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STUDIES ON DEHYDRATED MATURE JACKFRUIT (*ARTOCARPUS HETEROPHYLLUS* LAM.) CHIPS FOR VALUE ADDITION

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ABSTRACT:

The dehydrated chips of jackfruit pre-treated with five treatments *viz;* Blanching (T_1), Blanching + $CaCl_2$ (0.5%) (T_2), Blanching + Citric acid 0.5 per cent (T_3), Blanching + Ascorbic acid 0.4 per cent (T_4), Control (T_5) and storage period of 0, 30 and 60 days were evaluated to study their impact on chemical composition of chips. Results indicated that the moisture, TSS, acidity, reducing sugars, total sugars, non reducing sugars and β carotene content of dehydrated chips were found maximum in dehydrated jackfruit chips treated with ascorbic acid (T_4), while starch and pH content of dehydrated chips were noticed maximum in treatment T_2. *i.e.* Blanching + $CaCl_2$ (0.5%). Under storage conditions, moisture, TSS, titratable acidity and β carotene content of dehydrated jackfruit chips were found increased upto 60 days of storage and rest other chemical constituents i.e. reducing sugars, total sugars, non reducing sugars, starch and pH were significantly decreased towards the end of 60 days of storage.

The dehydrated chips of jackfruit pre-treated with ascorbic acid (T_4) recorded maximum mean score for colour, flavour and texture irrespective of storage period. The organoleptic scores of these dehydrated jackfruit chips for all above attributes were declined with the increase in storage period from 0 to 60 days. The dehydrated chips pre-treated with ascorbic acid (T_4) recorded

maximum overall acceptability score of 6.91 at 60 days of storage which clearly indicated its suitability for making good quality chips and also for storing them for 60 days at ambient conditions without much loss of sensory and nutritional qualities of chips.

KEY WORDS: *Dehydrated chips, Jackfruit, Value addition.*

INTRODUCTION:

Jackfruit, *Artocarpus heterophyllus* Lam. belonging to family Moraceae is one of the most popular and widely grown, evergreen fruit trees in the country that produces heavier yield than any other tree species and bears largest known edible fruit weighing around 35-50 kg each. This is one of the unexploited nutritious fruits indigenous to the rainforests of Western Ghats of India (Reddy *et al*., 2004).

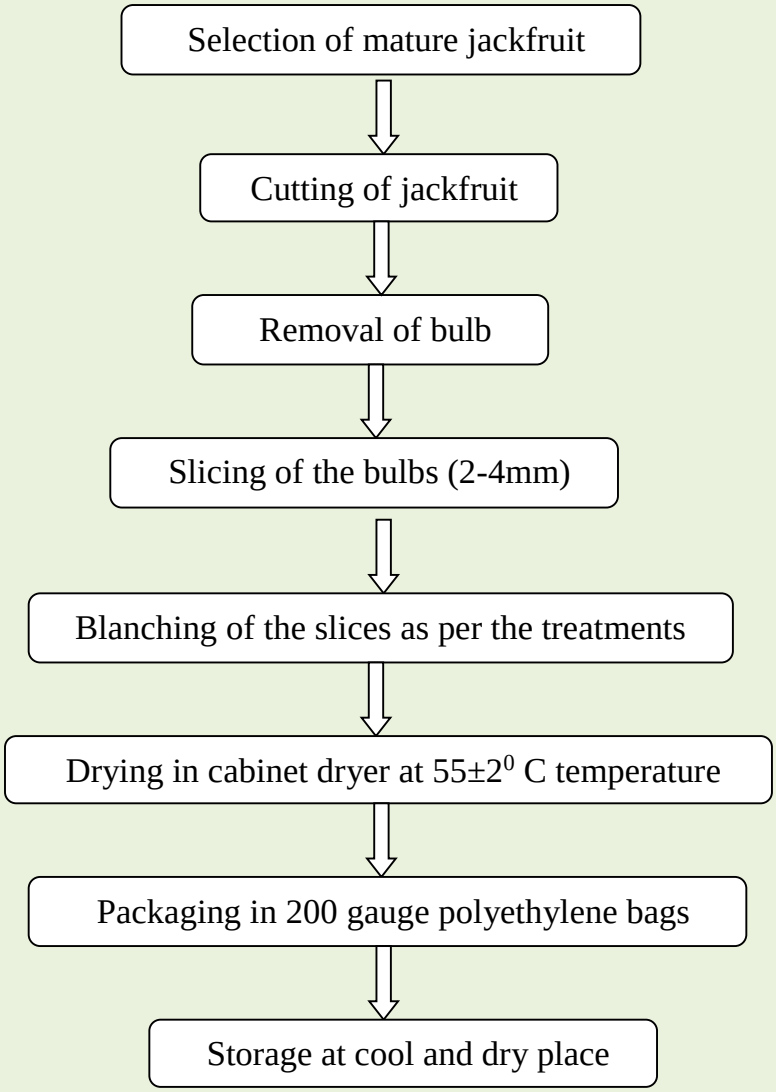
Jackfruit tree has several uses; peoples are consuming fruits mostly when ripe and also as vegetable in the unripe stage. The nutritious seeds are boiled or roasted and eaten like chestnuts, added to flour for baking or cooked in dishes. The carpels are cooked with coconut milk or made into ice cream, chutney, jam, jelly, paste, leather or papad or canned in syrup made with sugar or honey. The crisp type of jackfruit is preferred for canning and for making chips. Jackfruit significantly contributes to the nutrition of the people of this country as a source of vitamins, minerals and calories. Both tender and ripe fruits as well as the seeds are rich in minerals and vitamins. Every 100 grams edible portion(pulp) contain 84 per cent water,18g carbohydrates,1.9g proteins, 0.1g fat, 1.1g fiber, 30mg calcium, 287 mg potassium, 0.5 mg iron, vitamin 'A' 50 U.I., and thiamine 30U.I. (Abraham *et.al*., 2004). Besides this, tree is also known for its durable timber, valuable fodder for cattle, pigs, goats, etc., dye and medicinal properties. The fruits of some jackfruit trees suitable for dessert purpose may not be appropriate for making chips due to variation in their biochemical composition (Jagdeesh *et al*., 2006).Under such circumstances, proper post-harvest technology is necessary to make use of on seasonal production of jackfruit and to avoid post-harvest losses. Among the alternative ways, preservation of jackfruits by processing them into acceptable products is of paramount importance as it adds to the diversified alternative food item in dietary means as well as contributes to alternate sources of income and employment.

MATERIAL AND METHODS:

The cut slices of mature jackfruit bulbs were pre-treated as per the treatments *viz*. separately with various treatments comprising blanching (T1), blanching + calcium chloride 0.5 per cent (T2), blanching + citric acid 0.5 per cent (T3), blanching + ascorbic acid 0.4 per cent (T4) followed by untreated control (T5). The pre-treated samples were then kept separately for dehydration in an individual tray and dried in cabinet dryer at 55-60^{0}C for 6-8 hours. The samples were dried till the moisture was reduced to 9 per cent. Further, the samples were taken out from the dryer and packed in 200 gauge polythene bags and labelled accordingly. The final product was stored at ambient temperature of 28-32^{0}C in the laboratory (Flow chart

I). The rehydration of dehydrated slices was carried out by soaking the dehydrated slices in 3 per cent salt solution for 2 minutes. The rehydrated slices were fried under the standard condition. These qualities were compared with that of the crisp chips made from dehydrated and fresh slices. For organoleptic evaluation, dehydrated jackfruit slices were deep fat fried in coconut oil and frying was done till a rattling sound was heard and the slices turned to light yellow in colour. The chips thus prepared were taken in a vessel and immediately mixed with common salt @ 2 per cent to shreds of jackfruit. The chips were then allowed to cool for 5 minutes before being evaluated for organoleptic qualities.

Flow chart I:-Preparation of dehydrated jackfruit chips



RESULTS AND DISCUSSION:

Data recorded on effect of various pre-treatments of dehydrated chips of jackfruit on colour, flavour, texture and overall acceptability during storage at ambient temperature are presented in Table 1, 2 and 3 and 4 graphically illustrated in fig I, II, III and IV.

Perusal of data indicates that the dehydrated chips pre-treated with ascorbic acid (T4) recorded maximum mean sensory score of 7.70 for colour, flavour (7.41) and texture (7.45) irrespective of storage period

(Table 1, 2, and 3). The jackfruit chips treated with Cacl2 (T2) was ranked second best treatment in retaining better colour with mean score of 6.70. However second highest mean score for flavour (6.79) and texture (6.87) was noticed in dehydrated chips pre-treated with citric acid (T3). Under storage conditions, maximum mean score for colour (6.972), flavour (6.872) and texture (7.072) was exhibited by the samples evaluated at initial stage of storage i.e. 0 day storage. The organoleptic scores for all attributes like colour, flavour and texture were found to be declined with the increase in the period of storage (Fig. I, II and III). The dehydrated chips treated with ascorbic acid (T4) showed maximum overall acceptability score of 7.45 followed by the treatments with citric acid (6.80) irrespective of storage period (Table 4). As regards the influence of storage period on overall acceptability score of chips indicated significant variations. At initial stage of storage, it was 6.99 which were further decreased to 6.73 at 30 days of storage and 6.10 at 60 days of storage at ambient temperature (Fig. IV).

Studies on effect of various pre-treatments and storage period revealed that the dehydrated chips pre-treated with ascorbic acid (T_4) recorded maximum overall acceptability score of 6.91 at 60 days of storage, followed by the treatment with citric acid (T_3) with second highest organoleptic score of 6.20 at same period of storage. The results clearly indicated that the good quality and acceptable chips could be prepared from dehydrated chips of jackfruit pre-treated with ascorbic acid (T_4). The dehydrated jackfruit chips irrespective of the treatments could be stored significantly for a period of 60 days at ambient conditions without much loss of sensory and nutritional qualities of the product.

REFERENCES:

Abraham. D; Giraldo Rodimeire; M. Rodrigues; S. S. Carla and C. F. Amanda (2004). The air drying behavior of osmotically dehydrated for jackfruit (*Artocarpus heterophyllus* L.) slices. Proc. of the 14th International Drying Symposium, Brazil. Vol.C, PP: 2120-2126.

Jagdeesh, S. L.; B. S. Reddy; L. N. Hegde; G. S. K. Swamy and G. S. V. Raghavan (2006).Value addition in jackfruit. American Society of Agricultural and Biological Engineers (ASABE). Annual meeting, 2006. Paper number 066135.

Parab, B. P. (1992). Studies on some aspects of utilization of cashew (*Anacardium occidentale* L.) wastes. A thesis submitted to the Konkan Krishi Vidyapeeth Dapoli, Dist: Ratnagiri, Maharashtra State.

Patil, R. S. (2003). Studies on physico-chemical composition, storage, processing and waste utilization of jackfruit (*Artocarpus heterophyllus* Lam.). A Ph. D. thesis submitted to Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra State.

Reddy, B. M. C., P. Patil; S. Shashikumar and L. R. Govindaraju (2004).Studies on physio-chemical characteristics of jackfruit clones of south Karnataka. *Karnataka Journal of Agricultural Sciences*. 17:279-282.

Sawant, S. B. (2000). Studies on maturity indices and some aspects of post harvest handling and processing of jackfruit. A M.Sc. (Agri.) thesis submitted to the Konkan Krishi Vidyapeeth, Dapoli. Dist. Ratnagiri, Maharashtra State.

Table 1: Effect of pre-treatment's on colour score of dehydrated jackfruit chips during storage at ambient temperature

Treatments	Sensory score for colour			
	Storage (Days)			
	0	30	60	Mean
T_1 - Blanching,	6.62	6.37	6.12	6.37
T2- Blanching + Calcium chloride (0.5%)+ KMS (0.1%)	7.50	6.75	5.87	6.70
T_3 - Blanching + Citric acid (0.5%) + KMS (0.1%),	6.25	6.25	6.00	6.16
T_4- Blanching + Ascorbic acid (0.4%) + KMS (0.1%)	7.87	7.62	7.62	7.70
T_5- Control	6.62	6.25	6.00	6.29
Mean	6.97	6.64	6.32	6.64
	S.Em. ±		C.D. at 5 %	
Treatment (T)	0.182		0.52	
Storage (S)	0.141		0.40	
Interaction (T X S)	0.162		0.900	

Table 2: Effect of pre-treatment's on flavour score of dehydrated jackfruit chips during storage at ambient temperature

Treatments	Sensory score for flavour			
	Storage (Days)			
	0	30	60	Mean
T_1 - Blanching,	6.25	6.12	5.87	6.08
T2- Blanching + Calcium chloride (0.5%)+ KMS (0.1%)	6.37	6.00	5.87	6.08
T_3 - Blanching + Citric acid (0.5%) + KMS (0.1%),	7.37	6.75	6.25	6.79
T_4- Blanching + Ascorbic acid (0.4%) + KMS (0.1%)	7.75	7.62	6.87	7.41
T_5- Control	6.62	6.37	5.87	6.28
Mean	6.87	6.57	6.14	6.53
	S.Em. ±		C.D. at 5 %	
Treatment (T)	0.28		0.79	
Storage (S)	0.21		0.61	
Interaction (T X S)	0.48		1.38	

Table 3: Effect of pre-treatments on texture score of dehydrated jackfruit chips during storage at ambient temperature

Treatments	Sensory score for texture			
	Storage (Days)			
	0	30	60	Mean
T_1 - Blanching,	7.00	6.62	5.57	6.39
T2- Blanching + Calcium chloride (0.5%) + KMS (0.1%)	6.75	6.50	5.87	6.37
T_3 - Blanching + Citric acid (0.5%) + KMS (0.1%),	7.37	6.87	6.37	6.87
T_4- Blanching + Ascorbic acid (0.4%) + KMS (0.1%)	7.87	7.75	6.75	7.45
T_5- Control	6.37	6.25	5.50	6.04
Mean	7.07	6.79	6.01	6.62
	S.Em. ±		C.D. at 5 %	
Treatment (T)	0.23		0.66	
Storage (S)	0.18		0.51	
Interaction (T X S)	0.14		1.15	

Table 4: Effect of pre-treatments on overall acceptability of dehydrated jackfruit chips during storage at ambient temperature

Treatments	Overall acceptability			
	Storage (Days)			
	0	30	60	Mean
T_1 - Blanching,	6.62	6.36	5.87	6.28
T2- Blanching + Calcium chloride (0.5%)+ KMS (0.1%)	6.83	6.41	5.80	6.34
T_3 - Blanching + Citric acid (0.5%) + KMS (0.1%),	7.26	6.95	6.20	6.80
T_4- Blanching + Ascorbic acid (0.4%) + KMS (0.1%)	7.76	7.68	6.91	7.45
T_5- Control	6.52	6.29	5.76	6.19
Mean	6.99	6.73	6.10	6.61
	S.Em. ±		C.D. at 5 %	
Treatment (T)	0.08		0.24	
Storage (S)	0.06		0.19	
Interaction (T X S)	0.14		0.18	

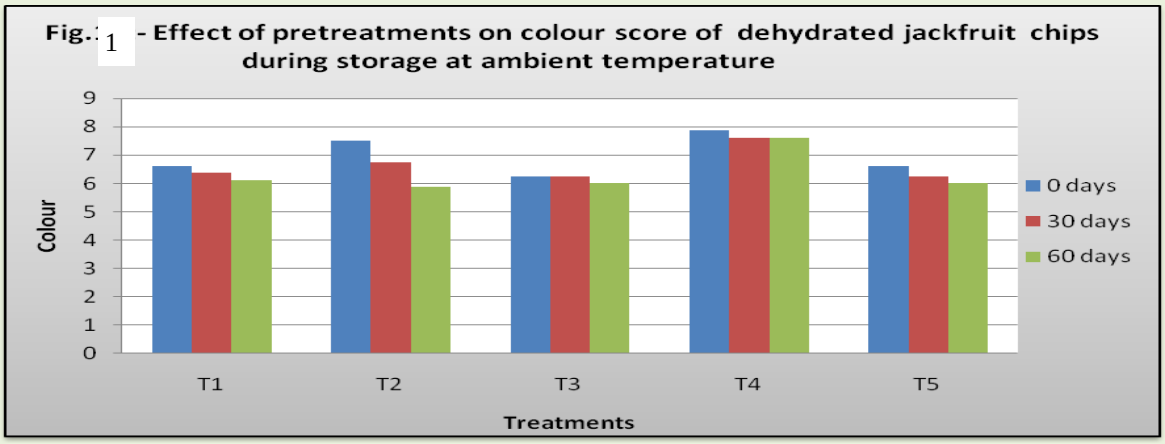


Fig. 1 - Effect of pretreatments on colour score of dehydrated jackfruit chips during storage at ambient temperature

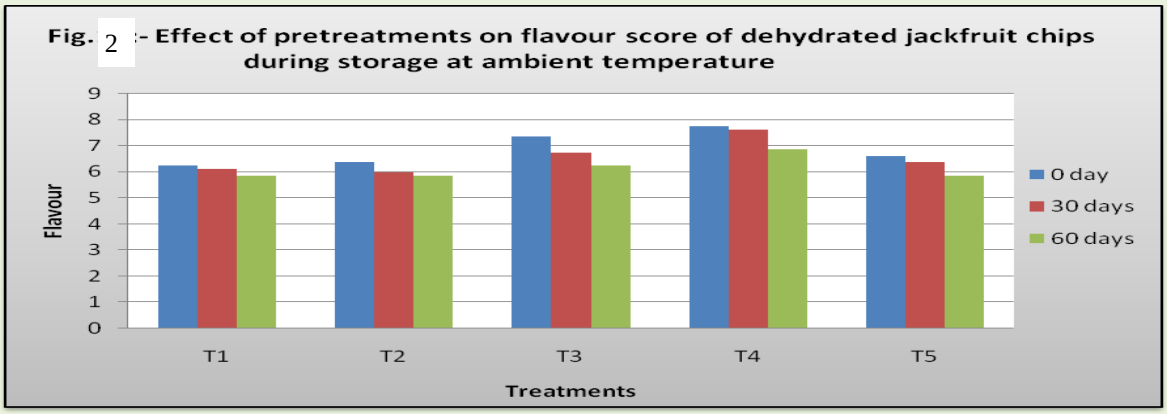


Fig. 2 :- Effect of pretreatments on flavour score of dehydrated jackfruit chips during storage at ambient temperature

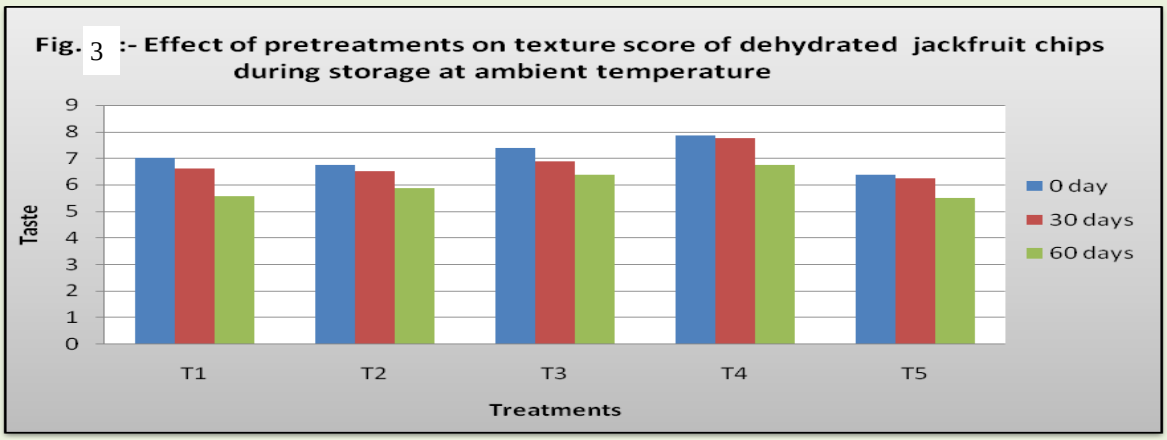


Fig. 3 :- Effect of pretreatments on texture score of dehydrated jackfruit chips during storage at ambient temperature

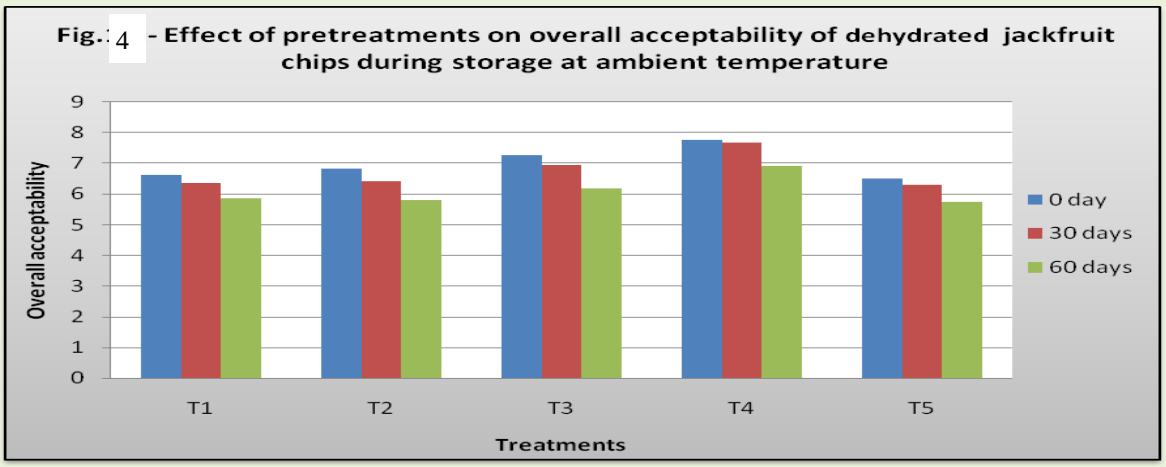


Fig. 4 - Effect of pretreatments on overall acceptability of dehydrated jackfruit chips during storage at ambient temperature