Sensory Evaluations of Advanced Specialty Potato Selections

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Abstract

Sensory evaluations were performed on an array of specialty potato selections as part of a field day held on October 18, 2006 at the Powell Butte location of Central Oregon Agricultural Research Center. Specialty potatoes of various colors and shapes were baked, fried as wedges or included in salads, and evaluated for taste, texture, smell, and overall visual impression. Evaluators preferred the visual appeal of fried wedges made from POR01PG45-5, but found wedges prepared from POR01PG22-1 and OR00068-11 less appealing. A clear separation in visual impression was observed among the three potato salad preparations. The salad made with selection POR02PG37-2 was rated highest in visual appeal followed by POR01PG20-12 and POR01PG16-1. No significant differences (P = 5 percent) were observed among the selections in taste, texture, or smell for any of the preparation methods.

Introduction

Specialty potatoes are increasing in popularity. In the United States, traditional potatoes include round white-fleshed potatoes that are chipped, boiled, or baked and white-fleshed russet types that are baked or processed into French fries. Red-skinned, white-fleshed varieties have also been popular. Specialty potatoes encompass a variety of skin colors, flesh colors, and tuber shapes. Skin colors include red, yellow, orange, blue, and combinations of those colors. Flesh colors include various hues of yellow, red, and purple that are sometimes arranged in eye-catching patterns. Tuber shapes of specialty potatoes can be long, oblong, or round but can also include "peanut" shapes, "banana" shapes, fingerlings, or other variations. Specialty potatoes are ideally suited for organic and nontraditional markets.

Specialty potatoes may have enhanced human health benefits due to higher levels of antioxidants than traditional white-fleshed potatoes. Elevated levels of carotenoids have been observed in yellow- and orange-fleshed selections, while increased anthocyanin levels have been noted in red- and purple-fleshed selections (Brown 2006). Producing specialty potatoes with potential human health benefits under organic systems has generated significant interest. Therefore, the TriState (Oregon, Washington, Idaho) Potato Variety Development Program began making genetic crosses and evaluating the subsequent progeny in recent years. A number of the selections are now nearing commercial release.

Many experiments have been conducted to evaluate the yield, storability, and pest resistance of specialty selections nearing release. Sensory evaluations have been lacking, so this study was designed to quantify culinary qualities for an array of specialty selections with varied skin and flesh colors.

Materials and Methods

On October 18, 2006, a field day was held at the Powell Butte location of Central Oregon Agricultural Research Center. An invitation was extended to the general public via a local newspaper that highlighted this event with photos and text as the featured event of the field day in central Oregon. Seventy people responded to the invitation. The program featured two presentations that discussed the development and testing of specialty potatoes and also the health benefits of specialty potatoes. A meal followed that included barbequed hamburgers and specialty potatoes presented in three ways: baked, fried wedges, or included in a salad. Samples were presented by selection and labeled by name (Fig. 1). They were grouped by preparation method. 'Shepody', a white-skinned, white-fleshed variety, was included with the fried wedge samples as a reference. Table 1 provides a description for each selection included in the evaluations.

Figure 1. Presentation of specialty potato samples.

The salads were identical in make-up except for the potato ingredient. Some of the purple color leached from the potatoes and caused the egg yolks to turn green in the salad prepared with purple-fleshed selection POR01PG16-1. Baked samples were washed and baked for 1 hour at 350°F and presented as whole potatoes sliced in half. Samples to be fried were cut into longitudinally cut wedges. The number of wedges per tuber varied with the size of the tubers. Wedges were fried for approximately 7 minutes at 375°F in commercial soybean frying oil.

Evaluation forms were distributed and explained prior to presentation of the prepared samples. Participants were asked to rate the samples for taste, texture, smell, and visual impression on a one to five scale: 1 = horrible, 2 = poor, 3 = OK, 4 = good, and 5 = excellent. They were coached on possible considerations for each trait as follows:

Taste: pleasant, bitter, off flavors, after-taste, etc.
Texture: fluffy, moist, waxy, grainy, etc.
Smell: pleasing, burnt, buttery, etc.
Visual Impression: the eye appeal of the sample.

Samples were presented as part of a buffet-style meal. Participants were allowed to select any or all of the potato samples they desired. Most participants rated from three to eight preparations. Overall averages were calculated from the responses after the evaluation forms were received. Responses were analyzed using an analysis of variance with uneven sample sizes.

Table 1. Tuber characteristics for the potato selections featured in the sensory study, Powell Butte, Central Oregon Agricultural Research Center.

Selection	Skin color	Flesh color	Shape
OR00068-11	Dark purple	Mottled purple with light vascular	Round
OR00068-29	Dark purple	Mottled purple	Long
POR01PG16-1	Dark purple	Dark purple	Fingerling
POR01PG45-5	Lavender	Light yellow	Round
POR01PG20-12	Dark red	Mottled red	Oblong
POR01PG22-1	Dark red	Mottled red	Fingerling
POR02PG2-4	Dark red	Red with a white star	Round
POR02PG4-2	Yellow with red splashes	Deep yellow	Round
POR02PG37-2	Yellow with red eyes	Yellow	Round
Shepody	White	White	Oblong

Results and Discussion

Sensory evaluation results are presented in Tables 2–4. Overall, ratings were very positive for all sensory categories and specialty potato selections. No significant differences (P = 5 percent) were observed among the selections in taste, texture, or smell for any of the preparation methods. No differences were observed among the sensory traits when the selections were prepared as baked products. Baking tends to reduce the impact of skin colors, resulting in more uniform brownish-colored products. Shepody is a variety that is known for excellent taste, regardless of preparation method. It received the highest rating for taste among fried wedges, the only test in which it was included.

Evaluators noted differences in visual impressions among the specialty selections in the fried wedge and potato salad preparations. They preferred wedges had the look of traditional "jo-jo" potatoes. POR01PG45-5 has a lavender skin, but when fried loses the purple coloration in favor of a light brown skin. The least appealing fried wedge selection was OR00068-11, with purple skin and flesh. The red-skinned, red-fleshed fingerling POR01PG22-1

Figure 2. Samples of fried potato wedges.

had a more favorable visual impression than the purple selection, but was less appealing than the more traditional-looking selections POR01PG45-5 and Shepody.

Figure 3. Potato salad featuring POR01PG20-12.

A clear separation in visual impression was observed among the three potato salad preparations. The potato salad made with the specialty selection POR02PG37-2 received the highest ratings for any trait or selection. This selection is similar to 'Yukon Gold' in both external and internal appearance. Yukon Gold was not included in any of the evaluations, however. The red-skinned, red-fleshed selection POR01PG20-12 scored second in visual impression while the purple-skinned, purple-fleshed selection POR01PG16-1 was rated last in visual impression.

Table 2. Sensory evaluations for four specialty potato selections prepared as fry wedges.

Selection	Taste	Texture	Smell	Visual impression	Overall average
POR01PG22-1	3.92	3.92	3.77	3.85	3.82
POR01PG45-5	3.42	3.83	4.00	4.29	3.90
OR00068-11	3.82	3.95	3.62	3.39	3.67
Shepody	4.10	3.60	3.71	4.10	3.81
LSD (5 %)	NS	NS	NS	0.39	NS
No. observations	7 to 26	6 to 25	5 to 22	7 to 26	

Table 3. Sensory evaluations for three specialty selections prepared as baked potatoes.

Selection	Taste	Texture	Smell	Visual impression	Overall average
OR00068-29	3.91	4.13	3.73	4.35	4.11
POR02PG2-4	3.83	4.28	3.79	4.06	4.06
POR02PG4-2	4.12	4.25	3.86	4.46	4.24
LSD (5 %)	NS	NS	NS	NS	NS
No. observations	18 to 32	18 to 32	14 to 26	18 to 31	

Table 4. Sensory evaluations for three specialty potato selections prepared in potato salads.

Selection	Taste	Texture	Smell	Visual impression	Overall average
POR01PG16-1	4.06	4.26	3.80	3.83	4.04
POR01PG20-12	4.37	4.44	4.03	4.09	4.22
POR02PG37-2	4.33	4.23	3.90	4.47	4.28
LSD (5 %)	NS	NS	NS	0.26	NS
No. observations	35 to 36	34 to 35	29 to 30	35 to 36	

References

Brown, C.R. 2006. Anthocyanin and carotenoid contents in potato: Breeding for the specialty market. Proceedings of the Idaho Winter Commodity Schools 39:157-163.