VARIETAL SUITABILITY OF POTATOES FOR DEHYDRATION

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Four varieties of potato, i.e., Desire, Lal-e-Faisal, Diament and Cardinal were used. After washing and hand peeling, the potatoes of each variety were divided into two lots. Proximate analysis was carried out before and after drying. The drying and rehydration ratios as well as the organoleptic evaluations were also conducted. These analysis showed that potatoes blanched in distilled water (DW) reconstituted and retained organoleptic characteristics better than those blanched in tap water (TW). However, among all the varieties, Cardinal blanched in DW was highly acceptable, followed by Diarnent, Lal-e-Faisal and Desire of the same treatment.

Key Words: Potato varieties, treatment, proximate analysis, drying and rehydration ratios, distilled water.

INTRODUCTION

Potatoes posses very high position in the diet of progressing countries including Pakistan. the total production of different varieties in Pakistan was 932.8 thousand tones during 1992-93 (Anon, 1994). Potatoes are preserved by canning, freezing and dehydration processes. Amongst these, dehydration offers certain advantages such as economy of space and volume in transportation as well as handling and distribution. However, the quality of dehydrated potatoes is greatly intluenced by variety (Willam and Smith, 1975) and water used for blanching (Robert and Karrns, 1975: Samuel, 1962 and Tore and Osker, 1977). Amihud and Bernard (1962) and Troller (1983) observed that the appearance and texture of many fruits and vegetables could be affected by the pH and hardness of water used in their preparation and processing. Potatoes are sulphited after blanching for dehydration. This improved the quality of the finished product and rehydration (Solmos *et al.*, 1980).

In Pakistan. inspire of availability of several potato varieties, the information regarding their suitability for dehydration as well as the effect of hard water during processing is lacking, Studies were, therefore, planned to assess the effect of variety and hard water on the quality of dehydrated potatoes.

MATERIALS AND METHODS

Four potato varieties, i.e. Desire, Lal-e-Faisal, Diament and Cardinal, harvested during January/February 1991, were procured from Vegetable Research Institute. Faisalabad. The potatoes were washed thoroughly with tap water., sorted to avoid bruised and greenish portions, weighed hand peeled and sliced into 2-3 mm thick slices with kitchen slicer. The potatoes were kept in water after peeling and slicing to avoid oxidative browning. All samples were analyzed for moisture, protein, fat, carbohydrates and ash contents (AOAC. 1990) by taking an edible portion before dressing.

Samples from each variety were then divided into two lots/treatments as under.

Blanched in distilled water (DW) Sample designated as T1.
Blanched in tap water (TW) Sample designated as T2.

The blanched samples of each treatment were sulfited by dipping into 0.2% solution of potassium metabisulfite for 15 minutes and then dehydrated with the help of tunnel dryer at 65°C, upto about 5, 6% final moisture level (William and Smith, 1975). After drying, each sample was packed in polyethylene bags, sealed and stored at ambient temperature (25-35° C) for five months.

Proximate analysis of each dried sample was done according to AOAC, 1990. The dried potatoes were analyzed for drying and rehydration ratios (William and Smith, 1975). The organoleptic evaluation for colour, flavour, taste and texture of rehydrated potatoes was carried out during storage at one month interval using Hedonic Scale rating of 1-9 (Larmond, 1987). The statistical analysis was also carried out (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

1. Proximate Analysis: The proximate analysis of each variety before and after drying are given in Tables I and 2. These results are in line with the work of William and Smith (1975). Who studied the composition and storage behaviour of potato before and after processing.

2. Drying and Rehydration Ratios: Drying and rehydration ratios of different potato varieties were calculated on the basis of peeled and dried slices (Table 3). From the Table 3, it is evident that Diarncnt variety has better drying ratio followed by Lal-e-Faisal. Furthermore, samples blanched in distilled water yielded better rehydration ratios for all varieties. However, the Cardinal variety blanched in distilled water has the highest rehydration capability. This may be due to the reason that the less solids the more water absorbed in case of potato (Solrnos *et al,* 1978).

3. Sensory Evaluation: The sensory evaluation of the rehydrated potatoes (Table-d) at each interval during storage were carried out by a panel of five trained judges. Potatoes were rehydrated by soaking for one hour in cool water and then boiling for 30 minutes. The level of means shows that the Potato varieties blanched in distilled water obtained higher score as compared to those blanched in tap water. However, among all varieties Cardinal blanched in distilled water was highly acceptable followed by Diament, Desire and Lal-e-Faisal of the same treatment (Table 4).

The analysis of variance (Table 5) shows that the treatments and storage have highly significant ($P<O.OI$) effect on colour, flavour, taste and texture of different treatments.

The results of sensory evaluation arc in line with the work of Troller (1973) who reported that chemicals in water, most often, cations such as calcium and magnesium as well as their anions have significant effect on colour, texture and even flavour of certain foods and also cause off-taste and health hazards.

The data of sensory scores revealed that Cardinal variety is better suited for dehydration purposes followed by Diament. The samples blanched in distilled water reconstituted better and retained better texture as compared to those of tap water. This might be due to the presence of calcium salts whieh eomplexed with pectin to calcium pectate resulting in tough texture.

Table I, Proximate composition **of** diff **eren t. pota to vane** ties **before** drying

Varieties	Moisture %	Protein (%)	Fat (%)	Carbohydrate (%)	Ash (%)
Desire (VI)	80.30	1.13	0.11	18.3	0.16
Lale-e-Faisal (V_2)	79.09	1.20	0.08	19.5	0.13
Diament (V_3)	77.00	1.64	0.09	21.1	0.17
Cardinal (V_4)	82.20	1.27	0.09	16.3	0.14

Table 2. Proxinna te compost tIOnofd'ff eren t. po tato vane ties **aft er dryng**

Varieties		Moisture 'lr;	Protein (%)	Fat (%)	Carbohydrate (%)	Ash (%)
Desire	(VjT_1)	7.1	6.95	0.78	83.97	1.2
	(V_1T_1)	7.1	6.96	0.77	83.27	1.9
Lale-e-	(V_2T_1)	6.7	7.20	0.56	84.54	1.0
Faisal	(V_2T_2)	6.8	7.20	0.55	83.65	1.8
Diament	(V_3T_1)	6.9	8.86	0.57	82.47	1.2
	(V_3T_2)	7.0	8.86	0.58	81.65	2.0
Cardinal	(V_4T_1)	7.0	8.39	0.66	82.95	1.0
	(V_4T_2)	7.1	8.39	0.66	82.05	1.8

Table 3. Drymz, **and rehydration ratios of potatoes under different treatment.**

Treatments	Drying ratio	Rehydration ratio
VI (DW)	7.15: 1	1: 3 .8
V_1 (TW)	7.15: 1	1 :3.7
V_2 (DW)	7.00: 1	1: 3 . 5
V_2 (TW)	7.00: 1	I : 3 . 3
V_3 (DW)	6.50: 1	1 : 3 . 7
V_3 (TW)	6.50: 1	1 : 3.5
V_4 (DW)	7.50: 1	I: 4.2
V_4 (TW)	7.50: I	I : 3 .9

Table 4. **Effect of variety and blanching on sensory evaluation of dehydrated potatoes during storage.**

Treatment	Storage Period (Months)					
	1	2	3	4	5	Means
			Colour			
VI CDW)	8.20	&.07	7,40	7.20	5.80	7.33 DE
VI (TW)	8.20	7.80	7.20	7.00	6.80	7,40 D
V2 (DW)	7.80	7.60	7,40	6.60	6.00	7.08 F
V2 (TW)	7,40	7.20	6.60	6.00	5.60	6.55 G
V3 (DW)	8.00	8.00	7.80	7.60	7.00	7.68 C
V3 (TW)	8.00	7,40	7.00	7.00	6.60	7.23 E
V4 (DW)	9.00	8.60	8.00	7.60	7,40	8.12 A
V4 (TW)	8.80	8.00	7.80	7.50	7.00	7.80 B
Means	8.18	7.83	7,40	7.07	6,53	
	A	B	C	D	E	
			Flavour			
VI (DW)	8.20	8.20	8.00	7.60	7,40	7.88 A
VI (TW)	8.00	7.80	7.60	7.00	7,40	7.56 BC
V2 (DW)	7.60	7,40	7.00	6.80	6,40	7.04 E
V2 (TW)	8.20	7.00	6,40	6.20	6.00	6.76 F
V3 (DW)	8.00	7.80	8.00	7.60	7.00	7.68 B
V3 (TW)	7.80	7,40	7,40	7.00	6,40	7.20D
V4 (DW)	8,40	8,40	8.00	7.80	7,40	8.00A
V4 (TW)	8.00	8.00	7.00	7,40	7.00	7,48 C
Means	8.03	7.76	7,42	7.18	6.87	
	A	B	C	D	E	
			Taste			
VI (DW)	8.20	8.00	7.80	7.60	7,40	7.80 C
VI (TW)	8.00	7.60	7,40	7,40	7.00	7,48E
V2 (DW)	8,40	8.00	7.80	7.60	7,40	7.84 C
V2 (TW)	8.00	7,40	7.00	6.80	6,40	7.12 F
V3 (DW)	8.00	7.60	7.60	7,40	7,40	7.12D
V3 (TW)	8.60	7.80	7,40	7.00	7.00	7.57 DE
V4 (DW)	8.00	8.80	8,40	8.00	8.00	8.24A
V4 (TW)	8,40	8,40	8.00	7.60	7,40	7.96 B
Means	8.20	7.95	7.68	7,43	7.25	
	A	B	C	D	E	
			Texture			
VI (DW)	8.20	8.00	8.00	7.60	7,40	7.80 DE
VI (TW)	8.00	7,40	7,40	7.00	7.00	7.36 G
V2 (DW)	8.20	8.00	7.00	7.60	7.60	7.80 E
V2 (TW)	8.00	7.80	7,40	7.20	7.00	7,48 F
V3 (DW)	8,40	8.20	8.20	8,40	7.70	8.17 B
V3 (TW)	8.20	8.20	7.80	8.00	7.60	7.96 C
V4 (DW)	9.00	8.60	8.20	8.00	8.00	8.36 A
V4 (TW)	8,40	8.00	8.00	7.60	7.60	7.92 CD
Means	8.30	8.03	8.83	7.67	7,49	
	A	B	C	D	E	

Means bearing same letters are not significant.

Table 5: F-Ratios of different sensory parameters of potatoes.

Source	d.f	Colour	Flavour	Taste	Texture
Treatments	7	133.6685**	83.5051 **	85.5050**	A6.9413**
Storage	4	384.2756**	158.1701**	177.8879**	98.1712**
Error	228				

** Highly significant.

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