

COOKING QUALITY OF OREGON-GROWN RUSSET
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The potato is a basic food in American meal service. Its distinctive but unobtrusive flavor, its pleasant texture and its adaptability to different methods of preparation as well as its year-'round availability contribute to its continued popularity.

Recent studies of potato purchases by homemakers (3) lead to the conclusion that homemakers usually prefer medium-size potatoes, although for special occasions they want small or large potatoes. They prefer potatoes that will be suitable for several methods of preparation. Here again, if assured that potatoes are especially good for baking or especially good for salad, they will buy for these particular uses (2).

In practice, potatoes that are suitable for most ordinary cooking purposes are probably the ones that meet the needs of the majority of homemakers most of the time.

This study was conducted to obtain information concerning the cooking quality of Oregon-grown Russet potatoes, to develop methods for study of cooking quality, and to determine profitable lines for future investigation.

The total value of Oregon's crop of potatoes in 1954 was \$17,292,000.00. The Russet variety constitutes about three-fourths of all potatoes produced in Oregon. Since this variety stores well, the cooking quality after storage, as well as at the time of harvest, is important.

PROCEDURE

Material: Potatoes of any given variety display many natural variations such as differences in size, skin thickness, percentage of dry matter and others. All such factors may affect the quality of the cooked potato. In selecting potatoes for study, size and specific gravity were controlled within certain limits.

Since the area where a crop is grown affects its yield and quality, potatoes were obtained from two important growing areas, one lot from the Southern and a second lot from the Central Oregon area. Medium size and large potatoes were procured from each area. All were selected from representative fields of commercially grown potatoes in which good practices for commercial production had been followed. Coverage of Oregon-grown potatoes was further insured by selection of potatoes varying widely in specific gravity. Those falling in the range 1.08 to 1.11 were picked for study.

Storage: All potatoes were shipped to Central Oregon to be held under the same commercial storage conditions. A continuous record of humidity and temperature was kept. The temperature throughout most of the storage period ranged between 30° and 36° F. At one time, the temperature dropped to 28° F. Humidity ranged from 84 to 88 per cent.

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Potatoes representative of each size and each growing area were brought to the laboratory for cooking tests soon after harvest and after 2, 4 and 6 months of storage. After sorting into cooking lots, half were stored for two weeks at approximately 40° F. while the remainder were stored at room temperature, approximately 75° F.

Matching Potatoes for Cooking Tests: Three potatoes which matched as to shape and size constituted one cooking sample. The width and thickness of potatoes in each cooking lot were within $\frac{1}{4}$ inch of each other.

Cooking Methods: Potatoes were cooked by five methods: baking at 350° F.; baking at 450° F.; boiling, peeled; steaming, peeled; and mashing.

In preliminary trials, interior temperature as registered by a thermometer or thermocouple was used as a guide to "doneness". However, for boiled and steamed potatoes these trials failed to establish an exact temperature at which all potatoes were uniformly cooked. The final criterion for doneness was softness of the potatoes when pierced with a fork, which was a subjective evaluation. Baked potatoes were judged to be "done" when the interior temperature reached 212° F.

For all methods of preparation the potatoes were washed and dried. For baking, the prepared potatoes were placed on racks in pans, and the pans centered in pre-heated ovens. A thermometer was inserted in one potato of each cooking lot.

For boiling, steaming and mashing, tubers were pared and cooked whole. Each lot of three potatoes was placed in a separate kettle. For boiling and mashing, sufficient hot water was used to cover the potatoes; for steaming, the potatoes were supported on racks above the water level. All pots were covered during cooking.

For mashing, the boiled potatoes were drained, then mashed by beating with an electric mixer. The potatoes varied in regard to the amount of mixing needed to break them up. For this reason, no exact time can be recommended for mashing potatoes by this method, though a minute or two of mixing was sufficient.

Judging: Quarters or halves of steamed, boiled and baked potatoes were distributed to the judges, and a scoop of mashed potatoes was served. All potatoes were judged while hot for texture, moistness and flavor. In addition, mashed potatoes were scored for smoothness and the skins of baked potatoes were judged for skin tenderness. The scoring range was "1" to "4", with "4" indicating very mealy, very dry, very desirable flavor, very smooth or very tender, respectively. In contrast, a score of "1" indicated least amount of the characteristic under consideration. The judging panel was composed of five persons, each experienced in food scoring.

Color and Sloughing: Steamed and boiled potatoes were judged directly after cooking for the degree of sloughing or breaking. Sloughing was evaluated by means of reference pictures taken especially for this study, as shown in figure 1, with minimum sloughing receiving a score of "6".

One potato of each cooked lot was cut across its diameter and the color of the cut surface was compared with color standards. The color of mashed potatoes was noted after mashing. Color was evaluated by means of color charts made especially for this purpose. A variety of potato colors was selected and swatches of color painted to match. The swatches were mounted on black paper and each assigned a number corresponding to desirability or undesirability of the color. The number ranged from "1" for

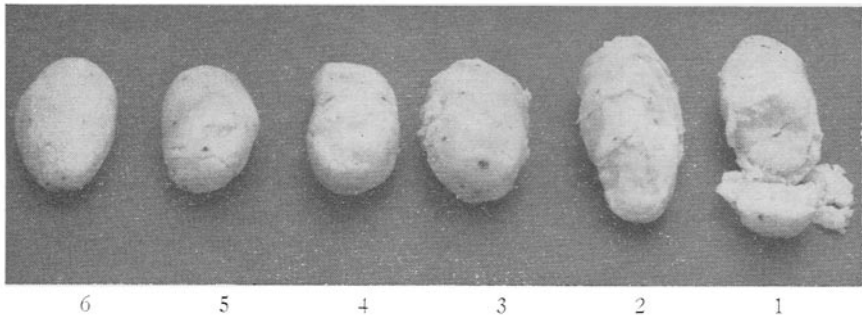


FIGURE 1.—Reference standard for scoring sloughing of boiled and steamed potatoes.

poor color to "6" for excellent color. In general the lighter, brighter colors were considered most desirable; whereas gray, green or intense yellow colors were least desirable.

Mealiness as Judged from Appearance of Dried Slices: During part of the study, an additional test for mealiness was carried out as described by Freeman (1).

As soon as the potatoes were cooked, a thin center slice was taken from one potato of each cooked lot. The slices were air dried at approximately 35° C. in the breeze from an electric fan. They were then evaluated for mealiness on the basis of the proportion of white porous material to vitreous, transparent material. When the whole slice was vitreous it received a score of "1", indicating extreme waxiness. When the slice was white and porous-looking it received a score of "4" indicating a high degree of mealiness.

In all, the following tests were made: 1 variety of certain specific gravity range x 2 growing areas x 2 sizes x 4 storage periods x 2 storage temperatures x 5 cooking methods x 4 replications equivalent to 640 tests.

Statistics: The order of preparation was planned in advance using randomized arrangement of all variables in each day's test. That is, on each day that potatoes were cooked and judged, samples were included to represent both sizes from each growing area, and storage temperatures of 40° and 75° F. The analysis of variance was used to determine the significance of the various factors on characteristics of cooked potatoes.

RESULTS

Average scores were in the neighborhood of 2.5 for boiling, steaming, and baking at 450° F. Scores for mashed potatoes as well as for potatoes baked at 350° F. were higher. The average scores of the various cooking methods were: boiling 2.46; steaming, 2.61; mashing, 2.72; baking at 350° F., 2.74; and baking at 450° F., 2.51. Scores for all characteristics at all storage periods are given in tables 1 through 7. In the following paragraphs, the differences discussed are those found significant at the 1 per cent level by means of the analysis of variance.

Estimate of Mealiness from Appearance of Dried Slices: There was close agreement between the two tests for mealiness, as revealed in table 8.

TABLE 1.—Average Scores for Potato Texture
Each Figure Is the Average of 20 Scores (5 Judges x 4 Replications)

Area	Size	Two-wk. Holding Temp., ° F.	Storage Period Months	Method					Total	Average	
				Boil	Steam	Mash	Bake 350°	Bake 450°			
A	Large	75°	0	2.9	2.3	2.5	2.1	1.9	11.7	2.34	
			2	1.8	2.6	3.0	2.2	2.0	11.6	2.32	
			4	1.8	2.0	2.6	2.1	2.5	11.0	2.20	
			6	2.6	2.7	2.2	3.1	3.0	13.6	2.72	
				Total	9.1	9.6	10.3	9.5	9.4		2.40
				Average	2.28	2.40	2.58	2.38	2.35		
	Medium	75°	0	3.1	2.7	2.4	2.2	1.9	12.3	2.46	
			2	1.8	2.2	2.8	2.3	2.0	11.1	2.22	
			4	1.9	1.8	3.3	2.5	2.5	12.0	2.40	
			6	1.5	1.4	2.1	1.8	1.7	8.5	1.70	
				Total	8.3	8.1	10.6	8.8	8.1		2.20
				Average	2.08	2.03	2.65	2.20	2.03		
Large	40°	0	2.8	2.5	3.2	2.4	2.0	12.9	2.58		
		2	2.3	2.8	3.7	2.8	2.6	14.2	2.84		
		4	2.4	2.7	2.7	2.6	2.6	13.0	2.60		
		6	3.0	3.1	3.6	3.4	2.7	15.8	3.16		
			Total	10.5	11.1	13.2	11.2	9.9		2.80	
			Average	2.63	2.78	3.30	2.80	2.48			
Medium	40°	0	2.2	2.3	2.7	2.0	1.4	10.6	2.12		
		2	2.5	3.2	3.0	2.6	2.6	13.9	2.78		
		4	2.4	2.8	3.3	2.8	2.9	14.2	2.84		
		6	1.4	2.1	2.3	1.8	1.5	9.1	1.82		
			Total	8.5	10.4	11.3	9.2	8.4		2.39	
			Average	2.13	2.60	2.83	2.30	2.10			
B	Large	75°	0	2.5	2.8	2.2	2.5	2.7	12.7	2.54	
			2	2.7	2.5	1.6	2.5	2.5	11.8	2.36	
			4	2.2	2.4	2.2	3.1	2.9	12.8	2.57	
			6	2.4	3.1	2.3	3.2	2.9	13.9	2.78	
				Total	9.8	10.8	8.3	11.3	11.0		2.56
				Average	2.45	2.70	2.08	2.83	2.75		
	Medium	75°	0	2.6	2.7	2.5	2.4	2.0	12.2	2.44	
			2	2.0	2.3	1.7	2.6	2.2	10.8	2.16	
			4	1.7	2.2	1.7	2.8	2.6	11.0	2.20	
			6	2.0	1.8	1.6	2.8	2.7	10.9	2.18	
				Total	8.3	9.0	7.5	10.6	9.5		2.25
				Average	2.08	2.25	1.88	2.65	2.38		
Large	40°	0	2.8	2.9	3.0	2.6	2.8	14.1	2.25		
		2	3.4	3.5	2.6	3.3	3.0	15.8	3.16		
		4	2.8	3.5	2.5	3.3	3.5	15.6	3.12		
		6	3.2	3.3	3.0	3.5	3.4	16.4	3.28		
			Total	12.2	13.2	11.1	12.7	12.7		3.10	
			Average	3.05	3.30	2.78	3.18	3.18			
Medium	40°	0	2.7	2.5	3.2	2.4	2.7	13.5	2.70		
		2	2.2	3.1	2.2	2.9	2.8	13.2	2.64		
		4	2.5	2.9	2.5	3.0	2.9	13.8	2.76		
		6	2.7	2.6	2.5	3.4	2.5	13.7	2.74		
			Total	10.1	11.1	10.4	11.7	10.9		2.71	
			Average	2.53	2.78	2.60	2.93	2.73			

TABLE 2.—Average Scores for Potato Flavor
Each Figure Is the Average of 20 Scores (5 Judges x 4 Replications)

Area	Size	Two-wk. Holding Temp., ° F.	Storage Period Months	Method					Total	Average	
				Boil	Steam	Mash	Bake 350°	Bake 450°			
A	Large	75°	0	3.2	2.5	2.8	2.9	2.8	14.2	2.84	
			2	3.0	3.1	3.0	3.2	2.8	15.1	3.02	
			4	2.6	2.8	2.6	3.2	3.0	14.2	2.84	
			6	3.1	2.9	3.1	3.4	2.6	15.1	3.02	
				Total	11.9	11.3	11.5	12.7	11.2		2.93
				Average	2.98	2.83	2.88	3.18	2.80		
	Medium	75°	0	3.0	2.8	3.0	2.9	2.9	14.6	2.92	
			2	2.6	2.9	3.2	3.2	3.0	14.9	2.98	
			4	3.0	2.7	3.2	3.1	3.4	15.4	3.08	
			6	2.6	2.6	2.5	3.1	2.7	13.5	2.70	
			Total	11.2	11.0	11.9	12.3	12.0		2.92	
			Average	2.80	2.75	2.98	3.08	3.00			
B	Large	40°	0	2.6	2.4	2.7	2.4	2.5	12.6	2.52	
			2	2.9	2.7	3.3	2.7	2.6	14.2	2.84	
			4	2.7	2.5	2.9	2.8	2.8	13.7	2.74	
			6	3.2	3.1	3.0	3.4	3.0	15.7	3.14	
				Total	11.4	10.7	11.9	11.3	10.9		2.81
				Average	2.85	2.68	2.98	2.83	2.73		
	Medium	40°	0	2.6	2.3	2.6	2.5	2.4	12.4	2.48	
			2	2.6	2.9	3.1	2.8	3.1	14.5	2.90	
			4	3.0	2.8	3.1	3.1	2.9	14.9	2.98	
			6	2.9	2.5	2.6	2.9	2.4	13.3	2.66	
			Total	11.1	10.5	11.4	11.3	10.8		2.76	
			Average	2.78	2.63	2.85	2.83	2.70			
B	Large	75°	0	2.7	2.9	3.0	3.1	3.0	14.7	2.94	
			2	2.8	2.9	3.1	3.2	2.9	14.9	2.98	
			4	2.8	2.9	3.1	3.1	3.3	15.2	3.04	
			6	3.4	3.1	3.2	3.5	2.7	15.9	3.18	
				Total	11.7	11.8	12.4	12.9	11.9		3.04
				Average	2.93	2.95	3.10	3.23	2.98		
	Medium	75°	0	3.3	3.0	2.9	3.0	2.9	15.1	3.02	
			2	3.0	3.1	3.1	3.1	2.9	15.2	3.04	
			4	3.2	3.2	3.1	3.2	3.3	16.0	3.20	
			6	3.5	3.0	3.4	3.3	2.3	15.5	3.10	
			Total	13.0	12.3	12.5	12.6	11.4		3.09	
			Average	3.25	3.08	3.13	3.15	2.85			
Large	40°	0	2.6	2.0	2.7	3.0	2.2	12.5	2.50		
		2	3.2	2.9	2.8	3.0	2.8	14.7	2.94		
		4	2.8	2.8	3.2	3.0	2.9	14.7	2.94		
		6	3.4	2.8	3.0	3.2	3.0	15.4	3.08		
			Total	12.0	10.5	11.7	12.2	10.9		2.87	
			Average	3.00	2.63	2.93	3.05	2.73			
Medium	40°	0	2.5	2.7	2.7	2.7	2.1	12.7	2.54		
		2	2.7	2.9	2.8	3.0	2.7	14.1	2.82		
		4	3.2	3.3	3.1	2.9	3.1	15.6	3.12		
		6	3.3	2.8	3.1	3.3	2.8	15.3	3.06		
			Total	11.7	11.7	11.7	11.9	10.7		2.89	
			Average	2.93	2.93	2.93	2.98	2.68			

TABLE 3.—Average Scores for Potato Moistness
Each Figure Is the Average of 20 Scores (5 Judges x 4 Replications)

Area	Size	Two-wk. Holding Temp., ° F.	Storage Period Months	Method					Total	Average
				Boil	Steam	Mash	Bake 350°	Bake 450°		
A	Large	75°	0	3.0	2.6	2.8	2.4	2.2	13.0	2.60
			2	1.7	2.4	2.9	2.5	1.9	11.4	2.28
			4	1.5	1.9	2.6	2.1	2.1	10.2	2.04
			6	2.4	2.4	2.3	2.7	2.7	12.5	2.50
			Total	8.6	9.3	10.6	9.7	8.9		2.36
	Average	2.15	2.33	2.65	2.43	2.23				
	Medium	75°	0	2.8	2.7	2.9	2.3	2.0	12.7	2.54
			2	1.8	2.1	2.8	2.4	2.0	11.1	2.22
			4	1.8	1.8	3.2	2.2	2.3	11.3	2.26
			6	1.3	1.3	2.0	1.7	1.7	8.0	1.60
Total			7.7	7.9	10.9	8.6	8.0		2.16	
Average	1.93	1.98	2.73	2.15	2.00					
Large	40°	0	3.0	2.8	3.2	2.6	2.2	13.8	2.76	
		2	1.9	2.5	3.1	2.5	2.3	12.3	2.46	
		4	2.0	2.1	2.7	2.2	1.8	10.8	2.16	
		6	2.4	2.8	3.3	2.9	2.6	14.0	2.80	
		Total	9.3	10.2	12.3	10.2	8.9		2.55	
Average	2.33	2.55	3.08	2.55	2.23					
Medium	40°	0	2.6	2.4	2.7	2.0	1.7	11.4	2.28	
		2	1.9	2.9	1.9	2.7	2.2	11.6	2.32	
		4	2.2	2.5	3.1	2.6	2.4	12.8	2.56	
		6	1.4	1.6	1.8	1.6	1.5	7.9	1.58	
		Total	8.1	9.4	9.5	8.9	7.8		2.19	
Average	2.03	2.35	2.38	2.23	1.95					
B	Large	75°	0	2.6	2.7	3.0	2.4	2.3	13.0	2.60
			2	2.4	2.6	1.8	2.3	2.5	11.6	2.32
			4	2.3	2.1	2.3	2.6	2.8	12.1	2.42
			6	2.4	2.7	2.5	3.1	2.7	13.4	2.68
			Total	9.7	10.1	9.6	10.4	10.3		2.51
	Average	2.43	2.53	2.40	2.60	2.58				
	Medium	75°	0	2.6	2.7	2.7	2.5	2.1	12.6	2.52
			2	1.9	2.3	2.4	2.5	2.1	11.2	2.24
			4	1.5	2.0	2.0	2.7	2.6	10.8	2.16
			6	2.2	2.0	2.1	2.6	2.6	11.5	2.30
Total			8.2	9.0	9.2	10.3	9.4		2.31	
Average	2.05	2.25	2.30	2.58	2.35					
Large	40°	0	2.5	2.7	2.9	2.5	2.6	13.2	2.64	
		2	2.8	3.0	2.5	3.1	2.5	13.9	2.78	
		4	2.6	3.0	2.3	2.7	2.9	13.5	2.70	
		6	2.5	2.8	2.8	3.1	2.8	14.0	2.80	
		Total	10.4	11.5	10.5	11.4	10.8		2.73	
Average	2.60	2.88	2.63	2.85	2.70					
Medium	40°	0	2.5	2.3	3.0	2.5	2.3	12.6	2.52	
		2	2.3	2.6	3.1	2.7	2.6	13.3	2.66	
		4	2.3	2.7	2.5	2.5	3.1	13.1	2.62	
		6	2.6	2.3	2.6	3.0	2.3	12.8	2.56	
		Total	9.7	9.9	11.2	10.7	10.3		2.59	
Average	2.43	2.48	2.80	2.68	2.58					

TABLE 4.—Average Scores for Skin Tenderness of Baked Potatoes
Each Figure Is the Average of 20 Scores (5 Judges x 4 Replications)

Area	Size	Two-wk. Holding Temp., ° F.	Storage Period Months	Method		Total	Average
				Bake 350°	Bake 450°		
A	Large	75°	0	2.8	2.9	5.7	2.85
			2	2.7	2.4	5.1	2.55
			4	3.0	3.1	6.1	3.05
			6	3.3	3.0	6.3	3.15
			Total	11.8	11.4		2.90
	Average	2.95	2.85				
	Medium	75°	0	2.8	2.5	5.3	2.65
			2	2.5	2.4	4.9	2.45
			4	2.8	2.8	5.6	2.80
			6	3.2	2.1	5.3	2.65
Total			11.3	9.8		2.64	
Average	2.83	2.45					
B	Large	40°	0	2.4	2.5	4.9	2.45
			2	2.8	2.4	5.2	2.60
			4	3.1	3.1	6.2	3.10
			6	3.5	2.9	6.4	3.20
			Total	11.8	10.9		2.84
	Average	2.95	2.73				
	Medium	40°	0	2.6	2.7	5.3	2.65
			2	3.0	2.9	5.9	2.95
			4	2.7	1.7	4.4	2.20
			6	3.0	2.2	5.2	2.60
Total			11.3	9.5		2.60	
Average	2.83	2.38					
B	Large	75°	0	2.5	2.6	5.1	2.55
			2	2.8	2.8	5.6	2.80
			4	3.2	2.7	5.9	2.95
			6	3.1	2.9	6.0	3.00
			Total	11.6	11.0		2.83
	Average	2.90	2.75				
	Medium	75°	0	2.5	2.1	4.6	2.30
			2	2.4	2.8	5.2	2.60
			4	2.5	2.2	4.7	2.35
			6	2.3	2.1	4.4	2.20
Total			9.7	9.2		2.36	
Average	2.43	2.30					
B	Large	40°	0	2.2	2.4	4.6	2.30
			2	2.6	2.3	4.9	2.45
			4	3.1	2.8	5.9	2.95
			6	3.3	3.0	6.3	3.15
			Total	11.2	10.5		2.71
	Average	2.80	2.63				
	Medium	40°	0	2.5	2.2	4.7	2.35
			2	2.5	2.2	4.7	2.35
			4	2.9	2.5	5.4	2.70
			6	2.4	2.7	5.1	2.55
Total			10.3	9.6		2.49	
Average	2.58	2.40					

Since judges scores were for three potatoes whereas estimates of mealiness of dried slices were made on one potato only from each cooking lot, the agreement between the two methods was remarkably good.

Storage Period: Flavor, texture and moistness were similar at all storage periods. The tendency to break or slough when steamed or boiled, and the color of flesh, were the characteristics most influenced by storage duration. Most of the sloughing or breaking took place in newly harvested potatoes. After 4 to 6 months of storage, sloughing during cooking was negligible. The color of the potato flesh changed, becoming more yellow as storage was prolonged. Grayness, especially of the outer surface of whole, steamed potatoes occurred more frequently after 4 to 6 months of storage. Skin tenderness of baked potatoes tended to improve as potatoes were stored.

Storage Temperature: Storage temperature for the two weeks directly preceding cooking had considerable effect on potato quality. Potatoes that were removed from the cold room and stored at 75° F. for two weeks, revealed a higher proportion of rot and showed more sprouting, especially as the total storage period was prolonged from 4-6 months. They were also harder to peel than potatoes taken directly from the cold room for cooking.

The texture of potatoes stored at 40° F. was more mealy than that of potatoes stored at 75° F., and they were less moist when tasted. The flavor of the potatoes stored at the higher temperature was preferred. Potatoes stored at 75° F. sloughed less when boiled or steamed, and the color of the flesh was somewhat better. These findings are discussed in more detail under "Cooking Method".

Potato Size: The large potatoes from each area had more mealy texture than the medium sized ones from the same area. In addition to being mealier in texture and less moist, the skins of large baked potatoes were more tender. Large potatoes stored six months were smoother when mashed. Flavor was not affected by the size of potatoes. The smaller potatoes were better than the large in two respects: they did not slough quite so much when boiled or steamed and flesh color was somewhat better.

Cooking Method: Baking at 350° F. was better in all respects than baking at 450° F. The texture of potatoes baked at the lower temperature was more mealy, the flavor was better and the skins were more tender. Large potatoes were better bakers than the smaller ones, being more mealy, and having more tender skins. The flavor of potatoes baked directly from storage at 40° F. was sweeter, and was not liked as well as the flavor of baked potatoes that had been stored at room temperatures for two weeks before cooking.

Stored potatoes were better than those newly harvested for boiling and steaming since newly harvested potatoes sloughed more during cooking. After storing 4 to 6 months, little breaking took place when potatoes were cooked by these methods. Steaming was somewhat more dependable than boiling for maintaining shape and wholeness. As far as flavor was concerned, boiled potatoes were generally preferred to steamed. Medium sized potatoes which had been stored at 75° F. showed least sloughing and had best color. The smaller amount of sloughing found among potatoes stored at 75° F. differs from results reported by Whittenberger and Nutting (4)

TABLE 5.—Average Scores for Smoothness of Mashed Potatoes
Each Figure Is the Average of 20 Scores (5 Judges x 4 Replications)

Area	Size	Two-week Holding Temp., ° F.	Storage Period Months	Average of Mashed
A	Large	75°	0	2.9
			2	3.5
			4	3.3
			6	3.4
			Total	13.1
			Average	3.28
	Medium	75°	0	3.1
			2	3.0
			4	3.4
			6	3.1
			Total	12.6
			Average	3.15
	Large	40°	0	2.9
			2	3.4
4			3.2	
6			3.5	
Total			13.0	
Average			3.25	
Medium	40°	0	3.0	
		2	3.1	
		4	3.8	
		6	2.9	
		Total	12.8	
		Average	3.20	
B	Large	75°	0	2.5
			2	2.6
			4	3.1
			6	2.7
			Total	10.9
			Average	2.73
	Medium	75°	0	3.1
			2	2.5
			4	2.7
			6	2.6
			Total	10.9
			Average	2.73
	Large	40°	0	2.9
			2	3.2
4			3.2	
6			3.4	
Total			12.7	
Average			3.18	
Medium	40°	0	3.2	
		2	3.0	
		4	3.1	
		6	2.8	
		Total	12.1	
		Average	3.03	

TABLE 6.—Average Scores for Potato Sloughing
Each Figure Is the Average of 20 Scores (5 Judges x 4 Replications)

Area	Size	Two-wk. Holding Temp., ° F.	Storage Period Months	Method		Total	Average
				Boil	Steam		
A	Large	75°	0	3.25	5.42	8.67	4.34
			2	5.08	5.67	10.75	5.38
			4	5.75	6.00	11.75	5.88
			6	5.92	6.00	11.92	5.96
			Total	20.00	23.09		5.39
			Average	5.00	5.77		
	Medium	75°	0	4.75	5.75	10.50	5.25
			2	4.83	5.75	10.58	5.29
			4	5.75	6.00	11.75	5.88
			6	6.00	6.00	12.00	6.00
			Total	21.33	23.50		5.61
			Average	5.33	5.88		
Large	40°	0	4.67	5.17	9.84	4.92	
		2	4.75	5.42	10.17	5.09	
		4	5.92	5.67	11.59	5.80	
		6	5.58	5.83	11.41	5.71	
		Total	20.92	22.09		5.38	
		Average	5.23	5.52			
Medium	40°	0	4.92	5.50	10.42	5.21	
		2	3.92	5.58	9.50	4.75	
		4	5.42	5.67	11.09	5.55	
		6	5.83	5.83	11.66	5.83	
		Total	20.09	22.58		5.34	
		Average	5.02	5.65			
B	Large	75°	0	5.92	5.50	11.42	5.71
			2	5.88	6.00	11.88	5.94
			4	6.00	5.92	11.92	5.96
			6	6.00	5.83	11.83	5.92
			Total	23.80	23.25		5.88
			Average	5.95	5.81		
	Medium	75°	0	5.42	6.00	11.42	5.71
			2	6.00	6.00	12.00	6.00
			4	6.00	6.00	12.00	6.00
			6	6.00	6.00	12.00	6.00
			Total	23.42	24.00		5.93
			Average	5.86	6.00		
Large	40°	0	5.33	5.83	11.16	5.58	
		2	5.38	5.78	11.16	5.58	
		4	5.50	5.92	11.42	5.71	
		6	6.00	6.00	12.00	6.00	
		Total	22.21	23.53		5.72	
		Average	5.55	5.88			
Medium	40°	0	4.75	5.67	10.42	5.21	
		2	5.82	6.00	11.82	5.91	
		4	5.92	6.00	11.92	5.96	
		6	6.00	6.00	12.00	6.00	
		Total	22.49	23.67		5.77	
		Average	5.62	5.92			

TABLE 7.—*Scores for Potato Color*

Area	Size	Two-wk. Holding Temp., ° F.	Storage Period Months	Method					Total	Average
				Boil	Steam	Mash	Bake 350°	Bake 450°		
A	Large	75°	0	5.00	5.25	6.00	4.50	3.50	24.25	4.85
			2	5.00	4.75	6.00	4.50	4.25	24.50	4.90
			4	2.75	3.50	5.75	3.25	2.50	17.75	3.55
			6	2.75	2.00	5.00	2.75	2.50	15.00	3.00
			Total	15.50	15.50	22.75	15.00	12.75		4.08
	Average	3.88	3.88	5.69	3.75	3.19				
	Medium	75°	0	4.75	5.00	6.00	4.50	4.75	25.00	5.00
			2	4.75	5.50	6.00	4.25	4.25	24.75	4.95
			4	4.50	4.00	6.00	2.75	2.75	20.00	4.00
			6	4.75	5.00	5.00	3.25	4.00	22.00	4.40
Total			18.75	19.50	23.00	14.75	15.75		4.59	
Average	4.69	4.89	5.75	3.69	3.94					
B	Large	40°	0	3.50	5.00	6.00	4.25	4.00	22.75	4.55
			2	4.25	4.25	6.00	3.00	3.50	21.00	4.20
			4	3.50	2.50	5.50	2.50	3.50	17.50	3.50
			6	2.50	3.50	6.00	3.00	3.50	18.50	3.70
			Total	13.75	15.25	23.50	12.75	14.50		3.99
	Average	3.44	3.81	5.88	3.19	3.63				
	Medium	40°	0	5.00	5.50	6.00	4.50	4.50	25.50	5.10
			2	5.00	4.75	6.00	3.75	3.25	22.75	4.55
			4	4.25	4.25	6.00	3.50	3.75	21.75	4.35
			6	4.75	4.00	6.00	3.00	3.00	20.75	4.15
Total			19.00	18.50	24.00	14.75	14.50		4.54	
Average	4.75	4.63	6.00	3.69	3.63					
B	Large	75°	0	4.25	5.50	6.00	4.25	3.50	23.50	4.70
			2	3.00	4.75	6.00	3.25	2.75	19.75	3.95
			4	2.00	1.75	5.25	2.25	2.25	13.50	2.70
			6	3.33	2.00	6.00	2.50	2.50	16.33	3.27
			Total	12.58	14.00	23.25	12.25	11.00		3.66
	Average	3.15	3.50	5.81	3.06	2.75				
	Medium	75°	0	5.00	5.50	6.00	4.50	3.50	24.50	4.90
			2	3.00	3.75	6.00	2.50	2.75	18.00	3.60
			4	3.00	2.75	5.33	3.00	3.00	17.08	3.42
			6	3.00	3.50	6.00	3.00	2.50	18.00	3.60
Total			14.00	15.50	23.33	13.00	11.75		3.88	
Average	3.50	3.88	5.83	3.25	2.94					
B	Large	40°	0	5.00	4.25	6.00	4.75	2.00	22.00	4.40
			2	3.50	2.75	6.00	2.50	3.25	18.00	3.60
			4	2.75	1.50	5.50	1.75	2.00	13.50	2.70
			6	2.00	2.00	6.00	2.25	2.50	14.75	2.95
			Total	13.25	10.50	23.50	11.25	9.75		3.41
	Average	3.31	2.63	5.88	2.81	2.44				
	Medium	40°	0	4.25	5.00	5.75	4.50	3.50	23.00	4.60
			2	3.25	2.50	5.75	2.75	3.25	17.50	3.50
			4	2.00	4.25	5.25	2.50	3.00	17.00	3.40
			6	2.00	3.50	6.00	2.75	3.00	17.25	3.45
Total			11.50	15.25	22.75	12.50	12.75		3.74	
Average	2.88	3.81	5.69	3.13	3.19					

TABLE 8.—Mealiness of Potatoes as Estimated by Appearance of Dried Slices and Judges Scores.

Storage Period	Cooking Method	Area A		Area B	
		Dried Slice	Judge's Score	Dried Slice	Judge's Score
2 Months	Boil	2.2	2.1	2.8	2.5
	Steam	2.7	2.7	2.9	2.8
	Bake at 350° F.	2.0	2.4	2.8	2.8
	Bake at 450° F.	2.4	2.3	2.7	2.6
4 Months	Boil	2.1	2.1	2.5	2.3
	Steam	1.7	2.3	2.4	2.8
	Bake at 350° F.	2.2	2.5	3.0	3.1
	Bake at 450° F.	2.2	2.6	3.2	3.0

who found that, in general, potatoes stored at 75° F. as compared with 32° F. sloughed more when boiled. However, in the specific gravity range of 1.08-1.10, which corresponds to potatoes used in the present study, very little difference was reported in sloughing due to storage temperature. The Russet potato was not included in that study.

Mashing was a good method at all storage periods. Mashed potatoes were mealy and of good flavor. The color of mashed potatoes was very good, even when most of the potatoes were tending to be yellowish or gray.

Area Where Potatoes Were Grown: Potatoes from the two areas were studied mainly to insure coverage of Oregon-grown potatoes. Differences were noted. These may have been due to variations in growing and harvesting practices as well as to soil and climatic differences. Potatoes from area (B) were more mealy than those from area (A) when cooked by boiling, steaming or baking. Even though they were more mealy, they did not slough or break as much when boiled or steamed. They had slightly better flavor scores.

In contrast, potatoes from area (A) were best for mashing, since they were smoother and more mealy when prepared by this method. The skins were more tender, which was an advantage when the potatoes were pared for cooking or when baked. These potatoes kept better in storage, since they did not develop as much rot when stored. Potatoes from this area were more attractive in appearance, being smoother, cleaner and more uniformly developed.

SUMMARY

Flavor, texture, moistness, smoothness of mashed potatoes and the skin tenderness of baked potatoes did not change to an appreciable extent from harvest through six months' storage. The color was better earlier in the storage period, and the quality improved for boiling and steaming since most sloughing took place at 0 or 2 months storage. The larger potatoes were mealier regardless of cooking method, whereas the smaller ones showed slightly less tendency to break when boiled or steamed. Potatoes stored at 40° F. for two weeks before they were cooked revealed fewer sprouts and less rot. They were easier to peel than those stored at

75° F. for two weeks before cooking. Storage at 40° F. resulted in higher scores for mealiness, but a less desirable flavor than storage at 75° F.

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