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RESEARCH ARTICLE

DEVELOPMENT OF INSTANT SOUP MIX (ISM) FROM BANANA PEEL

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ABSTRACT

The study was carried out with the objective to develop an Instant Soup Mix from banana peel and ascertain it's quality and shelf life. Physical characteristics, Sensory qualities of product, Nutrient profile, Chemical composition and shelf life were investigated. When sensory qualities among different formulations were evaluated S_1 got significantly higher values for appearance, colour and taste. It comprised of banana peel flour, corn flour, onion powder, capsicum powder, coriander leaves powder, white pepper powder, ginger powder, garlic powder, citric acid and salt. Among the physical qualities bulk density was found to be 0.81g/ml and moisture content was observed to be 6.4%.Instant soup mix found to be rich in calories (284 kcal),carbohydrate (48.6g) and minerals (potassium-62.8 mg,calcium-40.7mg and sodium-18.5 mg).The product did not reveal any pathogenic organism when stored for three months in laminated pouches.

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INTRODUCTION

Banana belonging to the family *musaceae* is a most important and popular fruit consumed worldwide by all sections of people. Banana is consumed in fresh form and processed forms like chips, puree or pulp, powder, jams, juice, bars, biscuits, wine and many more. Whatever be the form of consuming, 30-40 per cent of banana peel is generated as waste. Banana peels are thick ropey-textured with skin colour varying from green to yellow. This by -product is also known to cause an environmental problem, because it contains large quantities of nitrogen and phosphorous. Besides the high water content in it, makes it susceptible to attack by microorganisms. At present these peels are not used for any other use, but discarded and dumped (Robards *et al*., 2009). Emaga (2007) reported that banana peel is a rich source of starch (3%), crude protein (6-9%), crude fat (3.8-11%) and total dietary fibre (43.2-49.7%). It also comprises of polyunsaturated fatty acids and essential aminoacids. Due to the high nutritional benefits and the unexploited abundant availability, a value added product from banana peel was attempted.

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The objective of this study was to To develop an instant soup mix and ascertain its quality and shelf life.

MATERIALS AND METHODS

The methodology is discussed under the following heads.

- Selection of variety
- Collection of sample
- Standardization and product development
- Packaging and storage
- Quality assessment of the product

Selection of the variety

Nendran is a popular variety in Kerala. Banana peel of *cv* nendran variety was utilized for the study.

Collection of the sample

Fresh peels of nendran were collected from chips making unit at East fort, Trivandrum

Standardization and product development

In the recipe verification stage the selected recipe was reviewed for ingredients and quantity. The selected recipe was standardized to ensure consistency in the quality and quantity

of product. Recipe was replicated three times. Each time the yield and acceptability of the product were noted for bringing about any change.

Standardization of Instant soup mix

Fresh peels were washed under running water and cut into medium sized slices and the peels were subjected to blanching to prevent darkening and control microbial infestation. Blanching time, pre-treatment media and immersion time of banana peel were standardized by analyzing the scores of Overall visual quality (OVQ), by a panel comprises of 10 members using a 1 -9 point scale where, 9 refers to excellent and fresh appearance, 7 to good, 5 to fair (limit of marketability), 3 to fair useable but not saleable and 1 to unusable (Yuan *et al.,* 2010).

Formulations of banana peel Instant based soup mix (ISM)

The peels were dried in an electric oven at 60-65°C for 4-8 hrs till breaking stage. The product was then cooled and powdered in a food processor and sieved. The adjuncts in soup mix namely onion powder, citric acid, corn flour, capsicum powder, coriander leaves, white pepper powder, ginger powder, garlic powder and salt were mixed in different combinations and proportions (g) as given in Table 1.

parameters like cost, shelf life and sensory attributes were also ascertained.

Physical Characteristics of Instant soup mix

Appearance, moisture, yield, rehydration ratio, bulk density and water absorption index of the developed banana peel products were studied using standard methods.

Nutrient Composition

Nutrient composition of the developed products were analysed using the standard procedures as listed below.

Carbohydrate (g)	Sadasivam and Manikkam (1992)
Protein(g)	Bradford (1976)
Calories(Kcal)	Gopalan *et al* (2009)
Fibre (g)	Sadasivam and Manikkam (1992)
Total minerals(mg)	Thimmaiah(1999)
Calcium (mg)	Jackson (1973)
Iron(mg)	Jackson (1973)
Total acidity	AOAC (1990)
Reducing sugar	AOAC (1990)
pH	PHmeter
TSS	Refracto meter

Table 1. Formulations of banana peel based instant soup mix

Sl.No.	Soup mix	Ingredients	Proportion of ingredients(g)
1.	S1	Banana peel flour+onionpowder+cornflour+citricacid+capsicum powder+coriander leaves powder+white pepper powder+ ginger powder+garlicpowder+salt	5: 4: 1.5: 0.5: 0.25: 0.25: 0.5: 0.25: 0.25: 2
2.	S2	Banana peel flour+onionpowder+cornflour+citricacid+ capsicum powder+coriander leaves powder+white pepper powder+gingerpowder +garlicpowder+salt	5: 3: 1.5: 0.4: 0.25: 0.25: 0.5: 0.25: 0.25: 2
3.	S3	Banana peel flour+onionpowder+cornflour+citricacid+capsicum powder+coriander leaves powder+white pepper powder+gingerpowder+garlicpowder+salt	4: 4: 1.5: 0.3: 0.25: 0.25: 0.5: 0.25: 0.25: 2
4.	S4	Banana peel flour+onionpowder+cornflour+citricacid+capsicumpowder+coriander leaves powder+white pepper powder+gingerpowder+garlicpowder+salt	4: 5: 1.5: 0.2: 0.25: 0.25: 0.5: 0.25: 0.25: 2
5.	S5	Banana peel flour+onionpowder+cornflour+citricacid+capsicumpowder+coriander leaves powder+white pepper powder+gingerpowder+garlicpowder+salt	5: 4: 1.5: 0.1: 0.25: 0.25: 0.5: 0.25: 0.25: 2

All the adjuncts were dehydrated at 65°C and powdered separately. They were then mixed thoroughly to form the instant soup mix (14.5g). Soup was prepared by boiling 200ml of water and adding the soup mix as a paste and simmering for 1 mt. The 5 formulations were prepared and subjected to sensory evaluation. The cooked weight of product was noted.

Packaging and storage

The standardized banana peel based Instant soup mix was stored in laminated pouches was kept in ambient conditions and the shelf life was assessed in periodic intervals for 3 months.

Quality evaluation of the developed banana peel instant soup mix

Quality parameters with respect to physical, chemical and nutritional characteristics of the product analyzed. Besides

Shelf Life Study

The shelf life of the developed soup mix was evaluated at monthly intervals up to three months in terms of sensory attributes, moisture and microbial profile.

Cost of the Developed Products

Cost of the developed products of the mixes were worked out based on input cost i.e. cost of different ingredients used for the preparation of the product, cost of packaging materials and over head charges (10 per cent of the cost of products were added as overhead charges towards fuel and labour).

Statistical Analysis

In order to obtain suitable interpretation, the generated data was subjected to statistical analysis – measures of central tendency and Anova test were the main tools adopted.

Table 2. Sensory quality of various formulations of instant soup mix

Treatments	Appearance	Colour	Flavour	Texture	Taste	Overall acceptability
S_1	4.40	4.20	4.20	4.00	3.90	4.00
S_2	3.70	3.60	3.40	3.30	3.20	3.40
S_3	3.40	3.40	3.30	3.20	3.00	3.40
S_4	3.30	3.40	3.60	2.90	2.90	3.20
S_5	3.40	3.20	3.10	3.00	2.60	3.10
CD (0.05)	0.513	0.501	0.495	0.488	0.463	0.451

On the basis of analysis of scores S1 selected as best combination

RESULTS

Identification of the best treatments

Best treatments were identified based on the analysis of OVQ scores. As for pretreatments five minutes was selected as the optimum time for blanching, citric acid (0.5%) and salt (3%) was selected as the best pre treatment media and 10 mts was selected as the optimum time for immersion of the raw material. In the present study, five combinations of instant soup mixes were formulated keeping the banana peel flour as the major ingredient and varying the amount and proportion of adjuncts used.

A Sensory panel comprising of 10 judges evaluated the various formulations with respect to the five parameters namely, appearance, colour, texture, flavour, taste and overall acceptability. For the processing of ISM, drying and blending technique was used.

In this processing method the ingredients such as banana peel, onion, capsicum, coriander leaves, white pepper, ginger and garlic were dried and powdered at 60-65 °C for 6-8 hours. They were blended with other ingredients such as corn flour, citric acid and salt in different proportions

Sensory quality of ISM

The mean scores of sensory panel were analyzed for appearance, colour, texture, flavour, taste and overall acceptability. The results are depicted in Table 2.

Quality evaluation of instant soup mix (ISM)

The physical characteristics assessed for instant soup mix were moisture, yield, bulk density and water absorption index. Table 3 represents the physical characteristics of banana peel based instant soup mix.

Table 3. Physical characteristics of the soup mix

Physical characteristics	Instant soup mix
Moisture (%)	6.4
Yield Ratio	0.06
Bulk density(g/ml)	0.81
Water absorption index (per g)	13.5

Chemical/Nutrient composition

Nutrients analysed under the experiments were carbohydrate, protein, calories, fibre, minerals like K, Na, Ca and Fe, acidity, reducing sugar, TSS and pH. The profile assessed is presented in Table 4.

Table 4. Nutrient composition of Instant soup mix

Sl No	Nutrients	Amounts
1	Carbohydrate (g)	48.6
2	Protein (g)	7.5
3	Fibre (g)	9.4
4	Calories (kcal)	268
5	Sodium (mg)	18.5
6	Potassium(mg)	62.8
7	Calcium (mg)	40.7
8	Iron (mg)	2.62
9	Acidity (%)	0.76
10	Reducing sugar(%)	1.07
11	TSS (%)	20.03
12	pH	3.10

Instant soup mix was found to be rich in calories, carbohydrate and minerals.

Shelf life

Shelf life study of soup mix was evaluated in monthly intervals up to three months. From the analysis, it was observed that there was slight variation in the moisture content and sensory attributes of the soup mix than fresh soup mix, but no pathogenic organism could be detected in the developed product.

Cost of the product

The cost of instant soup mix was calculated to be Rs. 25 per kg.

Conclusion

This study concludes that the development of instant soup mix from banana peel is an excellent value added product of banana peel and is also seen to have acceptability with respect to all parameters like appearance, colour, flavour taste and texure. The nutrient profile of the product was also appealing from health point of view.

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