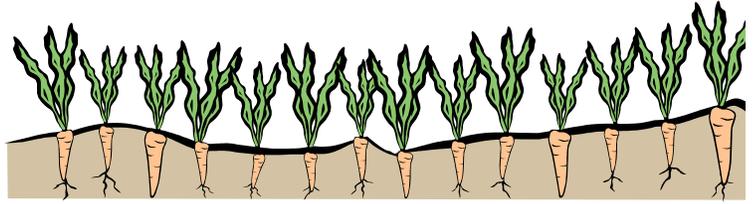


Taste is important!

Consumer Opinions about Alaska Food Products

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NOTE: This information on Alaska agricultural products was originally published in 1998 and 1999 as separate miscellaneous publications (MP-98-3, MP-98-4, MP-99-1, MP-99-2, MP-99-4, and MP-99-5). These Agricultural and Forestry Experiment Station publications are reformatted here as one document for web viewing. This publication is MP 2005-4.

We are often asked, “What food products can be produced in Alaska?” More often we hear, “How do Alaska food products taste, and do consumers want to buy them?” Scientists at the Agricultural and Forestry Experiment Station began answering that question since 1990, testing appearance, texture, flavor, and consumer acceptance of Alaska food products.

Although production of plants and domestication of animals were most important to the ancient world’s first farmers, flavor played a role in what was eaten. It was the search for spices that opened trade routes and resulted in discovery of continents.

The entire food supply chain includes more than just production. It extends to manufacturing, packaging, home processing, and serving. Early food choices were limited to local products. Developing processing technology and increasing globalization of communication and food distribution systems changed the profile of food choices. Taste and appearance became more important to increasingly better-informed and discerning consumers worldwide.

In Alaska food production began in the early 1800s. Russians in fur-trapping and trading colonies in the southcentral and southeastern regions were Alaska’s first farmers. Farming continued in the territory and state with assistance from the agricultural experiment stations, which celebrated 100 years of research in 1998. Food production was central to settlement and mining. A well-developed transportation system now allows Alaskans a wide variety of food choices and an equally well-developed communication system informs them about food products. Therefore, local products must not only be priced competitively, they must have a pleasing appearance and distinctive taste.

Sensory Testing

The Agricultural and Forestry Experiment Station does not have controlled-environment sensory laboratories, so when our producer and consumer clients wanted information about the taste and acceptability of Alaska products, we devised a scientifically valid procedure adequate to satisfy their requests.

There are a number of ways to determine appearance, taste, texture, and consumer acceptability of food products. We chose to use untrained panels and focus groups. The demographics of our panels closely match those of Alaska’s population. We do most of the chemical analyses necessary in our laboratories.

You can find our scientists in university classrooms; sensory panels are excellent tools to teach consumer-marketing principles. We also have conducted taste testing at fairs and community events in Fairbanks and the Anchorage area.

Alaska growers and producers supply the products we test. Recently we began testing vegetables from the Georgeson Botanical Garden, a part of the Agricultural and Forestry Experiment Station and the University of Alaska Fairbanks.

Our scientists prepare market research reports from information supplied by panelists. Students may also prepare market strategies and logos. Sensory panelists might describe a similar product to the one they are testing, or provide information on their shopping habits, views on organic products, the Alaska Grown program, and healthy eating habits.

Producers and processors can use the information we provide to promote special attributes of the products we test, confident in the knowledge that their claims are supported by scientifically valid research. Consumers can be assured that market claims are accurate when they purchase Alaska products we have tested.

**Prior to 2003, the School of Agriculture and Land Resources Management.*

A Taste of Honey—



Alaska's Flavorful Gold

A small segment of the growing honey market in the United States is for exotic, premium-priced, gourmet honeys. These honeys are produced from only one flower or blended from different flowers from a specific geographic region. Alaska producers have entered this growing market with exotics from fireweed, clover, and mixed wildflower.

Methods: We evaluated five honeys: Alaska wildflower, fireweed/clover, fireweed (harvested in 1990), Alaska synthetic honey (manufactured from fireweed, clover, and sugar), and one non-Alaska, mass-produced fireweed honey. Without knowing the price, panelists tasted the samples for acceptability. After being told the price, they were asked if they would buy the honey. Moisture content, viscosity, pH, and color similarity were measured to determine physical similarities of the honeys.

Results: Panelists preferred the Alaska wildflower, mass-produced fireweed, and Alaska fireweed-clover. After being told the price, they would purchase the lower-priced, mass-produced fireweed.

All honeys were similar in physical characteristics. The USDA sets 18.6% as the maximum moisture acceptable for honey. Only the Alaska synthetic was above the limit. With a moisture content of 19.4%, this honey appeared thin and watery. Alaska fireweed was the most viscous. All the honeys were in the acid end of the pH range (3.42–6.10). The honeys were lighter than the typical amber color found in grocery stores. Alaska wildflower and mass-produced fireweed were a light amber, while the Alaska fireweed was clear.

Panelists' answers to questions not specific to the honeys they tasted revealed that most thought honey sold in specialty shops was higher quality than honey sold in supermarkets. Those purchasing honey for gifts were less conscious of price and more conscious of the production location than those purchasing honey to eat.

Comments: Alaska honeys are marketed primarily through farmers' markets, gift and gourmet shops, and health food stores. The higher prices may not be a problem to shoppers in these outlets.

Alaska fireweed honey has characteristics desired by the baking industry that could provide an opportunity for Alaskans to sell bulk quantities. Overall, the honey industry in Alaska shows promise. The premium honey market has been entered and the bulk market is a possibility.

The author thanks Ruthann B. Swanson, former School of Agriculture and Land Resources Management (SALRM) faculty, and Kathy Birkliid, former SALRM research associate, for their assistance. This study was originally published in 1998 as MP-98-4.

How sweet it is!

Alaska carrots certainly are!

We often hear the comment "Alaska vegetables are sweeter than those from Outside." In 1992, we tested six carrot types, five from the Matanuska Valley and one from outside Alaska, to see if this was the case for Alaska carrots.

Methods: Two of our Alaska carrot varieties, Ingot and Nantes, were organically grown; three, Nantes, Pioneer Nantes, and Processor IV, chemically grown, as was the Emperor type from western Washington. Our panelists were asked to describe their ideal carrot before they tasted cut samples and commented on their appearance, texture, and flavor. We also asked if they would purchase the same carrots when they viewed them displayed loose and topped. The help of a laboratory was needed to perform Beta carotene (vitamin A) and sugar analyses.

Results: The panelists' ideal carrot had a uniform, reddish-orange color and was firm, crisp and juicy. Panelists agreed that the ideal carrot was more firm and crisp in texture, more juicy, and less chewy and woody than those sampled. The ideal was also sweeter and less bitter and oily. The Washington carrot was farthest from the ideal. Compared to the ideal, the Alaska carrots were moderately acceptable.

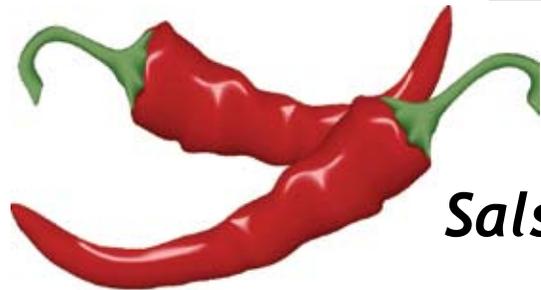
The organically grown Ingot and Nantes were most likely to be purchased by our panelists. The Washington Emperor type followed these varieties in preference. Least likely to be purchased was Processor IV.

Beta carotene content was similar for all the carrots. Carotene is highly variable in carrots, reflected by their variability in color. The Alaska carrots had a higher total sugar content (5 to 6 percent) than the Washington carrot (2.5 percent).



Comments: The important information for carrot producers is what characteristics sell carrots. Shape, size, and color are indicators of flavor. The Processor IV had a large, tapering diameter, hard to bite and cut. The slender tips of the Emperors and chemically grown Nantes break when they are peeled or scraped. The slender, uniform size, blunt-tipped organically grown varieties were most appealing to our panelists. These panelists favored a reddish-orange color. Carrot producers and marketers can use the information that Alaska carrots were significantly sweeter than the Washington carrot in our taste test. It is the 'hidden' attribute of the Alaska carrot. The Alaska carrot's sweetness and appealing shape of the Nantes and Ingot organics appeared to be an attractive combination of attributes for our panelists. Since their demographic profile was similar to that of the overall Alaska consumer, producers should be confident using the information we have provided in our taste test.

The author thanks the School of Agriculture and Land Resources Management (SALRM) for support for classroom sensory work and Ruthann B. Swanson, formerly SALRM faculty, and Kathy Birklid, formerly research associate, SALRM, for their assistance. This study was originally published in 1998 as MP-98-3.



ALASKA HEAT

Salsa can be a hot Alaska product!

HOT, the taste that pleases by irritating. Might salsa be an important value-added product for Alaska? Mexican sauces, including salsa, outsell ketchup in the U.S. Used as condiments with a wide variety of foods, their heat intensities range from extra mild to very hot. The "heat" flavor sensation at the very hot end of the scale is created by the chemical compound capsaicin in red peppers. At the less intense end, strong tomato, onion, and pepper flavors dominate.

Methods: There are regional differences in salsas and preference for salsas. We chose to compare Alaska opinions with those made in a midcentral state, Tennessee. Salsas prepared in Alaska and Tennessee were used at both locations. The Tennessee salsa was available in the marketplace, the Alaska salsa was not. The salsas' fresh base ingredients were tomatoes, onions, green peppers, celery, cilantro, garlic, chiles, and jalapenos. All can be produced in Alaska. Participants described the appearance, texture and flavor of their ideal salsa, then completed a questionnaire asking how geographic descriptions on the label affected their salsa choices and what ingredients they preferred in salsa. They also participated in a sensory comparison of the Alaska and Tennessee salsas.

Results: The participants in our Alaska and Tennessee panels were from households that consumed salsa. Over half consumed salsa at least several times per month. Although 86% of the panelists in Alaska and 70% in Tennessee were primary food purchasers, most never purchased salsa. Apparently salsa was eaten away from home or bought by someone other than the primary food purchaser. Canned was preferred over refrigerated.

The Ideal Salsa: There were few differences found in the ideal salsa. All wanted a salsa that appeared very chunky, red, and moderately juicy. They did not want a smooth texture. Panelists' ideal was thick, chunky, and juicy. The flavor had to be fresh and spicy. The attributes hot and tomato-like were preferred. These participants were neutral when asked if their ideal was sweet or acidic. Alaskans preferred more heat in their salsas than did Tennessee participants. Overall, the ideal salsa was in the medium to hot range.

Questionnaire Responses: Consumers use geographic origin to differentiate products. Labels specifying geographic origin are increasingly used on fresh and processed foods. More than half of our panelists thought those products originating from California, Washington, and Alaska were high quality. Approximately 30% read labels to determine product origin. They agreed a geographic label was most useful on fresh products (88%), chilled products (84%), and canned or frozen products (67%), and that specifying geographic location is advantageous in marketing.

The author thanks the School of Agriculture and Land Resources Management (SALRM) for support for classroom sensory work, Ruthann B. Swanson, formerly SALRM faculty, Cathy Birklid, formerly research associate, SALRM, and Joshua Greenberg, Associate Professor of Resource Economics, SALRM for their assistance. This study was originally published in 1999 as MP-99-1.

Alaska Tomatoes

Tempting, Tantalizing Tundra Treats



In the early sixteenth century, the tomato was known by Italians as pomi d'oro (golden apple) and by the French as pomi d'amour (love apple). First mention of tomato cultivation in the U.S. was by Thomas Jefferson in 1781. It wasn't until the mid 1800s that the tomato gained the popularity that makes it almost indispensable today. With the exception of tomatoes produced at home, Alaskans could not enjoy fresh tomatoes until the mid 1900s. Today producers and wholesalers ship most fresh tomatoes into the state from all over the world. However, Alaska's tomato producers are increasingly supplying more of the demand for fresh, high quality tomatoes from greenhouses from Fairbanks to Anchorage to Kenai.

We often hear "there is nothing like the smell and taste of a 'fresh from the vine' ripe tomato." We wanted to know how Alaska tomatoes compared to the 'vine-fresh ideal' in appearance, texture, and flavor. We also wanted to know if consumers were influenced by the Alaska Grown logo.

Methods: We compared tomatoes produced in an Alaska greenhouse to imported greenhouse tomatoes with a producer label and generic greenhouse tomatoes. Sensory panelists first described their ideal tomato and answered a questionnaire asking what tomato characteristics were most important and if brand name, packaging, and producing area were important. They then participated in a blind taste test. Chemical analyses were completed for sugar and acids for the three types of tomatoes. Finally, panelists were asked to indicate their willingness to buy the tomatoes.

Results: The panelists' ideal tomato was uniform in color, red, firm and juicy, and sweet with some tartness. Some pulpiness or seediness was acceptable, but the tomato could not be mushy, dry, or have a tough skin. In their questionnaire responses, 95% of the participants indicated that taste, firmness, and color were most important as were flavor and freshness. Only 60% considered size and shape an important attribute. Brand name (83%) and packaging (62%) were not important and only 12% considered producing area important when they made their tomato purchasing decisions. These participants wanted to purchase their sensory vision of the 'vine-fresh ideal' tomato and apparently had no regard for where it was produced, how it was packaged, or its size and shape.

The taste test revealed that the Alaska tomato came closest to the ideal in appearance, texture and flavor. The panelists agreed the appearance of both imported tomatoes was less uniform in color, less red, duller, and not as smooth skinned as their ideal while the Alaska tomato exceeded the ideal in these appearance characteristics. The texture of all the tomatoes was not as firm as the panelists preferred. The Alaska tomato had the ideal juiciness. The flavor of the Alaska tomato came closest to these panelists' ideal. However, all of the tomatoes were less sweet and tart than desired and more bitter, greasy, and oily.

Sugars, acids, and their interactions are important to sweetness, sourness, and overall tomato flavor intensity. High acids and low sugars produce a tart tomato while low acids and high sugars produce a bland product. If both are low, the tomato is flavorless and flat in taste. Panelists' opinions reflected the chemical analyses results. All our tomatoes had higher sugar ratios and lower acid ratios than typically found in red tomatoes. Thus they tended to be bland but sweet and not tart. The overall acidity of the Alaska tomato was highest. This may have contributed to the panelists' opinions that it was closest to the ideal.

Panelists' opinions about appearance of the tomatoes in our study were almost the same when they were asked about their willingness to purchase the tomatoes as they were when they rated appearance in the blind taste test. Both the tomatoes with the Alaska Grown label and the Alaska producer's label were considered redder than the ideal; all others were considered about the same redness. The imported labeled and generic tomatoes did not have the smooth skinned appearance these panelists liked. Judgment of appearance was reflected in the likelihood of these panelists to purchase the tomatoes. They were most likely to purchase either of the Alaska tomatoes. There was no apparent effect of labeling on their purchasing decisions.

Comments: The demographic profile of the panelists indicated they were representative of Alaska consumers. The Alaska consumer has a very definite opinion of their ideal tomato. It must be uniform in color and red, sweet yet somewhat tart, and juicy and firm textured. Brand name, logos, packaging, origin of the tomato, and size and shape will not influence them in their quest for the ideal.

The author thanks the School of Agriculture and Land Resources Management (SALRM) for support for classroom sensory work, Rob Leach, M.S., Natural Resources Management, and Joshua Greenberg, Associate Professor of Resource Economics, for their assistance. The author also thanks the owners of Happy Creek Greenhouse who graciously allowed us to use their tomatoes in this 1994 taste test. This study was originally published in 1999 as MP-99-2.

Alaska Grown Russet Potatoes:

Alaska consumers say “Thumbs up!”



Co-authors with Carol E. Lewis: Patricia Holloway, Associate Professor of Horticulture; Sharon Tavernier, Senior Thesis Researcher, B.S., Natural Resources Management

Shelikov recorded potato production by Russian settlers in Alaska in 1784. Potato variety trials have taken place at all agricultural experiment stations beginning in 1898 at the first experiment station in Sitka. The State of Alaska Division of Agriculture carries out potato variety testing at its Plant Materials Center near Palmer. The USDA Agricultural Research Service began a potato-breeding program in 1950 that ended in 1981 with the retirement of the lead scientist. The share of Alaska potatoes in the value of Alaska’s farm products is increasing. At statehood (1960), potatoes comprised 16% (\$560,000) of the total \$3.5 million in farm product value. Quality of Alaska potatoes has been improving as has the share of farm product value. It peaked at 23% in 1992 and was 20% of the total \$29.3 million (\$5.9 million) in 1996.

Alaska vegetables have a higher sugar content than those produced in more temperate regions. Sugar

content appears to be affected by storage temperatures and time in storage as well as cultivar. Alaska consumers have reacted negatively to the unattractive brown color typical when oils are used in preparation of potatoes at high cooking temperatures. This color results from the reaction between amine groups of free amino acids and reducing sugars. Baking, microwaving, or boiling does not appear to discolor the potatoes and the high sugar content may be a marketing attribute for those potatoes suited to these preparation techniques. Alaska consumers appear to want a potato that is produced in Alaska and has excellent baking or microwaving qualities. Russet varieties are known for these attributes and Alaska produced russets are increasingly being found in farmers’ markets and supermarkets and in the industrial and military markets of Alaska. We wanted to know consumers’ opinions when a russet variety was baked or microwaved after storage at different temperatures and for different lengths of time.

Panel Ratings of Attributes of Norkotah Russets

Skin Appearance

The skins were brown and uniform. They became significantly more feathered and greener at higher temperatures as storage times increased. The skins were not yellow, gray, or mottled.

Skin Texture

At lower temperatures, the skins became tougher. They were crunchier as storage times increased. The skins were not soggy at any storage temperature or length of time in storage.

Flesh Appearance

The flesh was yellowest (but not objectionably) at 35°F but became whiter (less yellow) as storage time increased. Flesh was whitest at 50°F for all storage times. It never appeared gray, green, or orange and was uniform at all temperatures and storage times.

Flesh Texture

The flesh was moistest at 70° and 50°F for all storage times. Moisture decreased at 35°F as storage time increased. The flesh became significantly less creamy at 70°F as storage time increased. It was creamiest at 35°F and significantly so between 35° and 50°F. The texture was never soggy, doughy, chewy, or oily.

Flavor

The flavor was sweet and buttery. Sweetness decreased as storage temperature increased. The potatoes were slightly buttery when stored at 35°F. None of the differences were significant for any temperature or storage time.

Methods: We received 550 lbs. of Russet Norkotah potatoes in 1997 from Schoen Farms that had been planted in mid-May and harvested in early September. They were stored at 65°F for four weeks, then 38°F for two weeks before delivery in mid-October. The Norkotahs were placed in three storage locations at the Fairbanks Agricultural Experiment Farm where the temperatures were 35°, 50°, and 70°F. They were distributed for testing after one week in storage. Thirty families were selected randomly from volunteers and divided into three groups. Each group was given potatoes from the same temperature treatment each week for eight weeks. They were instructed to bake or microwave the potatoes, taste them with no toppings, then complete a survey every week. The families evaluated the potatoes’ flavor, appearance, and texture, and told us if they liked the potatoes and would buy them. Chemical and mechanical tests were performed on all potatoes to determine percent moisture, specific gravity and sugar content at the end of each week in storage at each of the three temperatures.

Results: Our panelists agreed that the Norkotah Russets had brown, uniform skins and white to yellow colored flesh that was moist and

creamy. They liked and would buy the potatoes no matter what the storage temperature or length of time in storage. Laboratory tests indicated the Norkotahs became sweeter at lower temperatures and their density increased. There were no trends in percent moisture. None of the differences were significant for all temperatures and all weeks.

This information is part of a senior thesis report completed by Sharon Tavernier as a part of the requirements for her B.S. in Natural Resources Management that she received in 1998. She thanks her committee as well as Grant Matheke (GBG), Kristi Long (Alaska Cooperative Extension), and her husband, Ron Tarvernier, for his never-ending support. Both authors express their appreciation to all the volunteers who worked with us for two months to complete the consumer study. This study was originally published in 1999 as MS-99-4.

Alaska Spinach

a savory, succulent salad selection

Co-authors with Carol E. Lewis: Pat Holloway, Associate Professor of Horticulture, and Grant Matheke, Horticulturist

Spinach salad is a new, exciting choice for the table! There is an increasing use of a variety of greens in salads by U.S. consumers, spinach among them. The fresh quality demanded by Alaska consumers could be met by Alaska producers from June through August if a spinach cultivar that did not bolt early in the season could be identified. For the past 30 years, horticulturists at the Fairbanks Experiment Farm, now a part of the Agricultural and Forestry Experiment Station, University of Alaska Fairbanks, have tested spinach cultivars looking for a cultivar that will not bolt early in the growing season.

Methods: Denali Seed Company, Anchorage, Alaska, provided five spinach cultivars from their 1997 seed stock to the Georgeson Botanical Garden, University of Alaska Fairbanks, for testing in 1998. They were compared to Melody, the recommended cultivar for Fairbanks. All cultivars were direct seeded May 27, 1998. The objective was to test the cultivars during the 1998 growing season to determine the length of time between seeding and bolting. While it is advantageous to have a cultivar of spinach that does not bolt early in the growing season, it is also important that the cultivar is acceptable to the consumer. An untrained sensory panel evaluated appearance, texture when tasted, and flavor of the six spinach cultivars. They were also asked to indicate if they would purchase the cultivars.

Results: Tye emerged on May 31, followed by Melody, Teton, Medania, and Grodane on June 1 and Hybrid 457 on June 2. Hybrid 457 had spotty germination but all the other cultivars grew well. Tye began to bolt on June 27 followed by the remaining cultivars on June 29. All spinach was harvested on June 30.

Bolting did not provide a decision point for acceptance or rejection of the five varieties provided by Denali Seed Company. All bolted in approximately the same number of days. One cultivar that might have been rejected prior to the taste test was Hybrid 457. Germination for this cultivar was spotty.

The sensory panel provided the definitive consumer input for recommendations concerning the five cultivars. The recommended cultivar Melody was most preferred for its attractive appearance and its flavor. Our panelists liked the dark to bright green color of Melody. The cultivar was judged to have relatively balanced bitter and sweet flavor characteristics and was only somewhat grassy; a mild spinach with the least tendency for leaving an aftertaste. It was also the cultivar these panelists were most likely to purchase. When the panelists tasted the spinaches, they were indecisive about the texture of Melody and Tye. A higher percentage preferred the texture of Tye while the weighted average of their responses showed a slight preference for Melody. Melody appeared juicy and moist to these panelists, somewhat tender, with a tendency toward crispness.

Melody remains the recommended spinach cultivar for Fairbanks.

The authors thank Reg Yapple, owner of the Denali Seed Company, Anchorage, Alaska, for supplying the five spinach cultivars for the study. This study was originally published in 1999 as MP-99-5.

NOTE: Two other products tested for this series that are no longer produced were barley trailcake mix (MP-99-3) and hot dogs (MP-99-6). For more detailed information about any of the products we have tested please contact:

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Alaska's Agricultural and Forestry Experiment Station

The federal Hatch Act of 1887 authorized establishment of agricultural experiment stations in the United States and its territories to provide science-based research information to farmers. There are agricultural experiment stations in each of the 50 states, Puerto Rico, and Guam. All are part of the land-grant college system. The Morrill Act established the land-grant colleges in 1862. While the experiment stations perform agricultural research, the land-grant colleges provide education in the science and economics of agriculture. The first experiment station in Alaska was established in Sitka in 1898. Subsequent stations were opened at Kodiak, Kenai, Rampart, Copper Center, Fairbanks, and Matanuska. The latter two remain. None were originally part of the Alaska land-grant college system. The Alaska Agricultural College and School of Mines was established by the Morrill Act in 1922. It became the University of Alaska in 1935. The Fairbanks and Matanuska stations now form the Agricultural and Forestry Experiment Station of the University of Alaska Fairbanks, which also includes the Palmer Research Center. Early experiment station researchers developed adapted cultivars of grains, grasses, potatoes, and berries and introduced many plant cultivars appropriate to Alaska. Animal and poultry management was also important. This work continues, as does research in soils and revegetation, forest ecology and management, and rural and economic development. Change has been constant as the Agricultural and Forestry Experiment Station (AFES), as it continues to bring state-of-the-art research information to its clientele. AFES is administered by the School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks. The school offers degree programs in forest sciences, geography, and plant, animal, and soil sciences, as well as natural resource management.

Visit us on the web! University of Alaska School of Natural Resources and Agricultural Sciences and the Agricultural and Forestry Experiment Station: www.uaf.edu/snras

The Alaska Grown Program

The colorful and easy to identify *Alaska Grown* logo was first used in 1986. It is frequently seen in advertisements, retail markets, food shows, and farmers' markets around the state. It's a part of the *Alaska Grown* program that promotes high quality Alaska products. The program has two objectives: substitute locally produced for imported products, and establish criteria to identify quality characteristics of Alaska products.



Point-of-purchase posters and stickers help identify products that qualify for the *Alaska Grown* program. Specific quality characteristics of fresh and processed products produced in the state must be met. Quality attributes of fresh produce, for example, include appearance, condition, and other factors that influence eating quality.

The program works. Consumers are increasingly seeking products with the *Alaska Grown* logo. Each year more producers qualify to participate. Farmers gain the market visibility of the *Alaska Grown* logo. Consumers have the assurance that they are purchasing a high quality product, much as they would with an established brand name.

Positive consumer and producer response to the *Alaska Grown* program indicates the potential for an ongoing cooperative strategy, especially one that addresses consumer concerns and provides farmers with an opportunity for market entry.

Look for 'Alaska Grown' when you shop!



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