be top-iced.

¹Source: largely from Safeway Stores, Inc. (25)

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Table 10: Recommended temperature and relative humidity, and approximate transit and storage life for fruits and vegetables—Continued

Product	Temperature		Relative Humidity (percent)	Approximate storage life
	°C	°F		
Cherimoya	13	55	90-95	2-4 weeks
Cherries, sour	0	32	90-95	3-7 days
Cherries, sweet	-1 to -0.5	30-31	90-95	2-3 weeks
Chinese broccoli	0	32	95-100	10-14 days
Chinese cabbage	0	32	95-100	2-3 months
Chinese long bean	4-7	40-45	90-95	7-10 days
Clementine	4	40	90-95	2-4 weeks
Coconuts	0-1.5	32-35	80-85	1-2 months
Collards	0	32	95-100	10-14 days
Corn, sweet	0	32	95-98	5-8 days
Cranberries	2-4	36-40	90-95	2-4 months
Cucumbers	10-13	50-55	95	10-14 days
Currants	-0.5-0	31-32	90-95	1-4 weeks
Custard apples	5-7	41-45	85-90	4-6 weeks
Daikon	0-1	32-34	95-100	4 months
Dates	-18 or 0	0 or 32	75	6-12 months
Dewberries	-0.5-0	31-32	90-95	2-3 days
Durian	4-6	39-42	85-90	6-8 weeks
Eggplants	12	54	90-95	1 week
Elderberries	-0.5-0	31-32	90-95	1-2 weeks
Endive and escarole	0	32	95-100	2-3 weeks
Feljoa	5-10	41-50	90	2-3 weeks
Figs, fresh	-0.5-0	31-32	85-90	7-10 days
Garlic	0	32	65-70	6-7 months
Ginger root	13	55	65	6 months
Gooseberries	-0.5-0	31-32	90-95	3-4 weeks
Granadilla	10	50	85-90	3-4 weeks
Grapefruit, Calif. & Ariz.	14-15	58-60	85-90	6-8 weeks
Grapefruit, Fla. & Texas	10-15	50-60	85-90	6-8 weeks
Grapes, Vinifera	-1 to -0.5	30-31	90-95	1-6 months
Grapes, American	-0.5-0	31-32	85	2-8 weeks
Greens, leafy	0	32	95-100	10-14 days
Guavas	5-10	41-50	90	2-3 weeks
Haricot vert	4-7	40-45	95	7-10 days
Horseradish	-1-0	30-32	98-100	10-12 months
Jaboticaba	13-15	55-60	90-95	2-3 days
Jackfruit	13	55	85-90	2-6 weeks
Jaffa orange	8-10	46-50	85-90	8-12 weeks
Japanese eggplant	8-12	46-54	90-95	1 week
Jerusalem Artichoke	-0.5-0	31-32	90-95	4-5 months
Jicama	13-18	55-65	65-70	1-2 months
Kale	0	32	95-100	2-3 weeks
Kiwano	10-15	50-60	90	6 months
Kiwifruit	0	32	90-95	3-5 months
Kohlrabi	0	32	98-100	2-3 months
Kumquats	4	40	90-95	2-4 weeks
Langsat	11-14	52-58	85-90	2 weeks
Leeks	0	32	95-100	2-3 months
Lemons	10-13	50-55	85-90	1-6 months
Lettuce	0	32	98-100	2-3 weeks
Limes	9-10	48-50	85-90	6-8 weeks

Annex IV

AGRICULTURAL CHEMICALS ACCEPTABLE ON GARLIC

(From U.S. Environmental Protection Agency)

No. de Registro	Nombre Genérico	Nombres Comerciales	Tolerancias (ppm)	Días a Cosecha
Herbicidas				
180.117	EPTC	Eptam, Genep	0.1 N	ND
180.185	DCPA, Chlorothal	Dacthal	1	ND
180.205	Paraquat (RUP)	Gramoxone, Paracol	0.05	ND
180.207	Trifluralin	Treflan, Triflurex	0.05 N	ND
180.216	Chloroxuron		0.1 N bulbo seco ajo	ND ND
180.241	Bensulide	Prefar	0.1 N bulbo seco ajo	ND ND
180.319	Chlorpropham	CIPC	0.1 I	ND
180.324	Bromoxynil (RUP)	Buctril	0.1 ajo 0.1 N bulbo seco	ND ND
180.361	Penoximethalin	Prowl	0.1 R ajo	ND
180.384	Glyphosate	Rodeo, Roundup	0.2	ND
180.381	Oxyfluorfen	Goal	0.05 bulbo seco ajo	60
180.411	Fluazifop-butyl	Fusilade	0.5 bulbo seco ajo	45
180.412	Sethoxydim	Fervinal	1	14
180.1019	Acido Sulfurico (RUP)		EXENTO	
Insecticidas				
180.111	Malathion		8	3
180.133	Lindane	Lindafor	1 bulbo seco ajo	
180.153	Diazinon	Basudin, Diazinon	0.75	10
180.154	Azinphos-methyl (RUP)	Gusathion, Guthion	2	bulbo seco 28 verde 7
180.157	Mevinphos (RUP)	Phosdrin	0.25 verde, puerro, chalote	7
180.167	Compuesto nicotina (RUP)		2	
180.173	Ethion (RUP)	Rhodocide	1	
180.179	Emético Tártaro		3.5	
180.221	Fonofos (RUP)	Dyfonate	0.1 N	a la cosecha
180.253	Methomyl (RUP)	Lannate, Nudrin	0.02 bulbo seco, ajo 3 R verde, 3 puerro	7 seco 28 verde
180.330	Oxydemeton-methyl (RUP)	Metasystox-R	0.05 bulbo seco, ajo	30

N Tolerancias de residuos insignificantes
 R Tolerancia regional
 I Tolerancia provisional
 ND Datos no disponibles

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No. de Registro	Nombre Genérico	Nombres Comerciales	Tolerancias (ppm)	Días a Cosecha
180.342	Chlorpyrifos	Lorscan, Pyrinex	0.5 bulbo seco, ajo 0.5 R puerro	1 aplic. por año
180.349	Fenamifos (RUP)	Nemacur	0.5 ajo	a la siembra
180.378	Permethrin (RUP)	Ambush, Perthrine, Pounce, Talcord	0.1 bulbo seco, ajo	1
180.1001b	Las siguientes sustancias derivadas naturalmente son usadas como insecticidas: - Pirethro (Piretrinas) - Rotenone - Ryania - Sabadilla	Varios nombres comerciales	EXENTO solamente cuando es aplicado a cultivos en crecimiento	0
180.1002	Allethrin y D-allethrin	Pynamin Pynamin-Forte	EXENTO cuando es aplicado a cultivos en crecimiento	
180.1011	Bacillus thuringiensis var. kurstaki (B.t.)	Dipel, Javelin, Thuricide	EXENTO	0
180.1068	Safer	Safer Insecticidal Concentrate	EXENTO	
Fungicidas				
180.2	Polisulfuros de calcio		EXENTO	
180.2	Azufre (azufre elemental)	Elosal	EXENTO	
180.103	Captan	Orthocide	50 verde, puerro, chalote pre y pos-cosecha	
180.114	Ferbam	Carbamate	7	
180.116	Ziram	Mezene	7	
180.132	Thiram		0.5 bulbo seco, ajo	
180.158	Anilazine	Dyrene	1 bulbo seco, ajo 10 verde, puerro, chal.	3
180.176	Mancozeb (Maneb + Zinc ion)	Dithane M-45, Manzate 200	0.5 bulbo seco, ajo	7
180.275	Chlorothalonil	Bravo, Daconil 2787	5 verde, puerro, chal. 0.5 bulbo seco, ajo	14 verde, puerro, chalote 7 bulbo seco, ajo

N Tolerancias de residuos insignificantes
R Tolerancia regional
I Tolerancia provisional
ND Datos no disponibles

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No. de Registro	Nombre Genérico	Nombres Comerciales	Tolerancias (ppm)	Días a Cosecha
180.291	PCNB	Terraclor	0.1 I ajo	
180.294	Benomyl	Benlate	0.2 ajo	
180.371	Thiophanate-methyl	Topsin	3	a la siembra
180.380	Vinclozolin	Ronilan, Ornalin	1 bulbo seco, ajo	18
180.399	Iprodione	Rovral	0.1 ajo	
180.408	Metataxyl	Ridomil	0.5 bulbo seco 10 verde, puerro, chal.	7 todas
180.1001.b	Compuestos de cobre, Cu -Caldo Bordelés -acetato de cobre, -carbonato de cobre, -hidroxido de cobre, -mezclas de cobre-cal, -lineoleato de cobre, -oleato de cobre, -óxido de cobre, -sulfato básico de cobre, -monohidrato de sulfato de cobre, -pentahidrato de sulfato de cobre, -cromato de cobre-zinc, -óxido cuproso		EXENTO solamente cuando es aplicado a cultivos en crecimiento	
180.1015	Sodium Propionate		EXENTO para ajo	
180.123	Bromuros inorgánicos (RUP) (Bromuro de Metilo)	Brom O Gas	50 ajo 20 verde, puerro, chal. 50 bulbos Cipolini pos-cosecha	

N Tolerancias de residuos insignificantes
R Tolerancia regional
I Tolerancia provisional
ND Datos no disponibles

No. de Registro	Nombre Genérico	Nombres Comerciales	Tolerancias (ppm)	Días a Cosecha
Otros				
180.175	Maleic Hydrazinol, MH		15 bulbo seco, ajo	
	Regulador de crecimiento			
180.199	Bromuros inorgánicos (RUP) cuando se combina con Chloropicrin		300 R bulbo seco	
	Fumigante de suelo			
180.1001	Hipoclorito de cal (fuente de cloro) desinf. pos-cosecha		EXENTO	
180.1001 b+c	Aceites derivados del petróleo. Aceite mineral aceite superior, aceite hortícola y aceite emulsificable)	SunSpray, Stylet Oil	EXENTO	
180.1016	Etileno		EXENTO	
	Regulador de crecimiento			
180.1049	Dióxido de carbono (aplicación pos-cosecha en atmósfera modificada)		EXENTO	
180.1098	Giberelinas (GA 3) Regulador de crecimiento	Activol, ProGib	EXENTO cuando se usa como regulador del crecimiento de la planta, en dosis de aplicación de 20 gramos de ingrediente activo por acre.	
180.1099	Acido Indolbutírico IBA Regulador de crecimiento		EXENTO en dosis de aplicación menor de 20 gramos de ingred. activo por acre	
Anexo				
Herbícidas				
180.281	Dinoseb		0.1 N Revocación esperada en 1992.	
180.282	CDA	Radox	0.05 N	
Insecticidas				
180.121	Parathion (RUP)	Folidol, Niran	1	15
180.138	Toxaphene (RUP)		7	

N Tolerancias de residuos insignificantes

R Tolerancia regional

I Tolerancia provisional

ND Datos no disponibles

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No. de Registro	Nombre Genérico	Nombres Comerciales	Tolerancias (ppm)	Días a Cosecha
180.158	Carbendazim	Trithion	0.8	
180.234	Fenitrothion (RUP)	Terracur P, Dasanit	0.1 bulbo seco, ajo	
180.235	DDVP, Dichlorvos (RUP)	Dedevap, Nogos, Oko, Vapona, Nuvan	0.5 pos-cosecha	
Fungicidas				
180.103	Captan	Orthocide	25 bulbo seco, ajo pre y pos-cosecha	
180.110	Maneb	Dithane M-22, Polyram M, Trimangol	7 Revocacion esperada.	
180.115	Zineb		7 Revocacion esperada.	
180.200	Dichloran, DCNA	Botran	5	
180.191	Folpat		15 bulbo seco, ajo 50 ceb. verde, puerro, chalote	
180.267	Captafol	Difolatan	0.1 N	

N Tolerancias de residuos insignificantes
 R Tolerancia regional
 I Tolerancia provisional
 ND Datos no disponibles

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Country	PRODUCT NAME	
ARGENTINA	GARLIC	INSECT FILTH/DAM.
ARGENTINA	GARLIC	INSECT FILTH/DAM.
ARGENTINA	GARLIC	MOLD
ARGENTINA	GARLIC	DECOMPOSED
ARGENTINA	GARLIC	MOLD
ARGENTINA	GARLIC	INSECT FILTH/DAM.
ARGENTINA	GARLIC	DECOMPOSED
ARGENTINA	GARLIC	INSECT FILTH/DAM.
ARGENTINA	GARLIC FRESH	DECOMPOSED
ARGENTINA	GARLIC, RED	DECOMPOSED
ARGENTINA	GARLIC, RED	DECOMPOSED
CANADA	DRY GARLIC SPARE RIB SAUCE	UNREG. LACF MFR.
CANADA	GARLIC SPREAD	VIOL. FPLA
CHILE	OCTOPUS IN GARLIC	UNFILED LACF PROC.
CHINA, PEOPLES REP. of	DRIED GARLIC FLAKES/PLSTC	INSECT FILTH/DAM.
CHINA, PEOPLES REP. of	GARLIC	INSECT FILTH/DAM.
CHINA, PEOPLES REP. of	GARLIC FRESH	MOLD
CHINA, PEOPLES REP. of	GARLIC FRESH	DECOMPOSED
CHINA, PEOPLES REP. of	GARLIC FRESH	MOLD
CHINA, PEOPLES REP. of	GARLIC MINCED	MAND. LBLING. OMIT.
CHINA, PEOPLES REP. of	GARLIC POWDER	MAND. LBLING. OMIT.
CHINA, PEOPLES REP. of	GARLIC WHITE	DECOMPOSED
CHINA, PEOPLES REP. of	GARLIC, DEHYDRATED FLAKES	INSECT FILTH/DAM.
CHINA, PEOPLES REP. of	GARLIC, FRESH WHITE	INSECT FILTH/DAM.
CHINA, PEOPLES REP. of	GARLIC/ GLASS	MAND. LBLING. OMIT.
CHINA, PEOPLES REP. of	GARLIC/WHOLE/FRESH	DECOMPOSED
CHINA, REPUBLIC of	CHILI PASTE W/GARLIC/GLAS	ANIMAL FILTH/DAM.-NEC
CHINA, REPUBLIC of	CHILLI PASTE W/GARLIC	ANIMAL FILTH/DAM.-NEC
CHINA, REPUBLIC of	CHILLI PASTE W/GARLIC	ANIMAL FILTH/DAM.-NEC
CHINA, REPUBLIC of	CHILLI PASTE W/GARLIC	RODENT FILTH/DAM.
CHINA, REPUBLIC of	FRIED GARLIC IN PLSTC.	MAND. LBLING. OMIT.
CHINA, REPUBLIC of	FRIED GARLIC SLICES/PLSTC	RODENT FILTH/DAM.
CHINA, REPUBLIC of	HOTSAUCE/GARLIC	UNREG. LACF MFR.
CHINA, REPUBLIC of	MINCED GARLIC/ GLASS	UNFILED LACF PROC.
FRANCE	PARSLEY GARLIC POWDER	MAND. LBLING. OMIT.
HONG KONG	BLACK BEAN GARLIC SAUCE	RODENT FILTH/DAM.
HONG KONG	BLACK BEAN GARLIC SAUCE	RODENT FILTH/DAM.
HONG KONG	BLK BEAN GARLIC SAUC/GLAS	INSECT FILTH/DAM.
HONG KONG	GARLIC FLAKES, DEHYDRATED	MAND. LBLING. OMIT.
HONG KONG	GARLIC FLAKES, DEHYDRATED	
HONG KONG	GARLIC SAUCE	
HONG KONG	GARLIC SAUCE	UNFILED LACF PROC.
HONG KONG	GARLIC, WHOLE FRESH	UNFILED LACF PROC.
HONG KONG	MINCED DRIED GARLIC-PAPER	MOLD
INDIA	GARLIC FARFAR	INSECT FILTH/DAM.
INDIA	GARLIC FAVOR WAFERS	INSECT FILTH/DAM.
INDIA	GARLIC PAPAD	RODENT FILTH/DAM.
INDIA	GARLIC PAPAD/ PLSTC	INSECT FILTH/DAM.
INDIA	GARLIC PAPAD/CELLO	ANIMAL FILTH/DAM.-NEC
INDIA	GARLIC PAPPAD	ANIMAL FILTH/DAM.-NEC
INDIA	GARLIC PCKLS W/OIL/GLS	INSECT FILTH/DAM.
INDIA	GARLIC PICKLE	INSECT FILTH/DAM.
INDIA	GARLIC PICKLE	UNFILED LACF PROC.
INDIA	GARLIC PICKLE	RODENT FILTH/DAM.

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 (From U.S. Food and Drug Administration)

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Country	PRODUCT NAME	
INDIA	GARLIC PICKLE	UNREG. LACF MFR.
INDIA	GARLIC PICKLE CHUTNEY	INSECT FILTH/DAM.
INDIA	GARLIC PICKLE IN GLASS	INSECT FILTH/DAM.
INDIA	GARLIC PICKLE IN OIL	UNFILED LACF PROC.
INDIA	GARLIC W/GR CHILLIS PAPAD	INSECT FILTH/DAM.
INDIA	LENTIL BISCUITS/GARLIC	RODENT FILTH/DAM.
INDIA	WHOLE GARLIC	MOLD
ITALY	BREAD STICKS W/GARLIC/PLS	INSECT FILTH/DAM.
JAPAN	GARLIC PASTE	MAND. LBLING. OMIT.
JAPAN	GARLIC,PICKLED	UNREG. LACF MFR.
KOREA, REPUBLIC of	GARLIC STEM	UNREG. LACF MFR.
KOREA, REPUBLIC of	GARLIC STEMS	UNFILED LACF PROC.
KOREA, REPUBLIC of	GARLIC STEMS	UNFILED LACF PROC.
KOREA, REPUBLIC of	GARLIC/SOY SAUCE	UNREG. LACF MFR.
KOREA, REPUBLIC of	SEASONED GARLIC STEM	UNREG. LACF MFR.
KOREA, REPUBLIC of	SEASONED GARLIC W/ HOT SA	UNREG. LACF MFR.
MEXICO	DEHYDRATED GARLIC FLAKES	UNFIT FOR FOOD-N.E.C.
MEXICO	DRIED FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	DRIED FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	ELEPHANT GARLIC	INSECT FILTH/DAM.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	MOLD
MEXICO	FRESH GARLIC	INSECT FILTH/DAM.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	FILTH-N.E.C.
MEXICO	FRESH GARLIC	FILTH-N.E.C.
MEXICO	FRESH GARLIC	MOLD
MEXICO	FRESH GARLIC	MOLD
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	MOLD
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	MOLD
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	MOLD
MEXICO	FRESH GARLIC	DECOMPOSED
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	FRESH GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC	MOLD
MEXICO	GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC	UNFIT FOR FOOD-N.E.C.

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Country	PRODUCT NAME	
MEXICO	GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC	MOLD
MEXICO	GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC	MOLD
MEXICO	GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC	DECOMPOSED
MEXICO	GARLIC	DECOMPOSED
MEXICO	GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC FLAKES DEHYDRATED	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC, DEHYDRATED BULK	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC, DEHYDRATED BULK	FILTH-N.E.C.
MEXICO	GARLIC, DEHYDRATED BULK	UNFIT FOR FOOD-N.E.C.
MEXICO	GARLIC/ HEADS/BRAIDS	MOLD
MEXICO	INDUSTRIAL GARLIC	UNFIT FOR FOOD-N.E.C.
NETHERLANDS	MUSSELS N GARLIC	UNFILED LACF PROC.
NEW ZEALAND	ODORLESS GARLIC	NEW DRUG W/O NDA/IND
PAKISTAN	GARLIC PICKLE IN OIL	UNFILED LACF PROC.
PAKISTAN	GARLIC PICKLE IN OIL	ANIMAL FILTH/DAM.-NEC
PERU	GARLIC, FRESH	DECOMPOSED
PHILIPPINES	CRACKER NUT(GARLIC)/FOIL	INSECT FILTH/DAM.
PHILIPPINES	CRACKERS, ONION-GARLIC	MANDATORY LABELING OMITTED YELLOW #5
SINGAPORE	GARLIC CHILLI	UNREG. LACF MFR.
SINGAPORE	GARLIC CHILLI	UNREG. LACF MFR.
SPAIN	GARLIC	INSECT FILTH/DAM.
SPAIN	GARLIC	MOLD
SPAIN	GARLIC	MOLD
SPAIN	GARLIC	INSECT FILTH/DAM.
SPAIN	GARLIC	MOLD
SPAIN	GARLIC	MOLD
SPAIN	GARLIC	MOLD
SPAIN	GARLIC SUPER FLOR	MOLD
SPAIN	GARLIC SUPER FLOR	INSECT FILTH/DAM.
SPAIN	GARLIC SUPER FLOR	INSECT FILTH/DAM.
SPAIN	GARLIC SUPER FLOR	INSECT FILTH/DAM.
SPAIN	GARLIC, FLOR	INSECT FILTH/DAM.
SPAIN	GARLIC, FLOR	INSECT FILTH/DAM.
SPAIN	GARLIC, SUPER FLOR	MOLD
SPAIN	GARLIC,FLOR	INSECT FILTH/DAM.
THAILAND	FRIED GARLIC	MAND. LBLING. OMIT.
THAILAND	FRIED GARLIC	UNFILED LACF PROC.
THAILAND	FRIED GARLIC	MAND. LBLING. OMIT.
THAILAND	GARLIC IN BRINE	UNREG. LACF MFR.
THAILAND	GARLIC IN BRINE	UNFILED LACF PROC.
THAILAND	GARLIC WHOLE	UNFILED LACF PROC.
THAILAND	GARLIC, FRIED	BIRD FILTH/DAM.
THAILAND	PICKLED GARLIC	MAND. LBLING. OMIT.
THAILAND	PICKLED GARLIC	UNFILED LACF PROC.
THAILAND	PICKLED GARLIC	INSECT FILTH/DAM.
THAILAND	PICKLED GARLIC/GLASS	MAND. LBLING. OMIT.
TURKYL	GARLIC PICKLES	UNREG. LACF MFR.

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Country	PRODUCT NAME	
UNITED KINGDOM	GARLIC PASTE	RODENT FILTH/DAM.
UNITED STATES	GARLIC	DECOMPOSED
UNITED STATES	GARLIC	INSECT FILTH/DAM.
UNITED STATES	GARLIC BRAIDS	INSECT FILTH/DAM.

GRAND TOTAL DETENTION=163

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Country	PRODUCT NAME	
ARGENTINA	GARLIC	DECOMPOSED
ARGENTINA	GARLIC, FRESH	MOLD
ARGENTINA	GARLIC, FRESH	INSECT FILTH/DAM.
ARGENTINA	GARLIC, FRESH	INSECT FILTH/DAM.
ARGENTINA	GARLIC, FRESH	MOLD
ARGENTINA	GARLIC, FRESH	INSECT FILTH/DAM.
ARGENTINA	GARLIC, FRESH	INSECT FILTH/DAM.
ARGENTINA	GARLIC, PURPLE	DECOMPOSED
ARGENTINA	GARLIC/WOODEN BINS	INSECT FILTH/DAM.
CANADA	GARLIC CHUTNEY	RODENT FILTH/DAM.
CANADA	GARLIC TABLETS	MAND. LBLING. OMIT.
CANADA	GARLIC, DRY, SAUCE	UNREG. LACF MFR.
CHINA, PEOPLES REP. of	DEHYDRATD GARLIC GRANULES	SULFITES NOT DECLARED
CHINA, PEOPLES REP. of	DEHYDRATED GARLIC POWDER	SULFITES NOT DECLARED
CHINA, PEOPLES REP. of	DRIED GARLIC SLICE	RODENT FILTH/DAM.
CHINA, PEOPLES REP. of	GARLIC FLAKES	NOT LABELED IN ENG.
CHINA, PEOPLES REP. of	GARLIC FLAKES, GRADE A	SULFITES
CHINA, PEOPLES REP. of	GARLIC FLAKES, GRADE B	SULFITES
CHINA, PEOPLES REP. of	GARLIC FLAKES, GRADE B	SULFITES
CHINA, PEOPLES REP. of	GARLIC IN CDBD	MOLD
CHINA, PEOPLES REP. of	GARLIC, WHOLE, IND. GRADE	INSECT FILTH/DAM.
CHINA, PEOPLES REP. of	GARLIC/RIGID PLASTIC	MOLD
CHINA, PEOPLES REP. of	NATURAL GARLIC OIL CAPS	NEW DRUG W/O NOA/IND
CHINA, PEOPLES REP. of	WHITE GARLIC	INSECT FILTH/DAM.
CHINA, REPUBLIC of	CHILI PASTE W/GARLIC	UNFILED LACF PROC.
CHINA, REPUBLIC of	CHILI PASTE W/GARLIC	RODENT FILTH/DAM
CHINA, REPUBLIC of	CHILI PASTE WITH GARLIC	UNFILED LACF PROC.
CHINA, REPUBLIC of	CHILI PASTE WITH GARLIC	UNREG. LACF MFR.
CHINA, REPUBLIC of	CHILI PASTE/GARLIC/IN GLS	INSECT FILTH/DAM.
CHINA, REPUBLIC of	CHILLI PASTE W/GARLIC	UNFILED LACF PROC.
CHINA, REPUBLIC of	CHILLI PASTE W/GARLIC	UNREG. LACF MFR.
CHINA, REPUBLIC of	CHILLI SAUCE W. GARLIC	RODENT FILTH/DAM.
CHINA, REPUBLIC of	FRIED DRIED GARLIC/CELLO	INSECT FILTH/DAM.
CHINA, REPUBLIC of	FRIED GARLIC	MAND. LBLING. OMIT.
CHINA, REPUBLIC of	GARLIC BULBS/ CDBD	INSECT FILTH/DAM.
CHINA, REPUBLIC of	RAW FRSH GARLIC/PAPER BOX	MOLD
DOMINICAN REPUBLIC	GARLIC CREAM	MAND. LBLING. OMIT.
FRANCE	PARSLEY/GARLIC MIX	MAND. LBLING. OMIT.
GERMANY, FEDERAL REP. of	GARLIC TABLETS	FAL./MISLEAD.LBLING
GERMANY, FEDERAL REP. of	GARLIC TABLETS	MAND. LBLING. OMIT.
HONG KONG	BLACK BEAN GARLIC SAUCE	ANIMAL FILTH/DAM.-NEC
HONG KONG	BLACK BEAN GARLIC SAUCE	INSECT FILTH/DAM.
HONG KONG	BLACK BEAN GARLIC SAUCE	INSECT FILTH/DAM.
HONG KONG	BLACK BEAN GARLIC SAUCE	INSECT FILTH/DAM.
HONG KONG	BLACK BEAN GARLIC SAUCE	INSECT FILTH/DAM.
HONG KONG	BLACK BEAN W/GARLIC GLASS	INSECT FILTH/DAM.
HONG KONG	DRIED GARLIC FLAKES	INSECT FILTH/DAM.
HONG KONG	DRIED GARLIC GRANULES	MAND. LBLING. OMIT.
HONG KONG	FRESH WHITE GARLIC/PLASTI	MAND. LBLING. OMIT.
HONG KONG	SAUCE BLACK BEAN GARLIC	MOLD
HONG KONG		INSECT FILTH/DAM.

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Country	PRODUCT NAME	
HONG KONG	SAUCE, BLACK BEAN GARLIC	INSECT FILTH/DAM.
INDIA	GARLIC GINGER/MIXED SPICE	MAND. LBLING. OMIT.
INDIA	GARLIC PAPAD	BHC
INDIA	GARLIC PAPAD	BHC
INDIA	GARLIC PAPADS	MAND. LBLING. OMIT.
INDIA	PAPAD GARLIC	INSECT FILTH/DAM.
INDIA	URID WITH GARLIC	RODENT FILTH/DAM.
INDONESIA	GARLIC CRACKER	RODENT FILTH/DAM.
INDONESIA	GARLIC CRACKERS	UNS.COL.ADD.-N.E.C.
INDONESIA	GARLIC CRACKERS	RODENT FILTH/DAM.
JAPAN	GARLIC JUICE/RIGID PLSTC	MAND. LBLING. OMIT.
JAPAN	PIC GARLIC	UNFILED LACF PROC.
JAPAN	PICKLED GARLIC	FAL./MISLEAD.LBLING
JAPAN	PICKLED GARLIC	COCHINEAL
JAPAN	PICKLED GARLIC	UNREG. LACF MFR.
JAPAN	PICKLED GARLIC	UNS.COL.ADD.-N.E.C.
JAPAN	PICKLED GARLIC	UNS.COL.ADD.-N.E.C.
JAPAN	PICKLED GARLIC	UNS.COL.ADD.-N.E.C.
JAPAN	PICKLED GARLIC IN PLSTC	FAL./MISLEAD.LBLING
KOREA, NORTH	CANNED PICKLED GARLIC	UNFILED LACF PROC.
KOREA, NORTH	PICKLED GARLIC	UNREG. LACF MFR.
KOREA, REPUBLIC of	CANNED GARLIC	UNFILED LACF PROC.
KOREA, REPUBLIC of	CANNED PICKLED GARLIC	UNFILED LACF PROC.
KOREA, REPUBLIC of	CANNED PICKLED GARLIC	MAND. LBLING. OMIT.
KOREA, REPUBLIC of	GARLIC IN CAN	UNFILED LACF PROC.
KOREA, REPUBLIC of	GARLIC, PICKLED	MAND. LBLING. OMIT.
KOREA, REPUBLIC of	PICKLED GARLIC	INSECT FILTH/DAM.
MEXICO	GARLIC GARLANDS FRESH	VIOL. FPLA
PAKISTAN	GARLIC PICKLE	RODENT FILTH/DAM.
PAKISTAN	GARLIC PICKLE	INSECT FILTH/DAM.
PHILIPPINES	GARLIC CRACKER NUTS/FOIL	INSECT FILTH/DAM.
PHILIPPINES	GARLIC CRACKER NUTS/LAMIN	MAND. LBLING. OMIT.
PHILIPPINES	SINANGAG MIX GARLIC	UNREG. LACF MFR.
SPAIN	OCTOPUS GARLIC FLAVOR	INADEQ.ACIDIFICATION
SPAIN	OCTOPUS IN GARLIC	UNFILED LACF PROC.
THAILAND	CANNED FRIED GARLIC	UNFILED LACF PROC.
THAILAND	CANNED FRIED GARLIC	UNFILED LACF PROC.
THAILAND	CANNED FRIED GARLIC	UNREG. LACF MFR.
THAILAND	FRIED GARLIC	UNFILED LACF PROC.
THAILAND	FRIED GARLIC	UNREG. LACF MFR.
THAILAND	FRIED GARLIC	UNFILED LACF PROC.
THAILAND	FRIED GARLIC	UNFILED LACF PROC.
THAILAND	GARLIC CHILLI SAUCE	SULFITES NOT DECLARED
THAILAND	GARLIC IN BRINE	UNFILED LACF PROC.
THAILAND	OCTOPUS IN GARLIC	UNFILED LACF PROC.
THAILAND	PICKLED GARLIC	UNFILED LACF PROC.
THAILAND	PICKLED GARLIC	RODENT FILTH/DAM.
THAILAND	PICKLED GARLIC	UNFILED LACF PROC.
THAILAND	PICKLED GARLIC	UNFILED LACF PROC.
THAILAND	RED CHILLI GARLIC PASTE	UNFILED LACF PROC.
THAILAND	SQUID IN GARLIC	UNFILED LACF PROC.
EGYPT	GARLIC	MAND. LBLING. OMIT.
UNITED KINGDOM	GARLIC (LIQUID)	MAND. LBLING. OMIT.

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Country

PRODUCT
NAME

GRAND TOTAL DETENTION=105

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Country	PRODUCT NAME	
ARGENTINA	GARLIC	DECOMPOSED
ARGENTINA	GARLIC WHOLE	MOLD
ARGENTINA	GARLIC WHOLE	MOLD
ARGENTINA	GARLIC, WHOLE	MOLD
CHINA, PEOPLES REP. of	BLACK BEAN GARLIC SAUCE	INSECT FILTH/DAM.
CHINA, PEOPLES REP. of	GARLIC POWDER	ANIMAL FILTH/DAM.-NEC
CHINA, PEOPLES REP. of	GARLIC, WHOLE	INSECT FILTH/DAM.
CHINA, REPUBLIC of	CHILI PASTE W/ GARLIC	UNFILED LACF PROC.
CHINA, REPUBLIC of	CHILI PASTE W/GARLIC	UNREG. LACF MFR.
CHINA, REPUBLIC of	CHILLI PASTE W/GARLIC	UNFILED LACF PROC.
CHINA, REPUBLIC of	CHILLI SAUCE W/GARLIC	UNFILED LACF PROC.
CHINA, REPUBLIC of	FRIED GARLIC	UNREG. LACF MFR.
CHINA, REPUBLIC of	MINCED GARLIC IN GLASS	SULFITES NOT DECLARED
FRANCE	ROULE GARLIC CHEESE	MAND. LBLING. OMIT.
HONG KONG	BLACK BEAN GARLIC SAUCE	INSECT FILTH/DAM.
HONG KONG	BLACK BEAN GARLIC SAUCE	UNFILED LACF PROC.
HONG KONG	BLACK BEAN GARLIC SAUCE	INSECT FILTH/DAM.
HONG KONG	BLK. BEAN GARLIC SAUCE	INSECT FILTH/DAM.
HONG KONG	GARLIC FLAKES/DRIED/IN PL	INSECT FILTH/DAM.
HONG KONG	GARLIC POWDER/PLASTIC	MAND. LBLING. OMIT.
INDIA	AMLA W/O GARLIC	UNFILED LACF PROC.
INDIA	AMLA WITH GARLIC	UNFILED LACF PROC.
INDIA	CONGURA WITL GARLIC	UNFILED LACF PROC.
INDIA	GARLIC FARFAR	INSECT FILTH/DAM.
INDIA	GARLIC FARFAR	INSECT FILTH/DAM.
INDIA	GARLIC PAPAD	FILTH-N.E.C.
INDIA	GARLIC PAPAD	RODENT FILTH/DAM.
INDIA	GARLIC PICKLE	FILTH-N.E.C.
INDIA	GARLIC PICKLE	RODENT FILTH/DAM.
INDIA	GARLIC POWDER	INSECT FILTH/DAM.
INDIA	GARLIC WAFER	INSECT FILTH/DAM.
INDIA	GINGER W/O GARLIC	UNFILED LACF PROC.
INDIA	GONGURA W/GARLIC	UNFILED LACF PROC.
INDIA	GONGURA W/O GARLIC	UNFILED LACF PROC.
INDIA	LIJJAT GARLIC FARFAR	INSECT FILTH/DAM.
INDIA	LIJJAT GARLIC WAFER	INSECT FILTH/DAM.
INDIA	LIME W/GARLIC	UNFILED LACF PROC.
INDIA	LIME W/O GARLIC	UNFILED LACF PROC.
INDIA	MANGO IN OIL W/GARLIC	UNFILED LACF PROC.
INDIA	MANGO IN OIL W/O GARLIC	UNFILED LACF PROC.
INDIA	MIXED VEGETABLE W/GARLIC	UNFILED LACF PROC.
INDIA	RED CHILLI WITH GARLIC	UNFILED LACF PROC.
INDONESIA	GARLIC CRACKERS	INSECT FILTH/DAM.
ISRAEL	CREAM CHEESE W/ GARLIC	UNFIT FOR FOOD-N.E.C.
JAPAN	GARLIC NON-SMELL TABLETS	MAND. LBLING. OMIT.
JAPAN	PICKLED GARLIC	UNS.COL.ADD.-N.E.C.
JAPAN	PICKLED GARLIC	UNS.COL.ADD.-N.E.C.
JAPAN	SEASONED GARLIC	UNS.COL.ADD.-N.E.C.
KOREA, REPUBLIC of	"GARLIC" IN SOY SAUCE	UNFILED LACF PROC.
KOREA, REPUBLIC of	CANNED GARLIC STEM IN S/S	UNREG. LACF MFR.
KOREA, REPUBLIC of	GARLIC, PICKLED, CND	INSECT FILTH/DAM.
KOREA, REPUBLIC of	PICKLED GARLIC IN SAUCE	UNFILED LACF PROC.
KOREA, REPUBLIC of	PICKLED GARLIC STEMS	VIOL. FPLA

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GARLIC DETENTIONS FOR FY 92

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Country	PRODUCT NAME	
MALAYSIA	CHILLI GARLIC SAUCE IN GL	ANIMAL FILTH/DAM.-NEC
PERU	PRESERVED GARLIC	UNFILED LACF PROC.
SINGAPORE	CHILI SAUCE W/GARLIC	ANIMAL FILTH/DAM.-NEC
SINGAPORE	CHILI SAUCE W/GARLIC	SHORT WEIGHT
SINGAPORE	GARLIC CHILLI SAUCE	MAND. LBLING. OMIT.
SPAIN	GARLIC CLOVES	UNFILED LACF PROC.
SPAIN	GARLIC CLOVES	VIOL. FPLA
THAILAND	FRIED GARLIC	UNFILED LACF PROC.
THAILAND	FRIED GARLIC	VIOL. FPLA
THAILAND	FRIED GARLIC	INSECT FILTH/DAM.
THAILAND	GARLIC IN BRINE	UNFILED LACF PROC.
THAILAND	GARLIC IN BRINE	UNFILED LACF PROC.
THAILAND	GARLIC(WHOLE)IN BRINE	UNFILED LACF PROC.
THAILAND	PICKED WHOLE GARLIC	UNREG. LACF MFR.
THAILAND	PICKLED CHILI/GARLIC OIL	UNFILED LACF PROC.
THAILAND	PICKLED GARLIC	UNREG. LACF MFR.
THAILAND	PICKLED WHOLE GARLIC	UNREG. LACF MFR.
UNITED KINGDOM	GARLIC PICKLES	MFR'D/HELD UNDER INSAN.CONDS.
UNITED STATES	GARLIC BRAIDS,FRESH	INSECT FILTH/DAM.

GRAND TOTAL DETENTION=72

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Annex VI

COMPARATIVE SUMMARY TABLE OF STANDARD REQUIREMENTS

(European Economic Community)

REQUIREMENTS	CLASSES		
	"Extra"	I	II
Market quality	Superior quality	Good quality	Marketable quality
I. <i>Minimum requirements all classes</i>	<ul style="list-style-type: none"> - whole - firm - sound; produce affected by rotting or deterioration such as to make it unfit for consumption is excluded in any case - clean and practically free of visible foreign matter - undamaged by frost or sun - free of trace of mould - free of externally visible sprouts - free of abnormal external moisture - free of foreign smell and/or taste 		
II. <i>Classification</i>	<ul style="list-style-type: none"> - characteristic of the type - regular - compact - free from, except very slight superficial blemishes allowed 		
<i>Colouring</i>	- normal for the type	- fairly regular	- may be irregular
<i>Shape</i>	- reasonably compact	- up to three cloves missing	
<i>Cloves</i>		- laceration of outer skin allowed healed mechanical injuries or slight bruises allowed not more than 3 cloves may be affected	
<i>Defects</i>			
III. <i>Sizing</i>	- 45 mm minimum	- 30 mm minimum	- 30 mm minimum
	- Garlic packed loose -- individual packages size between smallest and largest may not exceed 15 mm when diameter is less than 40 mm and not more than 20 mm when diameter is equal to or greater than 40 mm		
IV. <i>Tolerances by weight</i>			
A. <i>Quality</i>	5 %	- 10 % not more than 1 % for visible sprouts	- 10 % not more than 5 % for visible sprouts
B. <i>Size</i>	- Total 10 % weight for specified sizes above and or below, including not more than 3 % below any specified minimum provided minimum is not less than 25 mm		
V. <i>Packaging and presentation</i>			
A. <i>Uniformity</i>	- Contents of each package or lot must be uniform and contain garlic of the same origin, type, quality and if sized -- of the size.		
B. <i>Presentation</i>			
1. <i>Loose</i>	- Stems severed -- length not more than 10 cm on fresh and semi-dry, 3 cm for dry		
2. <i>Bunches</i>	- Must contain 6 or more bulbs with stem length not more than 25 cm for fresh and semi-dry and 12 or more bulbs for dry garlic and bound with suitable material		
3. <i>Strings</i>	- containing for dry or semi-dry 12 bulbs or at least 24 bulbs being made up of its own plants and bound with suitable material.		
C. <i>Packaging</i>	<ul style="list-style-type: none"> - properly protected - packing materials must be new and harmless to human and product - bulk packages free from any foreign bodies 		

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Annex VII

PUBLICATIONS RELATING TO GARLIC

(From AGRICOLA and AGRIS)

2/9/1 (Item 1 from file: 10)

87048916 87013964 Holding Library: AGL

Effect of gamma rays on seed cloves of garlic (*Allium sativum* L.) at post-harvest: reversion by exogenous growth regulators

Croci, C.A.; Arguello, J.A.; Orioli, G.A.

Environmental and experimental botany. Jan 1987. v. 27 (1) p. 1-5.

Oxford : Pergamon Journals. ISSN: 0098-8472 CODEN: EEBOD

DNAL CALL NO: 450 R11

Language: English

Includes references.

Subfile: OTHER FOREIGN;

Document Type: Article

DESCRIPTORS: garlic; gamma radiation; growth regulators; postharvest physiology;

Section Headings: FOOD COMPOSITION-HORTICULTURAL CROP PRODUCTS(Q505)

2/9/2 (Item 2 from file: 10)

84017600 83066864 Holding Library: AGL

Study on the long term storage of garlic bulbs. 1. The effects of post-harvest drying method and storage condition on the quality.

Park, M.H. JKACA; Koh, H.Y.; Shin, D.H.; Suh, K.B.

Han'guk Nonghwa Hakhoe chi = Journal of the Korean Agricultural Chemical Society. v. 24 (4) , Dec 1981. p. 218-223.

Suwon : , The Society.

NAL: S584.K8H3

Language: Korean ; English

Includes references.

Subfile: OTHER FOREIGN;

Document Type: ARTICLE

Section Headings: FOOD STORAGE-HORTICULTURAL CROP PRODUCTS(Q115)

2/9/3 (Item 3 from file: 10)
82069935 81098443 Holding Library: AGL

Survey of machines and implements for the production, harvest and post-harvest processing of garlic.

Soubor mechanizacnich prostredku pro pestovani, sklizen a poskliznovou upravu cesneku
Habarta, F.; Zidlicky, J.

Mechanizace zemedelstvi. v. 30 (3) , 1980. p. 110-115.

Praha, , Ministerstvo zemedelstvi a vyzivy. ISSN: 0373-6776

NAL: 58.8 M467

Subfile: OTHER FOREIGN;

Document Type: ARTICLE

Geographic Location: Czechoslovakia

Section Headings: FARM EQUIPMENT(N200)

2/9/4 (Item 1 from file: 203)

1288853 AGRIS No: 91-043823

Influence of some post harvest treatments upon storage capacity of garlic

Mihailescu, N.; Iordachescu, C.; Fugel, S.; Rojancovschi, V.

Lucrari stiintifice. Institutul de Cercetari si Proiectari pentru
Valorificarea si Industrializarea Legumelor si Fructelor, 1989, v. 26/27 p. 147-151

Notes: 2 tables

Language: Romanian Summary Language: English, French, Russian

Place of Publication: Romania

Document Type: Journal Article, Numerical Data, Summary, Review Article

Journal Announcement: 1705 Record input by Romania

Descriptors in English: *GARLIC; *GERMINATION; *PREHARVEST TREATMENT; *
STORAGE; *CHEMICAL CONTROL; GERMINATION INHIBITORS; VARIETIES;
DEVELOPMENTAL STAGES; FLAVOURINGS; PEST CONTROL METHODS;
PLANT

DEVELOPMENTAL STAGES; PLANT GROWTH SUBSTANCES; PLANT
PRODUCTS; SPICES;

TAXA; TAXONOMY; TIME; TIMING; TREATMENT DATE

Section Headings: J11 (POSTHARVEST TECHNOLOGY -- Handl, transp, stor &
protect plant products)

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2/9/5 (Item 2 from file: 203)
1198801 AGRIS No: 90-063875

Impact of cigarette beetle *Lasioderma serricornis* (Fabricius) on grain storage and its control by Phosphine

Tauthong, P.; Visarathanonth, P. (Kasetsart Univ., Bangkok (Thailand))

8. Asean Technical Seminar on Grain Post-Harvest Technology, Manila (Philippines), 6-9 Aug 1985

Research and Development Systems and Linkages for a Viable Grain Post-Harvest Industry in the Humid Tropics: Proceedings of the Eighth ASEAN Technical Seminar on Grain Post-Harvest Technology

Semple, R.L.; Frio, A.S. (eds.)

ASEAN Crops Post-Harvest Program, College, Laguna (Philippines); ASEAN Food Handling Bureau, Kuala Lumpur (Malaysia); National Post-Harvest Inst. for Research and Extension, Taguig, Metro Manila (Philippines)

College, Laguna (Philippines), 1985, p. 85-90

Notes: Received Jul 1987

Notes: 3 tables; 9 ref

Language: English Summary Language: English

Place of Publication: Philippines

Availability: Philippines Center

Document Type: Analytic, Monograph, Conference, Summary, Nonconventional Literature

Journal Announcement: 1607 Record input by Philippines

Abstract in English

Biological studies of the cigarette beetle, *Lasioderma serricornis* Fabricius were conducted in the laboratory on various kinds of grain and dried food. The food media were yard long bean, mungbean (var. U-Thong), ground soybean (var SJ1, SJ2, SJ3, and SJ5), blackseeded race, red kidney bean, Job's tears, field corn (var. Suwan), sweet corn, sorghum (var. KU 439), broken rice, curry powder, wheat flour, rice flour, glutinous rice flour, cassava starch, chili powder, garlic, and shrimp meal. The beetles fed well on most of the food media except rice flour, glutinous rice flour, cassava starch, red kidney bean, and sorghum (var. KU 439). These food media did not promote growth and development of the insect after three months of exposure. The three most favorable media for insect growth and development were wheat flour, ground soybean (SJ2), and shrimp meal. Garlic induced slow growth rates and very few progeny were obtained. Results on phosphine fumigation with Magtoxin at 27.9 degrees Celsius and 81.5% relative humidity indicated that the pupal stage was more tolerant to phosphine than the fourth instar larva and adult. Phosphine concentrations of 55-125 ppm in a 48-hour fumigation or 65-115 ppm in a 7-2 hour fumigation could achieve 100% mortality of the test insects. A shorter exposure period (such as 24 hours) did not give good results for complete control of the pupae, although phosphine concentration was as high as 120 ppm.

Descriptors in English: *FLOURS; *GRAIN; *STORAGE; *LASIODERMA; *STORED PRODUCTS PEST CONTROL; *DRIED PRODUCTS; *STARCH; *THAILAND; ARTHROPODS; ASIA; CARBOHYDRATES; COLEOPTERA; CONTROL; INSECTS; INVERTEBRATES; ORGANIC COMPOUNDS; PEST CONTROL; PLANT PRODUCTS; POLYSACCHARIDES; PRODUCT GROUPS; PRODUCTS; STORED PRODUCTS PESTS
Section Headings: J11 (POSTHARVEST TECHNOLOGY -- Handl, transp, stor & protect plant products)

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2/9/6 (Item 3 from file: 203)

0921549 AGRIS No: 86-068383

Residue analysis of 2AB(Aminobutane) in garlic bolt from post-harvest treatment

Zhen Zengli; Zheng Shulin (Hebei Agricultural Univ., Baoding (China))

Acta Agriculturae Universitatis Hebeiensis, Sep 1985, v. 8(3) p. 130-136

Notes: 5 ill.; 3 ref

Language: Chinese Summary Language: Chinese, English

Place of Publication: China

Document Type: Journal Article, Summary

Journal Announcement: 1210 Record input by China

Descriptors in English: *ALLIUM SATIVUM; *ORGANIC COMPOUNDS; *RESIDUES;
*CHINA; POSTHARVEST SYSTEMS; STORAGE; ORGANOLEPTIC PROPERTIES;
ALLIACEAE; ALLIUM; ASIA; BULBOUS VEGETABLES; CHEMICOPHYSICAL
PROPERTIES; CROPS; ECONOMIC PLANTS; FLAVOURING CROPS;
LILIIFLORAE; MONOCOTYLEDONS; PLANTS; VEGETABLE CROPS
Section Headings: Q03 (FOOD SCIENCE -- Food contamination and toxicology)

2/9/7 (Item 4 from file: 203)

0653346 AGRIS No: 897032

Study on the long term storage of garlic bulbs, 1: the effects of
post-harvest drying method and storage condition on the quality

Park, M.H.; Koh, H.Y.; Shin, D.H. (Agriculture and Fishery Development
Corp., Suweon (Korea R.). Food Research Inst.)

Journal of the Korean Agricultural Chemical Society, Dec 1981, v. 24(4) p. 218-223

Notes: 7 ill.; 5 tables; 13 ref Notes: Received Dec 1982

Language: Korean Summary Language: English, Korean

Place of Publication: Korea R.

Document Type: Journal Article, Summary

Journal Announcement: 0906 Record input by AIBA (Agr Information Bank for Asia)

Abstract in English

This study was conducted to investigate the effects of post-harvest
drying method and subsequent storage condition on the quality of garlic
bulbs for 10 months from July, 1980 to April, 1981. The 27% weight loss of
garlic bulbs by HPHD (hot air post-harvest drying) for 12 days at 40
degrees Centigrade (8 hrs/day) was equal to that by NPHD (conventional
natural post-harvest drying) for 35 days. The decay occurred 5.5% only in
NPHD. During the storage period of garlic bulbs by HPHD, their decay and
weight loss were less 25.4% and 13.5% in ambient storage, and less 14.2%
and 7.5% in low temperature storage than those of NPHD. When garlic bulbs
were stored in low temperature, the weight loss and decay were less 20.0%
and 22.4% in NPHD, and less 14.0% and 9.9% in HPHD than those in ambient
temperature storage. The quality of garlic bulbs packed with 0.08mm
polyethylene film stored at ambient temperature for 2 months was so poor
as to be inedible because of the adverse effect of CO₂ and the growth of
molds. In low temperature storage for 10 months it was in good shape
showing the weight loss, the decay and the sprouting at 2.6%, 3.4% and
26.8%, respectively.

Commodity Codes: 1720 (Garlic (Allium sativum))

Section Headings: Q10 (FOOD SCIENCE -- Food processing) ; S10 (HUMAN
NUTRITION -- Food composition)

2/9/8 (Item 5 from file: 203)

0542225 AGRIS No: 719469

Study on drying methods of garlic as a post harvest treatment

Yim, H.; Lee, D.S.; Kim, C.O. (Agriculture and Fishery Development Corp., Suwon (Korea R.). Food Research Inst.)

Annual Report of Food Research Inst. (Agriculture and Fishery Development Corporation), 1979, p. 249-272

Notes: 14 ill.; 7 tables; 9 ref

Language: Korean Summary Language: English, Korean

Place of Publication: Korea R.

Document Type: Journal Article, Summary

Journal Announcement: 0801 Record input by AIBA (Agr Information Bank for Asia)

Abstract in English

Garlic bulbs were hot-air dried as a post harvest treatment. The drying characters, quality changes, and storage adaptability after the drying were monitored. Seven day air-drying at 40 degrees Centigrade brought the garlic bulbs to the optimum dried conditions. It took 30 days to achieve the same results in case of the ambient shadow drying. The weight losses of garlic bulbs in the hot air and ambient shadow drying method were similar. The range of weight loss was 25-30%, and then the moisture contents of paper-shell of garlic bulbs were about 15%.

Commodity Codes: 1720 (Garlic (*Allium sativum*)); 3760 (Water content)

Section Headings: Q10 (FOOD SCIENCE -- Food processing)