UF IFAS Extension UNIVERSITY of FLORIDA

UF/IFAS PEER REVIEWED HS1521
https://doi.org/10.32473/EDIS-HS1521-2026

Edamame for Florida: A Nutritious Leguminous Crop with Growing Market Demand[1]

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Edamame (*Glycine max* [L.] Merrill) has been consumed for centuries in Asia and is becoming increasingly popular in the United States for its nutritional profile and culinary versatility. Typically boiled or steamed, edamame is a rich source of protein and fiber. This publication highlights its nutritional properties, common cooking methods, major marketing strategies, and current trends in domestic production. While most edamame consumed in the United States is still imported, domestic production is gradually expanding, including in Florida. This guide provides insights and an overview for consumers, Florida's growers (especially small-scale and urban farmers), and Extension agents interested in exploring this emerging specialty crop.

Introduction

The term edamame, now widely used to refer to vegetable or immature soybean, originates from Japanese and denotes "beans on branches," a reference to the typical practice of harvesting pods while still attached to the stem (Shurtleff and Aoyagi 2021; Geist 2025). This "green-pod" harvest distinguishes edamame from grain-type soybean, the more commonly known form of *Glycine max*, which is widely produced in the United States, harvested at full maturity as dry seeds, and primarily used for oil production and animal feed (Moinuddin et al. 2023). While both types belong to the same species, they have been selectively bred for different purposes. Edamame cultivars typically have larger seed sizes, a sweeter flavor, and lower levels of anti-nutritional compounds (e.g., trypsin inhibitors and phytate content) to better meet consumer preferences for use as a vegetable (Saldivar et al. 2010; Xu et al. 2016).

Initial uses of edamame date back to China, where it was valued primarily for its medicinal properties and consumed as a vegetable as early as the second century BC (Mentreddy et al. 2002). Over time, its popularity began to spread beyond China, and the vegetable became an essential component of traditional Japanese diets (Konovsky et al. 2020; Nair et al. 2023). In the early 20th century, edamame consumption and markets expanded across other Asian countries (e.g., Thailand), where it continues to hold a culturally significant role for its nutritional benefits and culinary versatility (Nair et al. 2023; Wang 2024).

Edamame was first mentioned in the United States in the mid-1850s, where it was described as a flavorful, large green soybean (Shurtleff and Aoyagi 2021). Although Americans were already familiar with the grain-type soybean, cultivars bred for vegetable use were not yet available in the country. In 1890, the first edamame variety was introduced to the United States from Japan, and four years later, another variety known as 'Easycook' was introduced from China. These introductions contributed to the first official record of edamame in a USDA special publication, raising interest in this vegetable. This increasing curiosity resulted in cooking tests during World War I, as USDA researchers looked for an affordable, protein-rich legume with a lighter beany flavor to serve as a meat alternative (Shurtleff and Aoyagi 2021; Li et al. 2023). Since then, edamame's presence has expanded in the United States, especially with current global trends favoring plant-based diets and the incorporation of new foods into diverse culinary traditions (Rosso et al. 2024). Although not native to Florida, edamame is not considered to be an invasive species (UF/IFAS 2018).

A Flavorful and Nutritious Vegetable

The sweet and creamy texture of edamame is a key factor influencing its widespread consumer appeal. Previous studies reported that its sweetness is closely linked to the accumulation of soluble sugars (Yu et al. 2021). Among these, sucrose is the most abundant sugar in fresh seed, representing 72% of the total and typically ranging from 6–12 g per 100 g fresh weight (Nair et al. 2023; Li et al. 2012). In addition, amino acids, including asparagine, glutamate, and alanine, have been identified as compounds that reduce the beany flavor and increase overall sweetness (Guo et al. 2022). These attributes are critical marketability factors, as consumers generally prefer and tend to purchase edamame with a more appealing taste (Carneiro et al. 2020).

In addition to having a favorable taste, edamame offers a well-balanced nutritional profile, containing all 20 amino acids, including the nine that the human body cannot synthesize on its own and must obtain through diet. For each of these nine essential amino acids, edamame contains higher concentrations than several commonly consumed legume vegetables, such as snap bean (Table 1). Edamame is also rich in dietary fiber and essential fatty acids, which support cardiovascular and metabolic health (Rosso et al. 2024). Moreover, it is a good source of vitamins and minerals, while being naturally low in sugar and fat, making it a suitable option for those focused on weight management and healthy eating.

Edamame is a particularly rich source of isoflavones, a class of phytoestrogens with well-documented antioxidant and estrogen-like properties. Among the predominant isoflavones present in edamame are genistein and daidzein, which have been associated with a range of health-promoting effects, including cardioprotective action, improved bone mineral density, and potential relief of menopausal symptoms due to their ability to modulate estrogen receptor activity (Kim 2021).

Presentation in Restaurants and Incorporation in Dishes

Edamame is traditionally offered as a side dish or appetizer (Figure 1) in US restaurants. The pods are steamed or boiled and lightly seasoned with salt or other spices according to consumer preferences (Garden-Robinson and Halsted 2022). Although the pods are served whole, only the beans inside are edible. This simple way of preparing edamame is ideal for customers who enjoy light vegetable-based options before or alongside their main course.

Over the past decade, Asian and non-Asian restaurants have also adopted more creative ways of preparing edamame by incorporating it into dishes such as edamame noodles (National Restaurant Association 2020), rice bowls, pastas, sautés, and salads (He and Chen 2013). In contrast to the traditional style of cooking edamame, these preparations often include seasonings and sauces that improve flavor and appeal to a wider audience.

Shelled edamame has become increasingly available, making it easier to consume as a topping or ingredient in sushi and mixed dishes. Additionally, the development of value-added products, including roasted beans and hummus served with chips or as snack dips, have further diversified edamame culinary applications (Garden-Robinson and Halsted 2022). These innovations enhance the versatility and consumer appeal of edamame in modern cuisine.

Figure 1. Edamame dishes served in typical home-cooked meals (left) and local restaurant buffets (right).
Credit: M. Gnaegy, Mix'd Greens, Inc. (left); and X. Li, UF/IFAS (right)

Market Availability of Edamame

Based on data from the United Soybean Board (2023), total soy food consumption derived from domestically produced soybeans in 2023 was estimated at about 5.8 million tons. Soybean oil for salad and cooking purposes represented the largest share, approximately 4.1 million tons. Other edible soy products, including edamame, tofu, soy milk, and soy protein products, collectively accounted for around 33,000 tons. According to Xu et al. (2016) and Nair et al. (2023), edamame has become a popular soy food in the US market, with an estimated annual consumption of 25,000 to 30,000 tons, while at least 70% of the edamame consumed is imported and primarily sold in frozen form in grocery stores (Figure 2). To meet growing demand for fresh, locally produced edamame, domestic production has expanded in several states, including Arkansas and Virginia (Nolen et al. 2016), where fresh edamame is available during the fall season and sold at farmers' markets and grocery stores. At farmers' markets, edamame is often sold in bunches with pods still attached to the stems, which many Asian consumers associate with freshness. In contrast, grocery stores typically sell edamame as loose pods/beans packaged for convenience.

Figure 2. Packaged frozen edamame displayed in local grocery stores.
Credit: X. Li and V. Lacerda, UF/IFAS

The expansion of crop production has also been supported by advances in postharvest infrastructure. Arkansas has become the first state to establish a facility to improve the quality of edamame processing (Winrock International 2020; Shore 2024). These advances are intended to reduce labor costs and help increase the efficiency and viability of supplying the local market with fresh edamame (Neill and Morgan 2021). In support of production, Virginia Tech and the University of Arkansas have been conducting studies to develop regionally adapted cultivars, focusing on the evaluation of their agronomic traits. Alongside production efforts, sensory attribute studies were carried out to investigate effective marketing strategies and consumer willingness to purchase edamame (Carneiro et al. 2022; Lord et al. 2024; Rosso et al., 2024).

In Florida, fresh edamame is currently unavailable at farmers' markets due to the lack of local production. However, the favorable subtropical climate offers an excellent opportunity for local growers to produce edamame across multiple seasons. Since 2024, field trials have been conducted at the UF/IFAS Tropical Research and Education Center (TREC) in Homestead, Florida, to evaluate commercially available edamame varieties and identify adapted varieties that perform well under local conditions (Figure 3). With Florida's extended growing season, growing edamame could help to reduce reliance on imported frozen products, increase the availability of fresh edamame to local markets, and support regional distribution to large metropolitan areas (e.g., New York and Chicago) where demand for fresh edamame among Asian American and health-conscious consumers continues to grow.

Figure 3. Edamame growing in an experimental trial in south Florida.
Credit: You's K. Myrtil, UF/IFAS

Conclusion

Edamame is a nutrient-rich, flavorful, and versatile vegetable that continues to gain popularity in the United States. Its high protein content and presence of isoflavones, beneficial micronutrients, and all essential amino acids make it an ideal choice for health-conscious consumers.

With increasing interest in sustainable and local food systems, edamame offers promising opportunities for small-scale and urban farmers in Florida. Expanding domestic production and marketing efforts can help meet growing demand while reducing reliance on imports, promoting both economic and consumer health benefits (USDA-ARS 2019).

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Table

Table 1. Nutritional comparison of unprepared frozen edamame and raw snap beans.

Nutrient	Amount (per 100 g)	
	Edamame	Snap bean
Water	75.2 g	90.3 g
Protein	11.2 g	1.8 g
Carbohydrate, by difference	7.6 g	7.0 g
Total lipid (fat)	4.7 g	0.2 g
Total dietary fiber	4.8 g	2.7 g
Total sugars	2.5 g	3.2 g
Starch	0.3 g	0.9 g
Calcium	60.0 mg	37.1 mg
Iron	2.1 mg	1.0 mg
Magnesium	61.0 mg	25.0 mg
Phosphorus	161.0 mg	38.0 mg
Potassium	482.2 mg	211.2 mg
Sodium	6.2 mg	6.1 mg
Zinc	1.3 mg	0.2 mg
Copper	0.3 mg	0.1 mg
Manganese	1.0 mg	0.2 mg
Vitamin C	9.7 mg	12.2 mg
Vitamin B1	0.2 mg	0.1 mg
Vitamin B2	0.3 mg	0.1 mg
Vitamin B3	0.9 mg	0.7 mg
Vitamin B5	0.5 mg	0.2 mg
Vitamin B6	0.1 mg	0.1 mg
Vitamin E	0.7 mg	*
Vitamin K	31.4 µg	43.0 µg
Total folate	303.0 µg	33.0 µg
Histidine	0.25 g	0.03 g
Isoleucine	0.3 g	0.1 g
Leucine	0.7 g	0.1 g
Lysine	0.7 g	0.1 g
Methionine	0.13 g	0.02 g
Phenylalanine	0.5 g	0.1 g
Threonine	0.3 g	0.1 g
Tryptophan	0.12 g	0.02 g
Valine	0.3 g	0.1 g

Data from USDA-ARS (2019a, 2019b). Data entered as an asterisk (*) is unavailable.

[1] This document is HS1521, one of a series of the Department of Horticultural Sciences, UF/IFAS Extension. Original publication date May 2026. Visit the Ask IFAS website at https://ask.ifas.ufl.edu/ for the currently supported version of this publication.

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