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Protocol Development for flavoured banana chips

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ABSTRACT: *The possibility of development of flavoured banana chips was explored by adding different flavor imparting substances like garlic, black pepper, curry leaves and coriander leaves in fresh and dry forms at 1% & 2% concentrations and they were subjected to preliminary evaluation by organoleptic studies.Addition of 2% concentration was found necessary for imparting superior sensory qualities and oven dried powdered form was superior to its fresh form in all flavour imparting substances tried. On further sensory evaluation 2% garlic powder added chips was selected as the best flavoured chips by the sensory panel. It was having highest mean rank for appearance (8.10), colour (7.90), flavor (9.10), taste (9.00) and crispness (8.30).*

Key words*: spice flavouredbanana chips, antioxidants, sensory quality*

INTRODUCTION

Herbs and spices are added to dishes and snacks to beneficially improve the health status of the consumer without detrimental effect on flavor and taste. Spices and herbs are aromatic and pungent food ingredients with significant antioxidant activities [13].Flavours and seasonings are important considerations for snacks [16] and herbs could be used as both flavouring and functional ingredients [11] in snack foods.

Organosulphur compounds in garlic like s-allylcysteine and s-allylmercaptocysteine have potent antioxidant activity [9]. Both water and ethanol extract of black pepper exhibited strong antioxidant activity [8]. Antioxidant protein compounds isolated from curry leaf was effective in scavenging free radicals at 150 fold lesser concentration compared to BHA and tocopherol (400 µM) [3].Two antioxidant compounds namely mahanimbine and koenigine were isolated from curry leaf [5]. Coriander extracts containphenolics and caroteinoids which exhibit a considerable antioxidant action [6]. Wangensteen*et al*. [15] found that coriander leaves showed higher antioxidant activity than seeds. They suggested that addition of coriander to food will increase the antioxidant content and may have potential as a natural antioxidant inhibiting unwanted oxidation process.

Research on the use of these flavor imparting substances having antioxidant properties on food products are gaining momentum, which can also combat lack of variety in banana chips. Chips makers are seeking for such materials which could attract the snacking behavior of all age groups.

MATERIALS AND METHODS

For fullfilling the objective of developing flavoured banana chips, flavor imparting substances like garlic (G), black pepper (Bp), curry leaves (C) and coriander leaves (Co) were added directly to frying oil at 1% & 2% concentrations in its fresh and oven dried powdered form during preparation of chips [12].

The prepared chips were organoleptically evaluated using a 9 point hedonic scale by a 30 member semitrained panel. The panel was asked to rank the flavoured chips. The chips having maximum score was identified from each type of flavor imparting substances.

Flavoured chips were prepared using the best treatments selected from preliminary study and compared by evaluating their sensory quality attributes to select the best flavoured chips. The panel were asked to score the appearance, colour, flavor, taste, crispiness and overall acceptability of the sample using a specially designed score card.In

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organoleptic analysis, the different preferences as indicated by scores were evaluated by Kruskall – Wallis test to get the mean rank values for all the treatments.

RESULTS AND DISCUSSION

The developed flavoured chips were subjected to preliminary evaluation by conducting organoleptic studies and mean rank values for each attribute are presented in Table 1.

Sensory Quality of garlic flavouredchips

Highest mean rank value for appearance (31.05), flavor (34.40) and taste (34.95) was recorded by banana chips prepared by adding 2% oven dried garlic powder. No significant difference existed between the banana chips regarding colour and textural attributes.

Table 1
Mean sensory rank values of flavouredbanana chips

	Mean Sensory Rank Values				
Treatments	*GARLIC*				
	Appearance	*Colour*	*Flavour*	*Taste*	*Texture*
FC1	9.90	20.20	9.75	12.90	16.50
FC2	11.90	17.40	11.65	12.90	15.80
PC1	29.15	21.55	26.20	21.25	24.00
PC2	31.05	22.85	34.40	34.95	25.70
		BLACK PEPPER			
FC1	19.35	20.50	12.10	16.00	22.10
FC2	21.35	22.50	12.10	14.50	20.50
PC1	20.80	20.50	22.30	16.00	20.50
PC2	20.50	18.50	35.50	35.50	18.90
		CURRY LEAF			
FC1	12.00	12.00	16.65	18.55	15.80
FC2	9.90	14.95	19.55	15.45	17.50
PC1	29.30	29.85	17.10	18.55	15.80
PC2	30.80	25.20	28.70	29.45	17.50
		CORIANDER LEAVES			
FC1	15.25	20.55	17.20	14.50	19.20
FC2	15.80	19.00	14.40	16.00	17.50
PC1	20.35	19.00	14.90	16.00	22.70
PC2	30.60	23.45	35.50	35.50	22.60
CV			10.25		

Sensory quality of black pepper flavouredchips

Highest mean rank value for flavour (35.50) andtaste (35.50) was recorded by banana chips prepared by adding 2% oven dried black pepper powder. Though no significant difference existed for appearance, colour and texture, banana chips prepared by direct addition of 2% oven dried black pepper powder recorded highest mean rank value for flavor (35.5) and taste (35.5). Tarko*et al*. [14] reported that black pepper flavoured apple chips was accepted only by a very narrow group of consumers preferring spicy food.

Sensory quality of curry leaf flavoured chips

Highest mean rank value for appearance (30.80), colour (29.85), flavor (28.70)and taste (29.45)was recorded by banana chips prepared by adding 2% oven dried curry leaf powder. There was no significant difference between treatments with respect to its texture.

Sensory quality of coriander leaf flavoured chips

Highest mean rank value for appearance (30.60), flavour (35.50) and taste (35.50) was recorded by banana chips prepared by adding 2% oven dried coriander leaf powder. No significant difference existed between treatments with respect to its colour and texture.

Considering the overall performance of the samples, the application of 2% concentration of flavor imparting substances in powder form was selected for further study.

Banana chips prepared after direct addition of 2% oven dried curry leaf powder into frying oil recorded highest mean rank values for appearance (30.80), colour (29.80), flavor (28.70) and taste (29.45). Banana chips prepared by directly adding 2% oven dried coriander leaf powder to frying oil recorded highest mean rank values for appearance (30.60), flavor (35.50) and taste (35.50). Flavor and colour of chips treated with fresh coriander/curry leaves was not good as that of chips with corresponding leaf powders. During drying chlorophyll converted to pheophytins causing a colour change from dark green to olive brown which is undesirable to the consumer. Alibas [1] reported that blanching prior to frying could greatly reduce chlorophyll loss.

When overall acceptability of all flavoured banana chips was analysed (Fig 1.) it could be noted that addition of a higher concentration is needed for imparting superior sensory qualities and oven dried powdered form was superior to its fresh form. Here, all flavor imparting substances are providing good organoleptic characteristics to banana chips in its oven dried powdered form only at 2% concentration.

Consumer Acceptability Study of Selected Flavoured chips

Today's consumers are discerning, demanding and more knowledgeable about food and expect products which are safe, good value and of high sensory

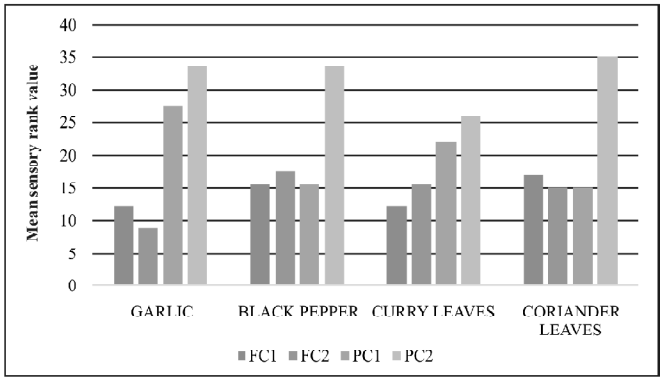

Figure 1: Overall acceptability of flavoured banana chips

quality. Therefore, knowing consumer preferences and perceptions of the sensory characteristics of food products is very important to food manufacturers and retailers alike [7]. Without appropriate sensory analysis there is a high risk of market failure. Sensory analysis is frequently considered as a requirement before product launch [2].

Flavoured banana chips were prepared using the above four flavor imparting substances by adding its oven dried powdered form at 2% concentration directly into frying oil. Appearance, colour, flavor, taste and crispness of the flavoured chips were evaluated by sensory panel and the mean rank value recorded (Table 2.).

Highest scores for appearance (8.10), colour (7.90), flavor (9.10), taste (9.00) and crispness (8.30) were recorded by garlic flavoured chips which was closely followed by curry leaf flavoured chips with a score of 7.10 for appearance, 7.20 for colour, 7.40 for flavour, 7.20 for taste and 8.00 for crispness. Black pepper and coriander leaf flavoured chips recorded comparatively lower scores for all the attributes.

Table 2
Mean scores of flavoured banana chips prepared from selected superior treatments

Attributes	*Garlic*	*Black Pepper*	*Curry leaf*	*Coriander leaves*
Appearance	8.10	6.40	7.10	6.10
Colour	7.90	7.20	7.20	6.20
Flavour	9.10	6.00	7.40	4.10
Taste	9.00	5.40	7.20	4.50
Crispness	8.30	7.30	8.00	6.60

Sensory quality depends on food characteristics and also on the consumers [4] which might have resulted in varied acceptance. Ngarmsak*et al.*[10] showed that garlic was the most preferred herb in snacks.

Star diagram/ star chart (Figure2.) allows a range of food products, intensity of its sensory attributes to be recorded. Hence, star diagram was plotted to evaluate differences in similar products and show new opportunities for product development. Higher the mean rank score higher will be intensity of positive attributes and it will be at maximum distance from the central point. The garlic flavoured chips, produced by the direct addition of 2% oven dried garlic powder to frying oil, whichshowed maximum acceptance, had all selected sensory attributes with maximum intensity. The developed product has to be further tested in a large population before market launching.

CONCLUSION

Different form and concentrations of the selected spices were tried for the development of flavoured banana chips and found that oven dried powdered form of spices at 2% concentrations is needed for imparting superior sensory qualities. Hence, in the present study 2% garlic powder added chips was selected as the best flavoured chips. It was having highest mean rank for appearance (8.10), colour (7.90), flavor (9.10), taste (9.00) and crispness (8.30).

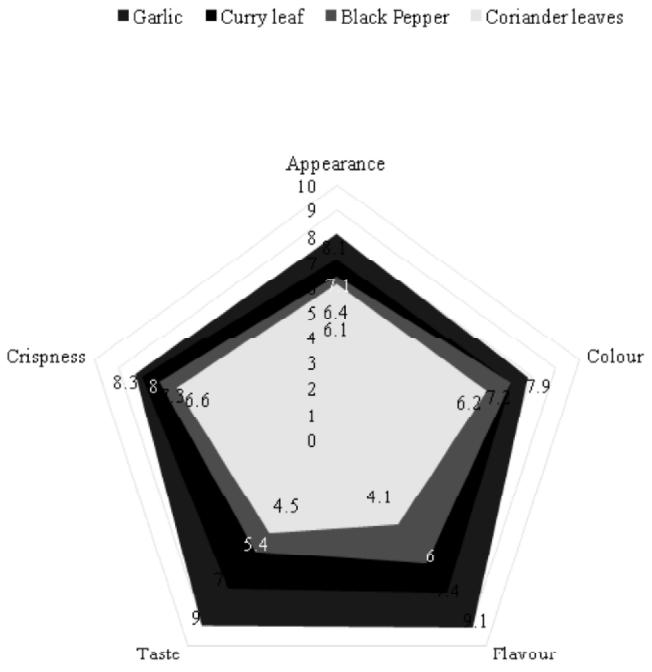

Figure 2. Sensory quality attributes of selected flavoured chips

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