RESEARCH ARTICLE

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Development and Evaluation of Muskmelon-Banana Blended Fruit Leather

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ABSTRACT

Muskmelon is a highly perishable fruit of summers. It is mainly consumed as table fruit and has least uses in processing industry. Being a good source of sugars, vitamins, minerals and due to its refreshing nature, musk melon is a popular fruit in summers. But due to high moisture content the fruit can't be stored for a long duration resulting in high post harvest losses of the fruit. Banana is also a very good source of minerals and nutrients. Due to the climacteric nature, it ripens very fast and therefore, is highly perishable in nature. Overripe bananas, although being a rich source of sugar and calories are not consumed by people due to its poor and soggy texture. Efforts were made to develop fruit leather from musk melon to utilize its nutritional properties and reduce post harvest losses during summers. Over ripe bananas were used to sweeten the product. Muskmelon and over ripe banana were mixed in different proportions to prepare fruit leather. Treatment R_4 (Muskmelon-90%, banana pulp-10%) was adjudged best,on the basis of overall acceptability and nutritional quality. It contained fair amount of ascorbic acid, carotenoids, total soluble solids and sugars. Fruit leathers were palatable, with good texture and flavour.Development of muskmelon-banana leather was found to be an innovative idea to blend the various nutritive properties of muskmelon and over ripe banana together to increase the consumption and usage of both muskmelon and over ripe banana.

INTRODUCTION

Fruit leather or bar or slab is a self-stable confectionary, dehydrated product with softgel like texture. It has a long shelf life and does not require refrigeration. It can be prepared from fresh pulp, frozen pulp orcanned fruit. It is made by drying a very thinlayer of fruit puree and other ingredients in cabinet drier in the form of leathery sheets(Andress and Harrison, 1999). Natural fruitpulp based fruit bars are more tasty and nutritious since substantial quantity of dietary fibers, mineral, vitamins and other phytochemicals are present. Fruit leathers add value to fruit which may otherwise not be acceptable for the fresh produce market. Fruit pulp-based fruit leathers are nutritious and organoleptically acceptable to customers. They contain substantial quantities of dietary fibers, carbohydrates,minerals, vitamins, and antioxidants (which remain constituents of the finished product) (Ayotte, 1980 and Gujral and Brar, 2003).

Fruits like muskmelon have a short harvest season and are sensitive to deterioration and even when stored under refrigerated conditions. Besides, few fruits like banana have high rate of ripening because of their climacteric nature resulting in fast deterioration of ripe fruits. Therefore, making fruit leather from such fruits is an effective way to preserve such highly perishable fruits (Maskan et al., 2002). Fruit leathers are manufactured by dehydrating a fruit puree into a leatherlike sheet (Raab and Oehler, 1976).Fruit leathers are often considered as a health food (Vatthanakul et al., 2010) Blending of different fruits by processing into nutritious fruit leather can be explored to obtain phyto-nutritional benefits from bothfruits (Sreemathi et al., 2008; Dwivedi et al.,2015; Uttarwar et al., 2018).

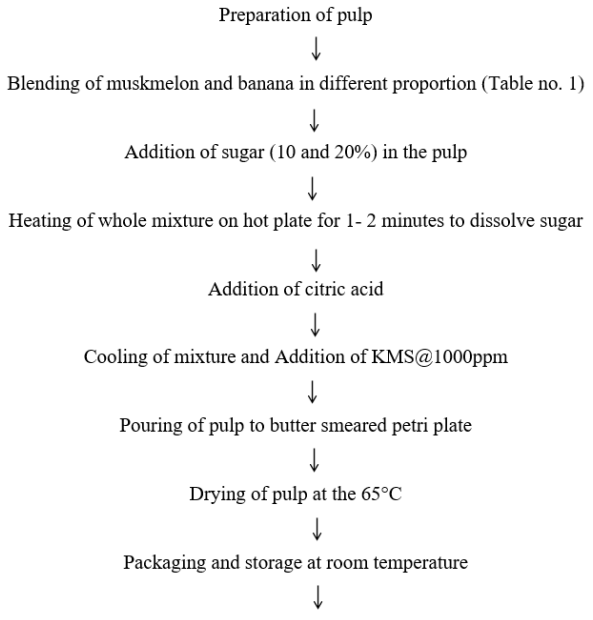
Present experiment was conducted to standardize nutritionally rich and tasty blended fruit leather from muskmelon and overripe banana fruits in order to utilize their nutritional potentials and reduce their post harvest losses.

MATERIALS AND METHODS

The present investigation was carried out at Post Harvest Technology Laboratory, Amity International Centre for Post Harvest Technology and Cold Chain Management, Amity University Uttar Pradesh, NOIDA. Muskmelon var. 'Punjab Hybrid' and banana var. 'Grand Naine' was purchased from Gazipur Vegetable *Mandi*, Ghaziabad. Fully ripe fresh fruits, uniform in size and shape, free from transportation injuries, bruises, insect damage and diseases which are uniformly ripened were selected. Both fruits were washed properly with running tap water to remove any adhering foreign matter. Pulps of muskmelon and banana fruits were extracted as per the standard methods.

Preparation of Fruit Leather

Muskmelon pulp and over ripe banana pulp were mixed in different proportions (Table 1) for standardisation of the recipe for preparation of fruit leather. Varying concentrations of table sugar (10 and 20 %) was added to the fruit mixture and acidity was maintained as 0.5 per cent. The pulp mixture was spread in a butter smeared SS tray and dried in a mechanical drier at a temperature of 60°C for 7 hours.



Flow chart: Preparation of fruit leather

Physico-chemical Analysis

Developed fruit leathers were analyzed for various physical and biochemical constituents.Total carotenoids and ascorbic acid content was recorded as per the methods of AOAC (1995). Organoleptic quality evaluation of blended fruit leather was done by a panel of semi-skilled judges (6) by adopting a hedonic rating scale. The experiment was laid out in completely randomized design comprising of 3 replications. Mean values were evaluated by critical difference (CD) test at 5 % level of significance by using ANOVA.

RESULTS

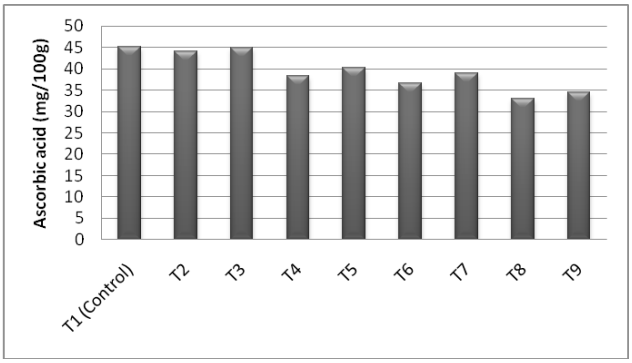
Data showing physico-chemical characteristics of muskmelon and banana has been presented in the Table 1. The average TSS for muskmelon and banana was recorded as 7.0°B and 14.0°B respectively. The average ascorbic acid content in muskmelon was recorded as 75.16mg/100g. The maximum pulp recovery was recorded as 72.80 per cent in muskmelon .Table 3 presents the total carotenoids content of mix fruit leather. Plain muskmelon leather had highest ascorbic acid and total carotenoids content as 45.20 mg/100g and 79.27mg/100g, respectively. Due to more content of ascorbic acid in muskmelon, the treatments with more proportion of muskmelon pulp showed higher ascorbic acid content. Thesimilar pattern of data has been observed in blended guava-papaya leather(Singh and Tiwari, 2019) and bael-aonla leather(Dwivedi *et. al*. 2015). The maximum total carotenoids content was recorded in T2 (78.65mg/100g) except control followed by T3 and T4. The maximum ascorbic acid content was recorded as 45.20 in control which was statistically at par with T2 and T3. Sensory score of muskmelon-banana

Table 1: Standardization of recipe for development of fruit leather

Sl. No.	*Musk melon pulp (%)*	*Banana pulp (%)*	*Acidity (% citric acid)*	*Sugar (%)*
$T_{1\ (Control)}$	100	-	-	-
T_2	100	-	0.5	10
T_3	100	-	0.5	20
T_4	95	5	0.5	10
T_5	95	5	0.5	20
T_6	90	10	0.5	10
T_7	90	10	0.5	20
T_8	80	20	0.5	10
T_9	80	20	0.5	20

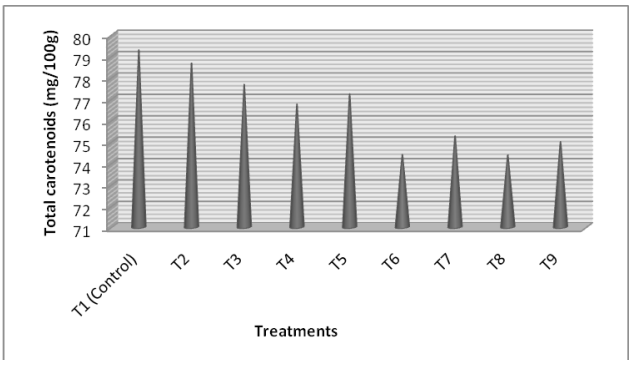
Table 2: Physico-chemical characteristics of muskmelon, banana and lemon juice

Parameters	*Muskmelon*	*Banana*
Weight (g)	521±25.80	136.0±2.14
Pulp (%)	72.80±1.24	56.61±2.68
Pomace (%)	27.20±3.21	43.39±2.51
TSS (°B)	7.0±1.23	14.0±1.50
pH	6.5±0.24	5.0±0.65
Ascorbic acid (mg/100g)	75.16±1.75	5.21±1.42



$CD_{(0.05)}$= 2.48

Figure 1: Ascorbic acid content of muskmelon-banana leather

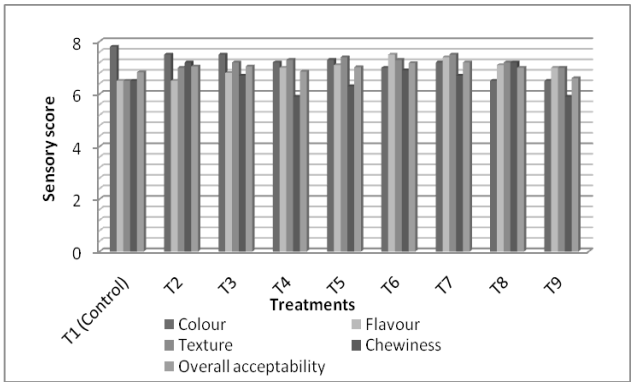


$CD_{(0.05)}$= 3.89

Figure 2: Total carotenoids content of muskmelon-banana leather

leather has been presented in Figure 3. The data showed that muskmelon-banana pulp mix (90:10) containing 20% sugar for sweetening scored maximum for overall acceptability value (7.20) which was statistically at par with T6 (containing 10% sugar).

In blended fruit leather, a significant difference with respect to ascorbic acid, carotenoids as well as sensory attributes such as colour and texture was recorded in all the treatments. Blended fruit leather made using muskmelon pulp and banana pulp in the ratio of 90:10 and



$CD_{(0.05)}$= 0.08 (for overall acceptability score)

Figure 3: Sensory score of muskmelon-banana leather

sweetened with 20% sugar (T_7) was found best among all the treatments based on sensory parameters. Therefore, blending of these fruits for preparation of leather can be successfully explored for sustainable use of these highly perishable commodities.

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