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Studies on Preparation and Quality of Nutrie Banana Almond fruit leather

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Abstract— **A present investigation was carried out with the objectives to study preparation and quality characteristics of banana almond leather with the incorporation of milk powder. The various trials were taken for formulation of recipe with the varying quantity of almond and banana pulp. The result outcome of this research is that, a good quality fruit based leather can be prepared by using Banana pulp 430 g, Almond powder 15 g, Milk powder 40 g, Okara (Soy milk residue) 4g, Sugar 38.79 g, Citric acid 0.862 g and KMS 0.862 g. The prepared leather founds a concentrated source of nutrients viz., Moisture 17g/100g, Protein 10.21g, Carbohydrate 61.63g, Fat 5.86g, Ash 2.42g and Fibre 2.5 g/100 g. Also it is a good source of Calcium 220 mg/100g, Phosphorous 67.7 mg/100g, Potassium 348 mg/100g and Magnesium 57 mg/100g. Beyond the basic chemical composition it is a very good source of Omega fatty acids and essential amino acids as it's fortified with an almond and milk powder. The leather having good consumer acceptability as per sensory evaluation conducted by semi trained panel members. The prepared leather can be stored for long time with better packaging material preferably LDPE and wrapped with butter paper at ambient temperature.**

Key words: Banana, Almond, milk powder, Nutritional leather, Storage.

I. INTRODUCTION

Fruit leather is a concentrated fruit product with good nutritive value. Fruit leathers are high calorie foods and are a rich source of the vitamins and minerals. It is classified as a confectionary product with longer shelf life.

Banana is the common name for herbaceous plants of the genus Musa and for the fruit they produce. It is one of the oldest cultivated plants. Bananas are an excellent source of potassium. Potassium can be found in a variety of fruits, vegetables, and even meats, however, a single banana provides you with 23% of the potassium that you need on a daily basis. Bananas contain 41% of what you need each day in vitamin B6; you will find that eating bananas helps to increase your focus and mental acuity (Sampath Kumar, 2012). Banana is the second largest produced fruit after citrus, contributing about 16% of the world's total fruit production (FAO, 2009). Nuts have been the food of man from the earliest times in many parts of the world. Their significance in the nutrition of man is based on their nutritive value as they contain a significant amount of high quality proteins and vital mineral. The superior quality of nut proteins makes them good substitutes for animal food and good sources of edible oils and fats (Olatidoye, 2011).

Okara is a by-product generated during tofu or soymilk production processes. It contains about 50% dietary fiber, 25% protein, 10% lipid, and other nutrients (Bo, 2012).

Milk contains all the essential nutrients for all physiological function of the body system. Dry milk or powder milk is a product obtained by the removal of water and fat from whole milk, usually fat percent of whole milk powder is minimum 26% and maximum 40%, for partially skimmed milk powder minimum 1.5% and maximum 2.5%. For all types of powder milk water content ranges from 3-5% (Edgar Spreer, 1995).

Materials and Methods

Raw material

The raw material required to prepare banana almond leather such as banana, almond, whole milk powder etc. was purchased from local market of Pune. The okara was prepared at laboratory for the preparation of banana almond leather.

Methodology

Preparation of Banana Almond Leather

Fruit leather refers to fruit purees or a mixture of fruit juice concentrate and other ingredients which are cooked, dried on a non-sticky surface and rolled (Bryk, 1997 and Huang and Hsieh, 2005).

Physicochemical analysis of Banana Almond Leather

The physicochemical analysis of final product viz. Moisture, Carbohydrate, protein, fat, calcium, phosphorus, potassium, Mg, vitamin, etc. was determined by AOAC, (1990) and Ranganna, (2007).

The banana almond leather was prepared by using following methodology given by Giridharilal and Siddhappa, (2006).

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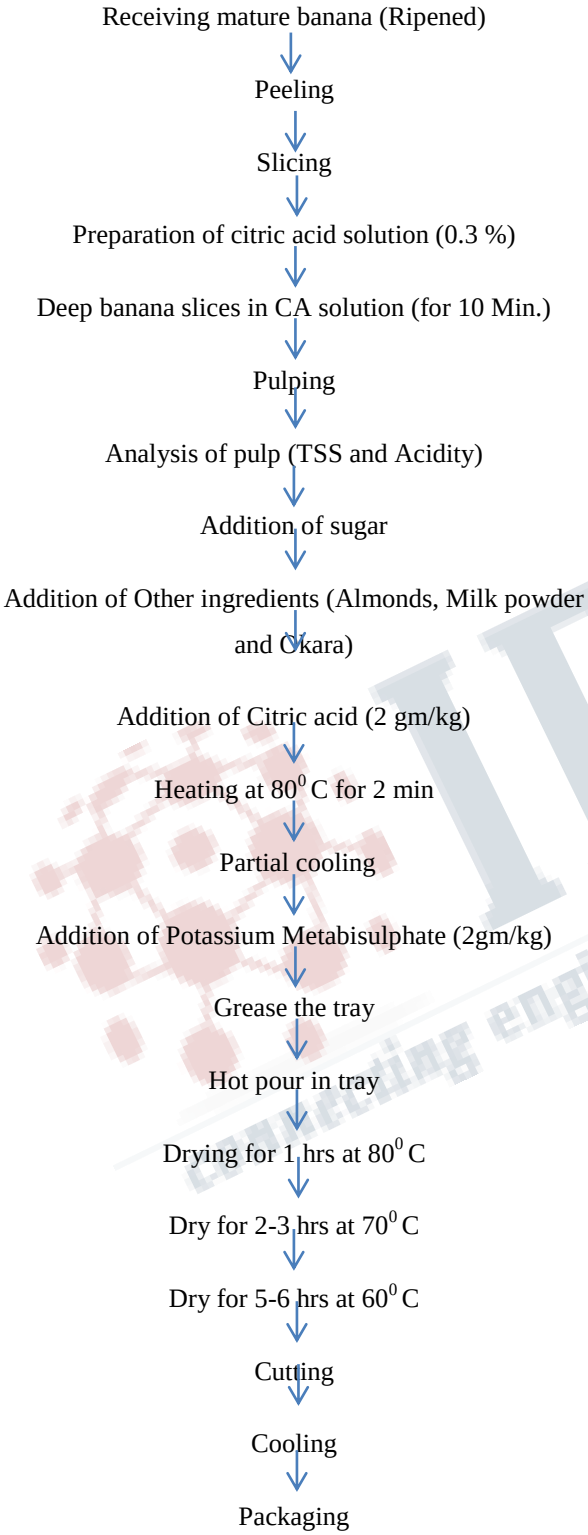

Optimization of Banana Almond Leather

The optimization process was carried with the formulation of leather, the banana and almond composition was optimized by sensorial evaluation of final product by semi trained panel members. The recipe for fruit leather was taken from Giridharilal and Siddhappa, (2006) book, and the final fortification of almond and milk powder was done by trials taken during optimization

Table 1. Optimization of Banana Almond leather

Ingredient/ Treatment	T1	T2	T3
Banana pulp (gm)	430	425	420
Almonds (gm)	05	10	15
Okara (gm)	4	4	4
Citric acid (gm)	0.862	0.862	0.862
Milk powder (gm)	40	40	40
Sugar (gm)	38.79	38.79	38.79
KMS (gm)	0.862	0.862	0.862

.Sensory evaluation of Banana Almond leather

The sensory evaluation of prepared banana almond leather was carried out as per the 9 point Hedonic scale method. The semi-trained panel of 5 members was there for sensory evaluation. Panelists were instructed to evaluate how much they liked appearance, texture, and overall acceptability of starch noodles on a hedonic scale.

Results and Discussion

Nutritive value of Banana

The bananas are an important dietary source of vitamin C and minerals especially Potassium and Phosphorous. Also

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it has been found that banana is a good source of thiamin riboflavin, nicotinic acid and folic acid.

Table 2. Chemical composition of ripen banana fruit

Constituents	Values per 100g
Moisture content, (g)	69
Protein, (g)	1.4
Fat, (g)	0.25
Minerals (g)	0.75
Carbohydrates, (g)	28.2
Calcium, (mg)	16
Phosphorus, (mg)	34.0
Iron, (mg)	0.81
Riboflavin, (mg)	0.07
Vitamin C (mg)	6.5

According to Table 2, banana is a good source of energy i.e. carbohydrate 28.2 g/100g, Also it contains a good amount of minerals and important vitamins viz. Phosphorous (34 mg), Iron (0.81 mg), Riboflavin (0.07 mg) and Vitamin C (6.5 mg) the similar findings were recorded by Gopalan *et al.* (1989).

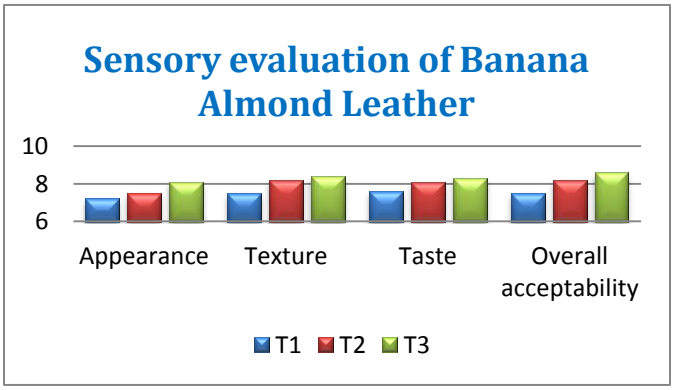
Sensory evaluation of Banana Almond Leather

The sensory evaluation of food products is a one of most important testing for quality judgement. The results pertaining to sensory evaluation of leather is stated in following Table 3 and Graph 1.

Table 3. Sensory evaluation of Banana Almond Leather

Sample	Appearance	Texture	Taste	Overall acceptability
T1	7.2	7.5	7.6	7.5
T2	7.5	8.2	8.1	8.2
T3	8.1	8.4	8.3	8.6
Mean	7.6	8.03	8.0	8.1
SE	0.9670	0.9653	0.9616	0.9654
CD@5%	2.9109	2.9060	2.9081	2.9063

Withholding to above Table 3, it could be visualized that the score for appearance varies from 7.2 to 8.1. The sample T3 secured highest score followed by T2 and T1 with 7.5 and 7.2 respectively. The texture is a very important property as with respect to leather. The score of texture ranged from 7.5 to 8.4, whereas T3 (8.4) has highest and T1 (7.5) lowest. Moreover, the taste of lather greatly affected by its formulation and it could be seen from it score ranged from 7.6 to 8.3, whereas T3 (8.3) gains highest and T1 (7.6) lowest one. The overall acceptability is an index parameter of foods to be determined at last of sensory evaluation. The score varies from 7.5 to 8.6, whereas T3, T2 and T1 secured 8.6, 8.2 and 7.5 respectively. According to sensorial evaluation, the sample T3 founds more significant than other two samples.



Graph 1. Sensory evaluation of Banana Almond Leather

Physicochemical analysis of banana almond leather

The physicochemical composition of banana almond leather is narrated in following Table 4.

Table 4. Physicochemical analysis of banana almond leather

Nutrients	Values Per 100 gm
Moisture content (g)	17
Protein (g)	10.21
Carbohydrate (g)	61.63
Fat (g)	5.86
Ash (g)	2.42
Fibre (g)	2.5
Calcium (mg)	220
Phosphorous (mg)	67.7
Potassium (mg)	348
Magnesium (mg)	57

*Each value is of three determinations

The prepared product is of good nutritional value and contributes important nutrients. The results pertaining to chemical composition are narrated in above Table 4. The values related to chemical composition exploits that it Contains Moisture 17, Protein 10.21, Carbohydrate 61.63, Fat 5.86, Ash 2.42 and Fibre 2.5 g/100 g. Also it is a very good source of Calcium 220mg, Phosphorous 67.7mg, Potassium 348mg and Magnesium 57mg/ 100g (Pratima and Puneet, 2015).

CONCLUSION

A banana, almond and milk powder are the good sources of nutrients like, carbohydrates, protein and fats with essential micronutrients viz. minerals and vitamins. Good quality leather can be prepared from banana and almond with other ingredients like milk powder and etc. The prepared leather can be stored for specified time under prompt conditions like, suitable packaging (HDPE, Aluminum foil) and ambient temperature (preferably refrigeration). The prepared product is a good source of required nutrients like carbohydrate, protein's, fats and other nutrients.

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