



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

These large soybeans are harvested when the beans are still green and sweet tasting. After being boiled in slightly salted water for 15 to 20 minutes, they can be served as a snack or a main vegetable dish. The beans are high in protein and fiber and contain no cholesterol. Edamame is more often found in Asian and natural food stores, shelled or still in the pod.

- Taken from Agricultural Marketing Resource Center, www.agmrc.org

Introduction

Edamame is an immature, green form of edible soybeans. They differ from field beans because they grow larger seeds and pods, have a milder taste, are more tender and easier to digest. Some similarities exist between the field bean and the green edamame bean including nutritional value and plant species; *Glycine max*.

Edamame contain Phytoestrogens, which help fight heart disease by increasing the good cholesterol (HDL) and lowering bad cholesterol (LDL). It can prevent breast cancer in premenopausal women and lower the risk of heart disease and osteoporosis. The nutritional benefits promote prostate health in men and also serve as an antioxidant in the body.

Edamame are high in protein, similar to that of meat products in their amino acid balance. Each serving provides men with 22% of their daily iron intake and 15% for women. In a ½ cup serving you will find:

- 126 calories
- 6g fat (0.5 sat. fat)
- 11g protein
- 10g carbohydrates
- 0g cholesterol
- 13mg sodium

- 4g dietary fiber
- 130mg calcium
- 485mg potassium
- 142mg phosphorus
- 100mcg folate

Market Information

There are two ways to market fresh edamame:
pod
bunched on stalk

In the pod they need to be kept clean, and caution must be taken in picking, grading, and field packing. An unskilled supervised worker should be able to harvest, grade, pack, and transport one box (25 lbs.) per hour.

By the bunch, pod quality will be higher, with the beans remaining on the stalk. Stalks should be bunched in groups of four to six plants or by the pound. Leaves should be removed from the top of the stalks to display pods.

In a 2000-2001 Kentucky research trial, used tobacco equipment (greenhouse for seedling start and planter for setting plants) was incorporated into the production. Beans were harvested by hand on the stalk and shipped to Cincinnati for the wholesale fresh produce market. One batch

became moldy due to improper cooling after harvest. It was unclear who was at fault (on or off-farm), but this showed the importance of involving the entire supply chain from the farm to retailer for successful marketing. Castellini Produce brokered and tested the sale of a small amount of edamame in their wholesale market for this study. No results were given on the success of the product.

Edamame Market

In 2002 the domestic price of edamame approached \$4 per pound. It has been estimated that the U.S. could produce 32,000 acres of the crop to meet demand domestically (The Edamame Market, Knudson).

Its primarily used as a snack food which is cooked in salted water wherein the seeds are then pushed directly into the mouth from the pod. It is also used in cooking for salads, stir-frys, and soups. The target global market is Japan as they still import approximately one third of their edamame crop.

Production Considerations

Edamame require a similar culture to field beans. Although the larger seed size may require planter variation size and or planting technique (row/seed spacing). Some farms in Kentucky have successfully started plants in a greenhouse and then transplanted to a field at a later date. Most of this is being done with tobacco equipment, making the greenhouses and transplants ideal for farms transitioning away from tobacco after the buyout. Wannamaker Seed Company in South Carolina recommends the following planting procedures:

soil temperature should warm to 55-60 degrees F prior to planting (edamame do not germinate in cool soils)

a planting depth of 1 inch,
seed spacing of 3 inches apart within rows
row spacing should be 20-36 inches apart

Production practices for edible soybeans that will be harvested as dry beans for roasting into a shelf stable snack, are identical to that of the production of oil or grain soybeans. These types of edible soybeans are planted at the same time, with the same equipment, management, and harvesting techniques. (Edible Soybeans – Do They Have a Future in Maryland?) This is not true for the edamame bean.

A Missouri study stated that their recommendation of fertilizer called for 50-120 pounds of

Nitrogen (N) per acre. A split application including N=25 lbs., Phosphorus, and Potassium preemergence, followed up with a side-dress of the remaining N approximately six weeks after planting would boost bean quality.

Herbicide use is unclear for post emergence in fresh production. Because the crop is sold and marketed as a vegetable crop, it is unclear if herbicides are eligible for use. Mechanical and hand cultivation is used more often. The Missouri study mentioned above noted that conventional herbicides were used for weed control. A pre-emergence herbicide was applied followed by a split-postemergence weed management program of herbicide and hand cultivation. Wannamaker Seed Company in South Carolina gives planting guidelines stating that current soybean herbicides for weed control are permitted and caution must be taken when using insecticides. However, the University of Kentucky New Crop Opportunities Center states that there are no herbicides approved for edamame production, and mechanical or hand cultivation is used by growers in their state.

Edamame have a short harvest window of only a few days. The plant maturity depends on color and pod fill. Typical harvests are reported between 99 and 120+ days from planting. Harvest is also better in the morning because the plant has a higher sugar content early in the day. Yields of 6,000-10,000 pounds per acre can be expected.

On a small scale, hand harvesting is the most viable, but machine harvest is more economical. Most of the research found noted that green bean harvesters could be used for the mechanical harvest of the beans. Estimates say that machines can cut costs by approximately 25 percent. Immediate post-harvest cooling is essential for preservation for fresh or fresh-frozen market sales. The beans must be cooled to 32-37 degrees Fahrenheit using air, vacuum, or ice water (Marketing New Crops Fact Sheet: University of Kentucky). Fresh beans have a shelf life of two weeks when stored properly.

Quality

Edamame quality is evaluated by distributors and consumers for appearance, aroma, flavor, and firm texture after cooking. Edamame pods should have:

- a white pubescence, preferable sparse and soft;
- light brown or gray hilum;
- pods must have two or three seeds;
- most pods should be at least 5 cm long
- 100 seed weight should exceed 30 grams
- pods should be completely green with no hint of yellowing
- pods must be unblemished

Grade A edamame must have 90 percent or more pods with two to three seeds, be perfectly shaped, completely green, and show no injury or spotting.



Grade B edamame must have 90 percent or more pods with two or three seeds, can be lighter green, and have a few pods with slightly spotted, injured, malformed, short, or small seeds.

For both A and B grades pods cannot be over mature, diseased, damaged by insects, one-seeded, malformed, yellow, split, spotted, or unripe. (Edamame: The Vegetable Soybean)

Economics

Initial budgets from a field trial in Kentucky estimate that there is substantial potential for wholesale fresh market beans. Returns of \$400-\$2,500 per acre (6,000-10,000 lbs./ac. X \$1.50 per pound) were reported in a 2001-2002 Edamame Marketing Fact Sheet available from University of KY. These figures can be increased based or depending on harvesting technique and local fresh market development. The most significant costs involved in the production include harvesting and post-harvest handling.

Comparative budgeting in a Kentucky study found an estimated return per acre to land and management for edamame was \$259. A breakeven price for the fresh edamame was almost \$24 per box or just over \$1 per pound.

Further research found that a company producing an edamame product for retail paid \$1.35 per pound to farmers growing edamame for them.

References and More Information

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