

Consumer Liking and Descriptive Analysis of Six Varieties of Organically Grown Edamame-Type Soybean

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Product quality, particularly that related to flavor, affects food purchasing decisions as real or perceived quality shortfalls shape consumer desire to eat fresh produce and food sensory attributes drive immediate and future consumption. The pleasure derived from consumption is an important motivator in eating. So, sub-optimal taste quality can interfere with the adoption of healthy diets.

Edamame is a popular food in Japan and increases in consumption of edible soybeans in the U.S. have been attributed to their health benefits and flavor. Relative to other soybeans, edamame-type soybeans have a clear hilum, relatively large size and unique sensory characteristics. Edamame is also sold in intact pods, which must lack external defects, be bright green in color, have no or translucent pubescence, and contain at least two beans. And, unlike most soybeans, which are grown agronomically, edamame-type soybeans are grown as horticultural crops.

Edamame consumption has been common in Asia for many years. Germplasm enhancement and variety development of edamame-type soybeans is relatively new in the U.S. and most varieties can be traced to origins in Asia. And, as with other vegetables, the influences of major production factors (e.g., cultivar, management system) on key sensory quality-related properties in edamame and the roles of these properties in shaping consumer liking and willingness to purchase edamame, particularly in the expanding U.S. market, are poorly understood.

Major crop management strategies differ in conventional and organic cropping systems. Contrasting management tactics may contribute to shifts in plant biochemistry, and, by association, panelists' sensory responses to crops. Therefore, it is important to note that previous work outlining edamame sensory quality has been conducted on samples grown conventionally. It is unclear whether similar results would be found in organically grown samples.

Earlier studies exploring the effects of edamame cultivar, harvest date, and interval between harvest and freezing have been conducted in Asia. Sweetness, taste, and overall desirability scores have been highest in seed groups containing green seed coats, while yellow soybeans score highest for chewiness. However, it is important to note that product acceptance scores may vary among ethnic groups. U.S. consumers appear to prefer edamame beans with buttery flavor and buttery texture while Japanese consumers prefer beans with a sweet, flowery flavor and crisp texture.

Flavor attributes, sensory characteristics and desirability scores also vary among U.S.-grown edamame varieties. For example, thirty lines and varieties were tested in

Pennsylvania for field performance and sensory attributes. Shared characteristics of the 16 top-rated varieties included bright green color, mild aroma, firm but tender texture, and sweet, nutty, and buttery flavor. In another test, sensory panelists had clear preferences for texture and overall appeal among three edamame varieties. However, no reports that compare the variety preference or flavor characteristics of organically grown edamame soybeans appear to be available.

Additional work is required to more fully explain and manipulate factors shaping edamame quality. Therefore, we employed consumer testing and descriptive analysis to: 1) identify which of six organically grown edamame varieties was most liked by consumers, and 2) further characterize the qualities that make particular varieties desirable to Ohio consumers. We hypothesize that improved cultural procedures, including variety selection, may facilitate increases in edamame consumption, as suggested previously for other crops.

In affective tests, 54 panelists rated pods and beans for appearance, and beans for aroma, taste, texture, aftertaste, and overall acceptability on a 9-point hedonic scale and willingness to buy on a 9-point category scale. The taste of ‘Sayamusume’ was liked significantly better than all varieties except ‘Kenko’ and ‘Sapporo Midori’. ‘Kenko’ was also rated higher than ‘Sapporo Midori’, ‘Misono Green’, and ‘Early Hakucho’ for pod appearance. The texture of ‘Misono Green’ was liked less than that of all other varieties except ‘White Lion’. In the descriptive analysis, 10 trained panelists rated the beaniness, sweetness, nuttiness, and chewiness of the same 6 varieties. ‘Kenko’ was rated significantly sweeter than all other varieties except ‘Sapporo Midori’. ‘White Lion’ was rated as significantly lower in chewiness than in all other varieties. Beaniness and nuttiness could not be consistently differentiated among varieties. The data suggest that consumer liking of bean taste varies, though subtly, among these six commercial edamame varieties and that preferences may differ between men and women. Results from descriptive analysis also suggest that panelists relied on texture (i.e., chewiness) and sweetness to differentiate edamame varieties. These results are particularly important in overall product quality management strategies as chewiness and sweetness may be influenced by production practices and harvest timing.

Publications Resulting From This Work

- Wszelaki, A.L., J.F. Delwiche, S.D. Walker, R.E. Liggett, and M.D. Kleinhenz. Consumer liking and descriptive analysis of six varieties of organically grown edamame-type soybean. *Food Quality and Preference*. *In press*.
- Wszelaki, A., J. Delwiche, S. Walker, R. Liggett, S. Miller and M. Kleinhenz. 2005. Sensory evaluation of six varieties of organically grown edamame-type soybean. Program and Abstracts, 2005 Annual Amer. Soc. Hort. Sci. Conference, 18-21 July, 2005, Las Vegas, NV. HortScience 40:1130.