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This publication discusses edamame, the immature green form of vegetable soybean. Issues important to edamame production and marketing are presented. Harvesting and post-harvest handling issues are presented as well as economic aspects of edamame. References and further resources for production and marketing follow the narrative.



Pods of edamame. Photo by Stephen Ausmus. Photo courtesy of USDA/ARS.

Introduction

Edamame, translated as “beans on branches,” is the Japanese name for green vegetable soybeans. (1) These are the immature, green form of edible soybeans. Edible or food-grade soybeans differ from field soybeans by being larger-seeded, milder-tasting, more tender, and more digestible. They also contain a lower percentage of gas-producing starches. Otherwise, the nutritional value of edible and field soybeans is comparable.

Edamame is a traditional food popular in Asia. In Japan, it is served boiled in salt water as a snack or appetizer. In China and other areas, the shelled, raw edible soybeans are cooked with meat or mixed with other vegetables for various dishes. Edamame is becoming increasingly popular in the United States as consumers become more interested in Asian cuisine.

Production

Edamame production is similar to that of traditional grain soybeans, although planting techniques and equipment need to accommodate the larger seed size of edamame. (2)

As with all soybeans, edamame is classified into maturity groups 0 to 8—where 0 represents the earliest maturation and 8, the latest—depending on the effect of day length on maturity. Select from varieties in the maturity group appropriate to your area. The lower-numbered maturity groups are more appropriate for northern areas and higher-numbered groups are best suited for southern areas. Your local Cooperative Extension service can advise you on the correct maturity group for your specific area. Market gardeners may want to plant several varieties to extend the season and to always have fresh edamame to market.

Edamame and grain soybeans share the same range of disease and insect pests. However, since edamame is harvested when green, growers can avoid many of the late season problems that occur with grain soybeans. (2) Regionally

specific production and marketing resources are listed in **Further Resources**.

Harvest and Handling

Edamame is harvested 99 to 120 days from planting, which can fit well into existing crop rotation patterns. Hand harvesting is preferred, but is costly. Equipment to harvest edamame differs from that used for other soybeans. Edamame may be harvested with the same equipment used for green beans, although this can cause bruising and reduce marketable yield. A fresh bean harvester causes approximately 24 percent loss and 5 percent bruising. (5)

Timing of the fresh edamame harvest is a critical factor in determining consumer acceptability and marketability. The harvest window for edamame is very short—only a few days. The optimum time to harvest edamame is when the pods are still green, immature, and tight with fully developed immature green seeds, usually at 85 percent pod fill. Chilling beans for 3 to 10 hours after harvest helps preserve quality. (3)

The appearance of the pod is extremely important in the Asian market. The highest prices are paid for bright green pods about 2.5 inches long and covered with fine, white or very light brown hairs, with two or more bright green seeds with light-colored hilum. (4) Blemished or damaged pods and those with only one seed are not acceptable. (2)

Organic Production

Many companies offer organic edamame products. See www.soyfoods.org/products/lists/retail_soybeans.html for a complete listing. Since organic production of edamame soybeans is much the same as organic production of grain soybeans, request the ATTRA publication *Organic Soybean Production* for comprehensive information. Marketers need to determine whether organic certification will add value to their edamame. Direct marketers can simply talk to their customers to determine how much value would be added by organic

certification. Indirect marketers can begin investigating potential markets and buyers in the Organic Trade Association's Organic Pages Online directory at www.ota.com. For more information, request the ATTRA publication *Organic Marketing Resources*.

Marketing

Edamame is marketed in three main ways. (5)

- Whole plants: Fresh beans are harvested by cutting the entire plant at about two inches and bunching stalks together in groups of four to six plants. The top leaves and small damaged pods are removed, while whole plants with leaves, pods, stems, and roots are packed in bundles or in 25-pound wooden boxes or cartons. This form is considered the most desirable and brings the highest prices, since Japanese consumers believe this method best preserves pod quality. (2)
- Pod only: Marketable pods are removed from the stalks and packed and marketed in plastic net bags. To maintain freshness, speedy harvesting and packaging is crucial.
- Bean only: Beans are shelled and marketed fresh or—more often in the U.S.—frozen.

Edamame is also sometimes marketed as bunches of beans in pods, called “hands.” In the U.S., edamame is currently becoming more popular, especially along the West Coast, and seems to be moving from specialty to mainstream status. (4)

While frozen edamame imports into the U.S. have grown rapidly since the 1990s, very little frozen edamame is produced in the United States. (2) Production is concentrated around the only two processors of frozen edamame: Sunrich Foods in Minnesota and Seapoint Farms in California. (2) Food brokers identify fresh edamame as the highest in demand and hardest to find, due to its seasonal and local market only. (2) There are probably fewer than 100 acres

Related ATTRA Publications

Organic Soybean Production

Organic Marketing Resources

Edible Soybean Production and Marketing



Edamame plant that is six feet tall. Photo by Stephen Ausmus. Photo courtesy of USDA/ARS.

farmed for fresh market sale of edamame in the U.S.

Producers need to consider which markets to target. Japanese consumers prefer edamame on the stalk or in-pod, while fresh shelled beans are preferred by Chinese consumers. Small-scale producers will probably want to target fresh markets, since setups to produce shelled beans may be expensive. Freshness of produce is the key to gaining the Chinese market. Experts recommend limiting the market radius to about 200 miles to ensure freshness. (4)

Economic Considerations

Research in Kentucky indicates break-even prices for fresh edamame at about \$22 per 20- to 25-pound box of fresh edamame, which is considerably higher than current frozen wholesale edamame prices. (6) This high break-even price is due to high labor costs to both harvest and pack fresh market edamame. (6) Evidence suggests that considerable value is added by marketing on-stalk to a strong Japanese market base. Marketing the whole plant (bunched on the stalk) requires the least amount of time and labor. (7)

The Kentucky researchers found that harvesting (especially when hand labor is used) and post-harvest handling are the main costs to edamame production.

For small-scale production, hand harvest is the most viable technique. Machine harvest, however, is definitely more economical; some estimates indicate machine harvest can cut edamame production costs by up to 25 percent. Total expenses per acre, including fixed costs, are projected to be \$6,750 to \$11,250. Edamame has the potential to return \$400 to \$1,300 per acre to land and management on the fresh, wholesale market. For those producers with access to a direct local market for fresh edamame, returns can reach \$2,500 per acre. (6)

Producers need to consider which markets to target.

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Further Resources

Woods, Tim, and Matt Ernst. 2003. Challenges for Marketing New Crops in Kentucky: Edamame. New Crop Opportunities Research Report PR-483. New Crop Opportunities Center, University of Kentucky. 4 p.

The Rodale Institute's New Farm Web site at www.newfarm.org offers some information on edamame (search on "edamame") from farmers in different areas of the country.

Several different varieties of edamame seed are described on Evergreen Seeds' Web site. www.evergreenseeds.com/evergreenseeds/edsoyed.html

Southeast

University of Kentucky's Edamame Information
www.uky.edu/Ag/HortBiz/edamame.html

Northwest

Washington State University's Edamame Site
www.edamame.wsu.edu

West

Colorado State's Edamame Information
www.colostate.edu/Depts/SoilCrop/extension/Newsletters/1999/JAN99.PDF

University of California Central Coast Region Edamame Information
www.sbceo.k12.ca.us/~uccesb1/sf8.htm

Midwest

Iowa State's Organic Edamame Information
<http://extension.agron.iastate.edu/organicag/researchreports/nkedamame02.pdf>

Northeast

Penn State's Edamame Research
www.ams.usda.gov/tmd/FSMIP/FY2002/PA0375.htm

A great series on marketing edamame to chefs is available in Penn State's Vegetable Gazette newsletters for 2005, which can be found at <http://hortweb.cas.psu.edu/extension/veg crops/newsletterlist.html>

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