

RESEARCH PAPER

Storability studies in dehydrated garden peas as influenced by different pre-treatments

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SUMMARY :

An experiment was conducted on storability studies in dehydrated garden peas as influenced by different pretreatments at University Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.) in 2011-2012. Amongst the different treatments, peas prickled and blanched in 6% NaCl₂ +0.1% MgO + 0.5% KMS + 1% NaHCO₃ for 5 minutes dried in cabinet dryer was found superior in maintaining maximum protein, chlorophyll, total sugar, non-reducing sugar, reducing sugar and rehydration ratio. Chemical components like protein, chlorophyll and ascorbic acid were decreased however, reducing sugar, total sugar, non-reducing sugar were increased during storage period.

KEY WORDS : Garden peas, Pretreatments, Cabinet drying, Storability

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Pea (*Pisum sativum*) belongs to family leguminaceae is an important vegetable crop. It is native of Ethiopia and South Asia and spread throughout the world. Pea is rich source of protein (25%), amino acid and sugar (12%) and good source of vitamin A, B, C (Yawalkar and Ram, 2005). Pea is grown for the fresh market and also for export. It is high value crop having more market demand but less in supply.

India is the second largest producer of vegetables in the world. Vegetables are rich reservoir of nutrients particularly vitamins and minerals. The area under vegetable crops in India 8.495 million ha, production is 146.554 million MT and productivity is 17.3 MT/ha. The area under vegetable crops in Maharashtra 611 thousand ha, production 7504 thousand MT and productivity 12.3 metric tons/ha, respectively. Area under pea cultivation in India was about 3,70,000 hectare, production 35,17000 MT and productivity 9.5 MT per hectare. Area under pea cultivation in Maharashtra was about 6,200 hectare,

production 28,900 MT and productivity 4.7 MT per hectare (Anonymous, 2010). There are few vegetables, which are season bound and available in a particular season only. But there is demand for the processing vegetables into value added products and make them available during the off-season. Thus, there is scope for processing some selected vegetables into value added products (Verma and Joshi, 2005). There are various methods of preservation of vegetables but dehydration is highly acceptable process for preservation and reduction in weight of raw materials and their product.

Dehydrated vegetables are good source of energy, minerals and vitamins. Some provide moderate amount of protein to diet and they are concentrated nutrients (Thomas and Calloway, 1961). The present work was undertaken to study the influence of different pre-treatments on dehydrated garden peas with the objectives to access the effect of different pre-treatments on quality of dehydrated garden peas and to find

out the suitable pre-treatment for good quality of dehydrated garden peas.

EXPERIMENTAL METHODS

The good qualities of garden peas free from inert material were procured from main garden, Department of Horticulture, Dr. PanjabraoDeshmukh KrishiVidyapeeth, Akola. Peas were washed properly with the tap water to remove the contamination like dirt mud etc. Water was removed by putting them on blotting paper and was kept in dry place for the withdrawal of excess amount of water. The peas were then subjected to drying in cabinet dryer. The experiment comprised of eight treatments and three replications. The design adopted in the experiment was Completely Randomized Design with eight treatment combinations and three replications.

Treatment details	
Treatment No.	Pre- treatment details
T ₁	Control
T ₂	Blanched in boiling water for 3 minutes
T ₃	Blanched in 2% NaCl ₂ and 0.1% MgO for 3 minutes
T ₄	Blanched in 4 % NaCl ₂ and 0.1% Mg O+0.2% KMS for 5 minutes
T ₅	Blanched in 6% NaCl ₂ + 0.1% MgO + 0.2% KMS for 5 minutes
T ₆	Blanched in 6%NaCl ₂ +0.1%MgO+0.2%KMS+1% NaHCO ₃ for 5 minutes
T ₇	Blanched in 6% NaCl ₂ +0.1%MgO + 0.5% KMS+ 1% NaHCO ₃ for 5 minutes
T ₈	Prickled and blanched in 6% NaCl ₂ +0.1% MgO + 0.5% KMS+ 1% NaHCO ₃ for 5 minutes

All the treated and untreated (control) peas were spread in a single layer on tray and drying temperature was maintained at 60°C for initial 3 hrs towards the end of drying, the temperature was reduced to 50°C (Lidhoo and Khar, 2007). Dehydrated peas were cooled to room temperature and packed in 200 gauge polyethylene bags, sealed and stored at ambient storage. Storage observations of the dried peas were recorded for change in chemical properties at every 20 days interval up to 80 days (Manimegalai and Ramah, 1998). The physico-chemical parameters were calculated by using procedure given by (Ranganna, 1979).

EXPERIMENTAL FINDINGS AND ANALYSIS

The results obtained in present investigation as well as relevant discussion have been summarized below:

The data regarding dehydration ratio of garden pea as influenced by different treatments is presented in Table 1.

The data from Table 1 revealed that, there were significant

differences among the treatments. Lowest dehydration ratio (3.67) was recorded by treatment T₈ i.e. peas when prickled and blanched in 6% NaCl₂ +0.1%MgO + 0.5%KMS+ 1% NaHCO₃ for 5 minutes. However, treatment T₇(3.71) was found statistically at par with treatment T₈. A similar result of decreasing dehydration ratio in garden peas was reported by Kalra *et al.* (1986).

Table 1: Influence of pre-treatments on dehydration ratio of garden peas

Treatments	Dehydration ratio
	Mean
T ₁	5.21
T ₂	4.94
T ₃	4.64
T ₄	4.35
T ₅	4.20
T ₆	4.03
T ₇	3.71
T ₈	3.67
S.E.±	0.014
C.D. at 5 %	0.041

The data regarding rehydration ratio of garden pea as influenced by different treatments is presented in Table 2.

The data from the Table 2 revealed that at 1st day and 80th day of storage, treatment T₈ recorded highest rehydration ratio i.e. 4.23 and 3.71, respectively. However, treatment T₁ i.e. control exhibited lowest rehydration ratio i.e. 2.92 and 2.69 at 1st day and 80th day of storage, respectively.

Chemical parameters of dehydrated peas as influenced by different pre-treatments:

The changes in the chemical parameters of dehydrated garden peas *viz.*, protein, ascorbic acid, chlorophyll, total sugar, non-reducing sugar and reducing sugar as influenced by different pre-treatments are presented in Table 3.

The data regarding chemical parameters of dehydrated peas presented in Table 3 revealed that, the protein content was highest in treatment T₈ at 1st and 80th day of storage i.e. 27.32 per cent and 26.07 per cent, respectively. Similar kinds of observations were also recorded by Das *et al.* (1992) for drying of garden peas.

The ascorbic acid content was found significantly lowest in treatment T₈ at 1st and 80th day of storage i.e. 26.60 mg/100g and 22.87 mg/100g, respectively. These results are in good agreement with the results reported by Kaur and Bawa 2002).

The total sugar content was found significantly highest in treatment T₈ at 1st and 80th day of storage i.e. 13.07 per cent and 15.34 per cent, respectively. Treatment T₈ exhibited

Table 2: Influence of pre-treatments on rehydration ratio of garden peas

Treatments	Rehydration ratio					
	Storage (days)					
	1 st	20 th	40 th	60 th	80 th	
T ₁	2.92	2.86	2.79	2.74	2.69	
T ₂	3.06	3.04	2.99	2.88	2.84	
T ₃	3.20	3.07	3.03	2.94	2.89	
T ₄	3.37	3.23	3.13	3.05	2.95	
T ₅	3.54	3.44	3.34	3.25	3.19	
T ₆	3.72	3.64	3.55	3.43	3.30	
T ₇	3.90	3.78	3.65	3.57	3.52	
T ₈	4.23	4.07	3.94	3.83	3.71	
S.E. _±	0.022	0.024	0.022	0.016	0.018	
C.D. at 5%	0.065	0.071	0.067	0.048	0.054	

Table 3: Influence of pre-treatments on chemical parameters of dehydrated garden peas

Treatments	Chemical parameters											
	Protein (%)		Ascorbic acid (mg/100g)		Total sugars (%)		Non reducing sugars (%)		Reducing sugars (%)		Chlorophyll content (mg/100 g)	
	1 st day	80 th day	1 st day	80 th day	1 st day	80 th day	1 st day	80 th day	1 st day	80 th day	1 st day	80 th day
T ₁	24.84	23.95	34.91	31.48	11.76	14.14	2.30	2.75	9.38	11.33	36.92	27.91
T ₂	25.08	24.07	33.55	29.74	11.85	14.33	2.42	2.89	9.51	11.46	37.20	28.14
T ₃	25.42	24.39	32.24	28.03	12.25	14.55	2.54	2.95	9.80	11.62	38.08	29.17
T ₄	25.82	25.02	30.14	26.26	12.51	14.83	2.64	3.09	10.01	11.82	38.71	29.77
T ₅	25.79	25.05	28.76	24.65	12.53	14.77	2.85	3.17	10.03	11.79	39.06	30.85
T ₆	26.26	25.13	28.76	24.57	12.68	14.95	2.86	3.22	10.18	11.96	39.05	30.81
T ₇	26.92	25.54	26.57	22.91	12.90	15.18	2.95	3.28	10.31	12.12	39.88	29.96
T ₈	27.32	26.07	26.50	22.87	13.07	15.34	3.06	3.49	10.50	12.29	40.56	31.12
S.E. _±	0.023	0.015	0.018	0.012	0.017	0.013	0.012	0.011	0.013	0.012	0.020	0.018
C.D. at 5%	0.070	0.045	0.054	0.037	0.052	0.040	0.037	0.033	0.039	0.037	0.061	0.055

significantly highest non-reducing sugar at 1st and 80th day of storage *i.e.* 3.06 per cent and 3.49 per cent, respectively. The increase in total sugars of garden peas during storage was probably due to conversion of starch into simple sugars. Similar trend of results were also recorded by Ram and Sanchant (1972).

The reducing sugar content was found significantly highest in treatment T₈ at 1st and 80th day of storage *i.e.* 10.50

per cent and 12.29 per cent, respectively. Similar results were also reported by Osunde Makama (2007). Significantly highest chlorophyll content was showed by treatment T₈ at 1st and 80th day of storage *i.e.* 40.56 mg/100g and 31.12 mg/100g per cent, respectively. Similar results of reduction of chlorophyll content during storage have been reported by Nilmani and Bains (1993).

LITERATURE CITED

- Das, N., Saini, S.P.S. and Bains, G.S. (1992). Drying behaviour of green peas. *Indian Food Packer*, **46**(3): 27- 33.
- Karla, C.L., Beerh, O.P., Manan, J.K., Teotia, M.S., Sharma, T.C., Dhillon, G.S. and Sharma, B.R. (1986). Studies on the screening of new pea cultivars for dehydration. *Indian Food Packer*, **40** (6): 16-21.
- Kaur, H. and Bawa, A.S. (2002). Studies on fluidized bed drying of peas. *J. Food. Sci. Technol.*, **39**(3) : 272-275.
- Lidhoo, C.K. and Khar, Sanjay (2007). Effect of hot air drying temperature on product quality and consumer acceptability of bitter gourd. *J. Res.*, **6** (2): 34-35.
- Manimegalai, G. and Ramah, S. (1998). Effect of pre-treatments on the quality characteristics of dehydrated bitter gourd rings. *Indian Food Packer*, **52**(2): 7-14.
- Nilmani, S.P.S. and Bains, G.S. (1993). Effect of variety and maturity on quality and dehydrated peas. *Indian Food Packer*, **48** (5): 17-23.
- Osunde, Z.D. and Makama, A.L. (2007). Assessment of changes in nutritional value of locally sun dried tomatoes. *A.U.J.T.*, **10** (4): 248-253.
- Ram, K. and Sanchant, B.P. (1972). Correlation between sugar and ascorbic acid content of different varieties of peas. *Indian Food Packer*, **38**(5): 21-25.
- Ranganna, S. (1979). Manual of analysis of fruit and vegetable products Mc-Graw Hill publication, NEW DELHI, INDIA.
- Thomas, M. and Calloway, D. (1961). Nutritional value of dehydrated food. *J. Am. Dietetic Assoc.*, **39** : 150.
- Verma, L.R. and Joshi, V.K. (2005). Post harvest technology of fruits and vegetables Vol. II .Indus Publishing Company, NEW DELHI, INDIA.
- Yawalkar, G.N. and Ram, M. (2005). Breeding of vegetable crop. pp. 26-28.

■ WEBLIOGRAPHY

Anonymous (2010). Indian Horticulture Database. Area, production and productivity of major vegetable crops in India. www.nhb.gov.in.

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