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Process Development for Brining of Tender Jackfruit

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A B S T R A C T

The study entitled "*Process development for brining of tender jackfruit*", was conducted in the Department of Food Science and Nutrition, College of Home Science, C.A.U., Tura during the period from Jan-June, 2018, to investigate the effect of pre-treatments and different types of packaging on the shelf-life of tender jackfruit. Brining was done at strengths of 8%, 10%, and 20% for minimal processing. The pre- treated samples of tender jackfruit were filled manually in PP (65 microns), standing pouch (75 microns) and glass jar with brine solution and sealed air tight. They were stored at room temperature for visual signs of spoilage. The findings of results indicated that 8% saline stored in glass jar and standing pouch showed better result in extending shelf-life of minimally processed tender jackfruit. Higher concentrations of brine lead to colour leaching, browning and cloudiness.

Introduction

Jackfruit (*Artocarpus heterophyllus*) trees belong to the family Moraceae. They grow abundantly in India, Bangladesh, and in many parts of Southeast Asia (Rahaman *et al.*, 1999). Jackfruit is the nation fruit of Bangladesh, and is commonly referred to as "poor man's food" as it is cheap and plentiful during the season. It is one the most significant evergreen trees in tropical areas and widely grown in Asia including India. It is a medium-size tree typically reaching 28 to 80 ft in height that is easily accessible for its fruit. The fruit is borne on side branches and main branches of the tree. Average weight of a single fruit is 3.5 to 10 kg and sometimes a fruit may reach up to 25 kg.

People consume it mostly as a fruit when ripe and also as vegetable in the tender stage. Jackfruit contains vitamin A, vitamin C, thiamine, riboflavin, calcium, potassium, iron, sodium, zinc, and niacin among many other nutrients. Jackfruit is also contains good amount of Vitamin C or ascorbic acid, which aids in building immunity and helps in iron absorption. The human body does not make vitamin C, so, one must eat foods that contains vitamin C to reap its health benefits. The health benefits of vitamin C are that it is an antioxidant that protects the body against

free radicals, strengthens the immune system, and keeps our gums healthy (Umesh *et al.*, 2010). Jackfruit contains phytonutrients: lignans, is of lavones, and saponins that have wide ranging health benefits. These phytonutrients have anticancer, antihypertensive, antiulcer and anti-aging properties. The phytonutrients found in jackfruit, can therefore aid in preventing cancers, in lowering blood pressure, fight against stomach ulcers, and can slow down the degeneration of cells that make the skin look young and vitae. Jackfruit is also a good source of niacin, also known as vitamin B3 which is necessary for energy metabolism, nerve function, and the synthesis of certain hormones (Soobrattee and others 2005).

Madhavan (1994) is of the view that in spite of the huge production of jack fruit, its processing has not gained much attention when compared to other fruits. Nunjundas way and Mahadeviah (1993) reported that the difficulty in the collection of fruit, separation of bulb from the rind, uncertainly and variability in the yield and quality are the major problems involved in the utilization of jack fruit. However, the fruit has a short shelf life and therefore cannot be stored for long time because of its inherent compositional and textural characteristics. Every year a considerable amount of jackfruit, specially obtained in the peak season (June-July) goes waste due to lack of proper postharvest knowledge during harvesting, transporting and storing, both in quality and quantity. Jackfruit is a heavy to transport and it has to be harvested when mature, only a few days days from ripening, so for fresh fruits, nearby markets are preferred. In places that are remote and where markets are far, processing into different value added products may be the only alternative. It adds variety to food items in dietary menu as well as contributes to generation of income and employment. So, it is now a burning issue to reduce the losses by developing processing techniques for jackfruit. Cottage industries and small scale jackfruit processing industries can be set up at the grass root levels. It can be hoped that with a continuous increase in agro based industries, unemployed people can be provided with work through auxiliary and useful services which would make rural life more prosperous in the near future.

In consideration of the above circumstances, the present study was under taken to develop processing techniques to increase the shelf life of tender jackfruit by way of using a brine solution of pre-determined strength.

Materials and Methods

A study was carried out to investigate the effect of pre-treatments and different types of packages on shelf life of tender jackfruit in brine solution. The pre-treatments included washing the fruit in 0.1% potassium metabisulphite (KMS), removal of outer covering/rind, washing with 0.1% KMS solution, chopping the fruit, blanching in hot water (70°C), cooling and brining. Treatment with KMS was done to sanitize the fruit and to maintain natural colour of the jackfruit. Sakhale *et al.*, (2012) reported in his study that the highest score of mango pulp with KMS as a chemical preservative is associated with more effective control of browning retaining original color. Brining was done at different strengths, viz., 8%, 10%, and 20%. Visual changes such as colour change were used as an indication for spoilage and shelf life. Two sets of samples were prepared; the first set included citric acid in the brine solution and the second set was brined without citric acid.

The control sample was given the same pre-treatments without brine solution. The aim was to find out the most suitable concentration of the brine and whether the

solution was better with or without added citric acid.

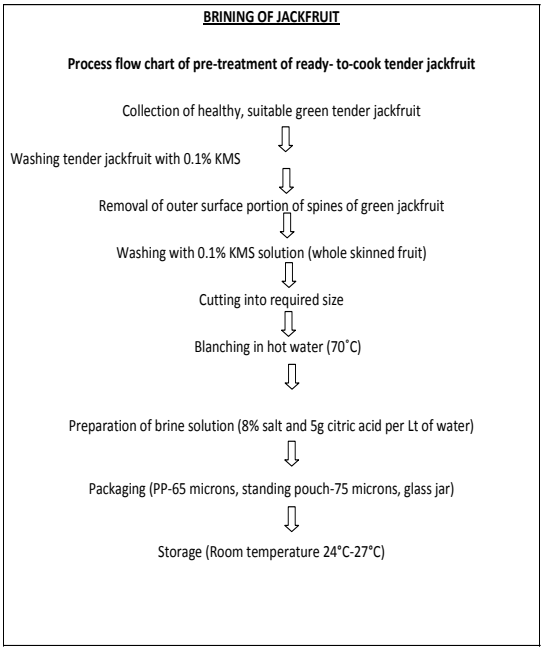
Packaging materials used for brining

Polypropylene (PP-65 microns)
Standing pouch (75 microns)
Glass Jar

Storage at room temperature

The pre-treated samples of tender jackfruit were filled in PP 65 microns (PP also known as polypropylene, which is a thermoplastic polymer used in a wide variety of applications of packaging), standing pouch (75microns) and glass jar with brine solution and sealed air tight. The packages were then stored at room temperature (24˚C-27˚C)

Process protocol for brining tender jackfruit



Results and Discussion

During the initial stage of the experimentation, utilising 10% and 20% brine solution with and without citric acid was carried out, but it did not yield a favourable result in prolonging shelf life. Also colour leaching and cloudiness was observed within a few days.

Further experimentation with glass jar for 10% and 20% brine solution of the same was not carried out because it did not give positive result in PP (65 microns) and standing pouch (75 microns). As a result, further studies of tender jackfruit with 8% brine solution in polypropylene (PP 300 gauges), standing pouch (75 microns) and glass jar was done. Shelf life of the control sample was only two days.

From Table 1, it can be observed that brine solutions with 10% and 20% strength did not have a good shelf life; a maximum of only 20 days reported from 10% brine strength without citric acid. However, it can be seen that 8% brine strength solution gave good results, especially in the standing pouch and glass jars, with and without citric acid added to the brine solution.

No visual changes were observed upto the end of the study period of six months (180 days), indicating a minimum of six month shelf life. Polypropylene pouches of 65 microns gave a shelf life of only 45 days.

There was no difference in the shelf life of tender jackfruit in brine (8%) with and without citric acid after 6 months of storage study using standing pouches (75 microns) and glass jars. Wabali and Simon (2013), studied the effect of brine solution on mushroom preserved at room temperature (26- 30°C) and results obtained indicates the preservative effect of brine solutions at 0-15 % concentration, the changes in colour, texture and smell were not significant while the shelf life remained the same as the control. However, 20% concentration of brine

solution showed a significant change in quality parameter as the concentration of brine solution increases the quality parameters of mushroom. Although there is no change in quality characteristic after 35% concentration but there is a 100% improvement in shelf life of mushroom when treated with 30% brine solution when compared with the control that had as shelf life of 3 days (Tale 1; Fig. 1 and 2).

Table.1 Formulation of RTC tender jackfruit in brine *WITH* Citric acid at ambient temperature

Formulation	Packing	Shelf life
T1 (8%)	PP (65 microns)	45 days
	Standing pouch (75 microns)	6 months
	Glass jar	6 months
T2 (10%)	PP (65 microns)	15 days
	Standing pouch (75 microns)	18 days
T3 (20%)	PP (65 microns)	7 days
	Standing pouch (75 microns)	10 days

Note:
T1= Treatment with 8 percent brine solution with citric acid
T2= Treatment with 10 percent brine solution with citric acid
T3= Treatment with 20 percent brine solution with citric acid
PP= Polypropylene (65 microns)

Table.2 Formulations of RTC tender jackfruit without citric acid at ambient temperature

Formulation	Packing	Shelf life
W1 (8%)	PP(65 microns)	30 days
	Standing Pouch (75 microns)	6 months
	Glass jar	6 months
W2 (10%)	PP (65 microns)	15 days
	Standing Pouch (75 microns)	20 days
W3 (20%)	PP (65 microns)	4 days
	Standing Pouch (75 microns)	5 days

Note:
W1=Treatment with 8 percent brine solution without citric acid
W2= Treatment with 10 percent brine solution without citric acid
W3= Treatment with 20 percent brine solution without citric acid

Fig.1 Shelf life study of Tender jackfruit in brine with citric acid

PP (65 MICRONS)

Fig: 1A: 8% solution with citric acid at 45th day

Fig: 1B: 10% solution with citric acid at 15th day

Fig: 1C: 20% solution with citric acid at 7th day

STANDING POUCH (75 MICRONS)

Fig: 1D: 8% solution with citric acid at 6 months

Fig: 1E: 10% solution with citric acid at18th

Fig:1F: 20% solution with citric acid at 10th day

GLASS JAR

Fig: 1G: 8% solution with citric acid at 6 months (No signs of spoilage)

Fig.2 Shelf life of Tender jackfruit in brine without citric acid

PP (65 MICRONS)

Fig: 2A: 8% solution w/o citricacid at 30th day

Fig: 2B: 10% solution w/o citric acid at15th day

Fig: 2C: 20% solution w/o citric acid at 4th day

STANDING POUCH (75 MICRONS)

Fig: 2D: 8% solutions w/o citric acid at 6 months (no signs of spoilage)

Fig: 2E: 10% solution w/o citric acid at 20th day

Fig:2F: 20% solution w/o citric acid at 5th day

GLASS JAR

Fig: 2G: 8% solutions w/o citric acid at 6 months(no signs of spoilage)

It is therefore concluded that tender jackfruit can be brined at 8% salt strength in glass jars or standing pouches of 75 microns for a period of at least six months. The brined tender jackfruit can be used as a vegetable in curries during the off season and can be easily transported to places where it is not available.

References

Madhavan, N., 1994. More fruits less processing. The Hindu daily, October 22 p.6.

Nunjundaswamy, A.N., and Mahadeviah, M. (1993) Fruit processing. Advances in Hort. 4. In: Chandha, K.L. and Pareek, O.P (Eds.). Malhotra Publishing House, New Delhi, pp.1835-1875.

Rahman, MA., Nahar, N, Mian, AJ, Moshiuzzaman, M. 1999. Variation of carbohydrate compostion of two forms of fruit from jack tree *(Artocarpus heterophyllus L)* with maturity and climatic condition. *Food Chem* 65: 91– 7.

Soobrattee, MA., Neergheen, VS, Luximon-Ramma, A, Aruma, OI, Bahorun, T. 2005. Phenolics as potential antioxidant therapeutic agents: mechanism and action. *Mutation Res* 579: 200– 13.

Sakhale BK., Pawar VN., Ranveer RC (2012) Studies on Effect of Chemical Preservatives on Keeping Quality of Kesar Mango Pulp. 1: 184

Wabali CV., and Obele S (2013). The Effect of Brine Solution on Mushroom (*Pleurotus ostreatus*) Preserved at Room Temperature (26-30ºC). Greener Journal of Agricultural Sciences, 3(6): 445-447,

Umesh, JB., Panaskar, Shrimant N, Bapat, VA. 2010. Evaluation of antioxidant capacity and phenol content in jackfruit (*Artocarpus heterophyllus Lam.*) fruit pulp. *Plant Foods Hum Nutr* 65: 99– 104

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