

Development of Nutritious Instant Soup Mix, Its Organoleptic and Experimental Evaluation with its Popularization

Research Article

Aiswarya S Kumar * and Kavitha Vijayan

Dietetics and Food Service Management, Department of Family and Community Science, CMS College Kottayam (Autonomous) 686001, Mahatma Gandhi University, Kottayam, Kerala, India

***Corresponding author:** Aiswarya S Kumar, Dietetics and Food Service Management, Department of Family and Community Science, CMS College Kottayam (Autonomous) 686001, Mahatma Gandhi University, Kottayam, Kerala, India

Article Information: Submission: 14/11/2023; Accepted: 23/01/2023; Published: 30/01/2024

Copyright: © 2024 Kumar AS, et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

The present study is focused on developing a nutrient-rich instant soup mix and to conduct the experimental and shelf life evaluation. Four alternative formulations were created with various component ratios. The formulation with a larger ratio of sprouted garden cress seed powder, along with equal amounts of red kidney beans and amla powder was selected as the best variant. The proximate study of the selected sample contained the energy, protein, fat, carbohydrate, moisture, and fiber content as 65.32kcal, 28.81g/100g, 3.0g/100g, 55.77g/100g, 8.83g/100g and 7.0g/100g respectively. In the nutrient analysis, iron and calcium are 4.8mg/100g and 20mg/100g respectively. The total antioxidant activity is 567mg/kg respectively. The physicochemical properties such as water absorption capacity, swelling capacity, and soluble solids were 18%, 10%, and 0.7% respectively. The total ash and acid insoluble ash were 3.59g/100g and 0.09g/100g. It can be concluded that the developed instant soup mix kept in glass bottle was selected as the best packaging material with a good shelf life of more than 60 days at room temperature. So, the developed instant soup mix will help to increase the nutritional status of an individual..

Keywords: Instant soup mix; Garden cress seeds; Red kidney beans; Formulation; Shelf life

Introduction

The increase in population and urbanization has made less time available for people to prepare healthy foods. As a result, most of them consume whatever is available or food that requires less preparation time, without considering the health benefits of the food. Instant soups play an important role in balancing the nutrients required for people to stay healthy, and they can be prepared easily with less time [1].

Soup is a filling, flavourful, and substantial meal. It can be made by combining items like meat or vegetables with stock, milk, or water. A soup is a savoury and nourishing liquid food that is typically served at the start of a meal or snack [2].

Instant soups are usually considered universal comfort food. An instant soup is a type of soup made for quick and easy preparation. Instant soup is frequently pre-portioned and pre-cooked. This type of soup is marketable as a wholly dry product. The soup is heated briefly

before consumption after being reconstituted with water or another liquid by the drinker [3].

The majority of instant soups have a strong flavour and low salt content. Instant soup mixes are popular because of their portability and long shelf life. They are free from pathogenic attacks and their quality may be maintained for a month at a normal room temperature. They don't have any microbial contamination and are hygienic. They also have convenient and ingenious packaging.

Lepidium sativum, often known as garden cress seeds or "Chandrasur" in the local language, is a member of the Brassicaceae family (Cruciferae). [4] Garden cress seeds differ from many spices in that it has significant quantities of iron and folic acid. Garden cress seeds have a wide range of medicinal properties such as antioxidant properties, anti-anemic properties, anti-diabetic properties, and anti-inflammatory properties and they also have many health benefits [5].

Red kidney beans, which is also referred to as common kidney bean and rajma in India. These beans have a mild flavour and a reddish-brown colour. Although kidney beans mostly include carbohydrates and fibre, they are also an excellent source of protein. They include significant amounts of folic acid, calcium, carbohydrates, fibre, and proteins, among other vital elements, all of which are crucial for the body’s healthy functioning [6].

Phyllanthus emblica often referred to as emblic, Indian gooseberry, or amla, is a member of the Phyllanthaceae family of deciduous trees. The fruit amla is regarded as the best anti-ageing fruit. Amla berries include several healthy antioxidants and vitamins [7].

Based on the above mentioned facts, the present study was done on the formulation and development of a nutritious and healthy instant soup mix using sprouted garden cress seeds, red kidney beans and amla to find out the best among them based on organoleptic evaluation from different formulations. The analysis of nutritional components was done by various experimental analysis and the assessment of shelf life was by microbial analysis and organoleptic evaluation. (Figure 1).

Materials and Methods

Selection of Ingredients

Ingredients required for the development of instant soup mix were selected based on their nutritional and functional properties. The major ingredients were garden cress seeds, red kidney beans, and amla. A spice blend containing diverse spices such as ginger powder, onion powder, pepper powder, garlic powder, cinnamon, cloves, and crushed red chilli was also chosen to enhance the flavour, colour, texture, and appearance of the developed instant soup mix.

The selected ingredients were procured from the local market. Good quality garden cress seeds and red kidney beans were selected. The best quality organic amla was selected that feels hard, well skinned, and looked bright yellowish-green in colour.

Formulation and Standardization of Instant Soup Mix using Selected Ingredients in Different Proportions

The formulation and standardization of the developed instant

soup mix were done with four alternative formulations. The different ratios of the main ingredients were formulated. The ratio of spice mix and thickening agent remained the same for all samples.

Selecting the Best Thickening Agent

Three different types of thickening agents, including ragi flour, wheat flour, and corn starch, were investigated for the development of the instant soup mix. The nutritional qualities of the thickening agent, as well as its boiling time, thickening time, and thickening temperature, were taken into consideration while selecting it.

Preparation of Developed Instant Soup Mix using the Selected Ingredients

After the selection of ingredients, the preparation of the instant soup mix was started. Garden cress seeds were chosen and sprouted before being dried into a powder. The red kidney beans and amla powders were dried and ground finely. The spice mixes were dried separately, roasted, and ground into fine powders (Figure 2).

Organoleptic Evaluation

Sensory evaluation was done by comparing the control sample of the instant soup mix and the other four developed formulations. The sensory assessment has been performed using the developed scorecard to evaluate the sensory attributes of soup based on a 5-point hedonic scale.

Experimental Analysis

Experimental analysis such as proximate composition, nutrient analysis, antioxidant assay, and physiochemical properties were determined for the developed instant soup mix. The proximate composition of the developed instant soup mix was done for the determination of energy, moisture, fat, carbohydrate, and protein. The nutrient analysis was done for the estimation of iron and calcium properties.

Additionally, the physiochemical properties of the developed instant soup mix were also analyzed. The physiochemical properties such as water absorption capacity, swelling capacity, and soluble solids were determined.

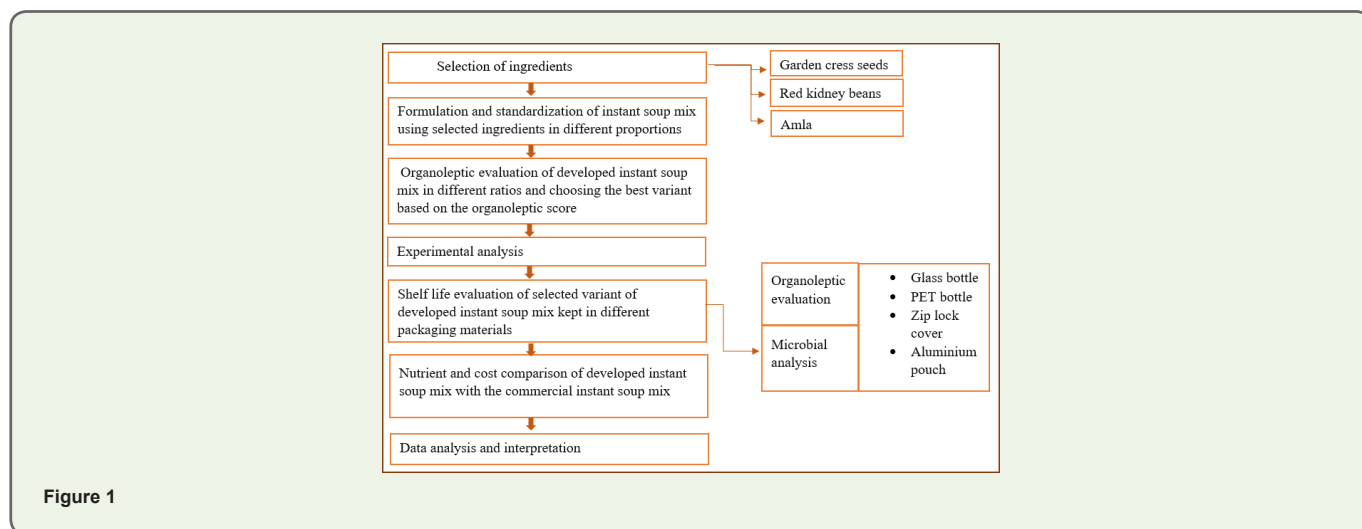


Figure 1

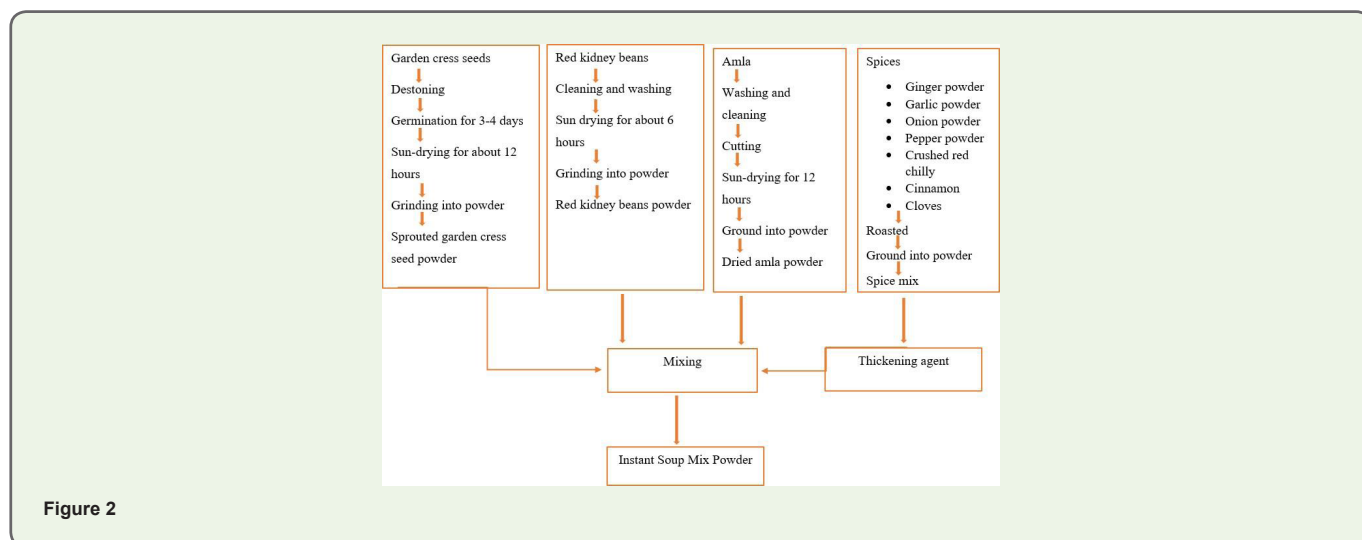


Figure 2

Shelf-life Evaluation of Developed Instant Soup Mix Using Different Packaging Materials

The shelf life evaluation among the four variants of the developed instant soup mix was done in four different packaging materials such as glass jars, PET bottles, zip lock covers, and aluminium foil covers. All the freshly prepared samples were placed hygienically in the above-mentioned packaging materials for 40 days at room temperature. For every tenth day, samples from all packaging materials of respective dates have been out, and conducted the sensory evaluation in an informal way. Change in colour, texture, and aroma has been checked and the presence of any microbial growth was also observed. The above-mentioned pattern of evaluation has been repeated till the 40th day.

A) Shelf-Life Assessment by Organoleptic Evaluation

Shelf-life assessment by organoleptic evaluation was done for the selected variant on day 10, day 20, day 30, and day 40. Attributes such as appearance, colour, texture, flavour, taste, and overall acceptability were assessed.

The statistical significance of sensory attributes of the developed instant soup mix kept in different packaging materials such as glass bottles, PET bottles, zip lock covers, and aluminium foil covers was statistically analysed using the two-way Anova test.

B) Shelf-life Assessment by Microbial Analysis

The shelf-life assessment by microbial analysis of the developed instant soup mix was done. The total plate count, yeast and mold analysis of the product were analysed.

Nutrient and Cost Comparison of the Developed Instant Soup Mix with the Commercial Instant Soup Mix

A comparison of the nutritional values of the developed instant soup mix with the commercial instant soup mix was done. Similarly, the cost of the developed instant soup was also assessed along with the overhead charges that were compared with the cost of commercially available instant soup mix.

Data Analysis and Interpretation

The data was analysed to determine its acceptability and is interpreted under results and discussions.

Results & Discussion

Selecting the Best Thickening Agent

For the developed instant soup mix, three different types of thickening agents were examined. The different types of thickening agents such as corn flour, wheat flour, and ragi flour have been used. The boiling time and thickening time of corn flour, wheat flour, and ragi flour almost remained the same with only a slight difference in seconds. The cooking temperature of wheat flour and ragi flour is the same.

In sensory attributes, the appearance, colour, texture, flavour, and taste of ragi flour and corn flour are seen as more acceptable than wheat flour. When comparing the nutritional benefits of ragi flour and wheat flour, ragi flour is seen as more nutritional. Based on all the properties ragi flour is selected as the best thickening agent for the developed instant soup mix.

Formulation and Standardization of Instant Soup Mix Using Selected Ingredients in Different Proportions

For the developed instant soup mix, four different formulations were made with various component ratios. The recipe was standardized for 20 grams of instant soup mix powder in 200ml of water. Four alternative formulations were created with various component ratios. A larger ratio of garden cress seed powder was used in sample 1, along with equal amounts of red kidney beans and amla powder as 22:9:9. A larger ratio of red kidney beans powder was used in sample 2, along

Table 1: Selecting the Best Thickening Agent

Thickening Agents	Boiling Time	Thickening Time	Thickening Temperature
Corn flour	1:30 min	3:30 min	90°C
Wheat flour	1:00 min	4.11 min	100°C
Ragi flour	1:30 min	4:00 min	100°C

with an equal amount of garden cress seed and amla powder as 9:22:9. A larger ratio of amla powder was used in sample 3 together with an equal amount of garden cress seed powder and red kidney powder as 9:9:22. Garden cress seed, red kidney beans, and amla powder were combined in equal amounts for sample 4 as 14:14:14. The ratio of spice mix and the thickening agent was equal for all four samples. The ratio of thickening agent with spice mix is 37:20.

Organoleptic Evaluation Score of Developed Instant Soup Mix

A) Organoleptic Evaluation Score for Appearance of Developed Instant Soup Mix

The mean score of appearance for sample 1 is 3.94, sample 2 is 3.71, sample 3 is 4.00, and sample 4 is 3.90. When comparing the mean score value of the appearance between the samples, the highest mean score of 4.00 is for sample 3, which may be due to the higher ratio of amla powder which gives a youthful and smooth appearance.

B) Organoleptic Evaluation Score for Colour of Developed Instant Soup Mix

The mean score of colour for sample 1 is 3.94, sample 2 is 3.8, sample 3 is 4.0 and sample 4 is 3.78. When comparing the mean score value of the colour between the samples, the highest mean score of 4.0 is for sample 3, which gives a light brown colour and it may be due to the highest ratio of amla powder.

C) Organoleptic Evaluation Score for Texture of Developed Instant Soup Mix

The mean score of texture for sample 1 is 3.8, sample 2 is 3.71, sample 3 is 3.77 and sample 4 is 3.88. When comparing the mean score value of the texture between the samples, the highest mean score of 3.88 is for sample 4, which is smooth and lump-free and it may be due to the equal ratios of sprouted garden cress seed powder, red kidney beans powder and amla powder.

D) Organoleptic Evaluation Score for Flavour of Developed Instant Soup Mix

The mean score of flavour for sample 1 is 3.61, sample 2 is 3.66, sample 3 is 3.78 and sample 4 is 3.58. When comparing the mean score value of the flavour between the samples, the highest mean score of 3.78 is for sample 3, which has a unique sour flavour and it may be due to the highest ratio of amla powder.

E) Organoleptic Evaluation Score for Taste of Developed Instant Soup Mix

The mean score of taste for sample 1 is 3.71, sample 2 is 3.57, sample 3 is 3.72, and sample 4 is 3.52. When comparing the mean score value of the taste between the samples, the highest mean score of 3.72 is for Sample 3, which has a unique sour flavour and it may be due to the highest ratio of amla powder.

F) Organoleptic Evaluation Score for Overall Acceptability of Developed Instant Soup Mix

The mean score of overall acceptability for sample 1 is 3.80, sample 2 is 3.66, sample 3 is 3.78 and sample 4 is 3.76. When comparing the mean score value of the overall acceptability between the samples, the highest mean score of 3.80 is for sample 1, which gives good overall acceptability and it may be due to the higher ratio of sprouted garden cress seed powder.

Experimental Analysis

Experimental analysis has been conducted for the selected variant of the developed instant soup mix including proximate composition analysis, nutrient analysis, antioxidant assay, and determination of physiochemical properties.

A) Proximate Composition Analysis of the Developed Instant Soup Mix

The proximate composition analysis of the developed instant soup mix contained an energy of 365.32 kcal, a protein content of 28.81g/100g, a fat content of 3.0g/100g, the carbohydrate content of 55.77g/100g, a fiber content of 7.0g/100g and moisture content of 8.83g/100g.

According to Bogati (2020) in their study on the formulation of gundruk soup and its evaluation revealed that it contains a moisture content of 9.5%, crude fat of 5.37%, protein of 12.2%, crude fiber of 6.53%, total ash of 19.0%, and carbohydrate of 52.74%.

B) Nutrient Analysis of the Developed Instant Soup Mix

The nutrient analysis of the developed instant soup mix shows an iron content of 4.8mg/100g and a calcium content of 20mg/100g.

According to Abeysinghe (2006) in the formulation of an MSG-free instant vegetable soup mix revealed that it contains 4.6 % iron and 0.17 % calcium.

Table 2: Formulation of Instant Soup Mix

Ingredients		Formulations			
		Sample 1	Sample 2	Sample 3	Sample 4
Base ingredients	Sprouted gardens cress seed powder	4.56 g	1.99 g	1.99 g	2.85 g
	Red kidney beans Powder	1.99 g	4.56 g	1.99 g	2.85 g
	Amla powder	1.99 g	1.99 g	4.56 g	2.85 g
Thickening agent	Ragi flour	7.41 g	7.41 g	7.41 g	7.41 g
Spice mix	Ginger powder	0.57 g	0.57 g	0.57 g	0.57g
	Pepper powder	0.28 g	0.28 g	0.28 g	0.28 g
	Crushed red Chilly	0.28 g	0.28 g	0.28 g	0.28 g
	Garlic powder	0.57 g	0.57 g	0.57 g	0.57 g
	Cinnamon Powder	0.28 g	0.28 g	0.28 g	028 g
	Cloves powder	0.28 g	0.28 g	0.28 g	0.28 g
	Onion powder	1.79 g	1.79 g	1.79 g	1.79 g

Table 3: Organoleptic evaluation Score for Different Samples of Developed Instant Soup Mix

SL NO	CRITERIA	SCORE	SAMPLES			
			Sample 1	Sample 2	Sample 3	Sample 4
			MEAN ± SD			
1.	Appearance	5	3.94 ± 1.06	3.71 ± 1.00	4.00 ± 1.04	3.90 ± 1.09
2.	Colour	5	3.94 ± 0.91	3.80 ± 1.16	4.00 ± 1.09	3.78 ± 1.14
3.	Texture	5	3.80 ± 1.06	3.71 ± 1.05	3.77 ± 1.13	3.88 ± 1.07
4.	Flavor	5	3.61 ± 1.11	3.66 ± 1.01	3.78 ± 1.14	3.58 ± 1.12
5.	Taste	5	3.71 ± 1.27	3.57 ± 1.12	3.72 ± 1.27	3.52 ± 1.20
6.	Overall acceptability	5	3.80 ± 1.01	3.66 ± 1.01	3.78 ± 1.30	3.76 ± 1.26

Table 4: Proximate Composition Analysis of the Developed Instant Soup Mix

Parameter Analysed	Result	Percentage of RDA
Energy	365.32 kcal	37%
Carbohydrate	55.77g/100g	43%
Protein	28.81g/100g	63%
Fat	3.0g/100g	-
Fiber	7.0g/100g	-
Moisture	8.83g/100g	-

C) Antioxidant Activity of the Developed Instant Soup Mix

The antioxidant analysis of the developed instant soup mix shows an antioxidant activity of 567mg/100g.

According to Farzana (2016) in their study on the formulation and nutritional evaluation of a healthy vegetable soup powder supplemented with soy flour, mushroom, and moringa leaf revealed that it contains vitamin C of 6.4mg.

D) Determination of Physiochemical Properties of the Developed Instant Soup Mix.

The physiochemical properties of the different samples of developed instant soup mix show that the water absorption capacity of sample 1 is 1.8ml/g, sample 2 is 2.6ml/g, sample 3 is 1.6ml/g and sample 4 is 2ml/g. The swelling capacity of sample 1 is 0.1ml/g, sample 2 and sample 3 have a swelling capacity of 0.6ml/g and sample 4 has 0.2ml/g. The amount of soluble solids present in sample 1 is 0.014ml/g, sample 2 is 0.005mg/l, sample 3 is 0.004mg/l and sample 4 is 0.022mg/l.

Shelf-life Evaluation of the Developed Instant Soup Mix in Different Packaging Materials

Shelf-life evaluation has been conducted for the developed instant soup mix, to explain how long a food will maintain its quality while being stored. Shelf life evaluation was conducted using different packaging materials such as glass bottle, PET bottle, zip lock

Table 5: Nutrient Analysis of Developed Instant Soup Mix

Parameter Analysed	Result
Iron	4.8mg/100g
Calcium	20mg/100g

Table 6: Antioxidant Activity of Developed Instant Soup Mix

Parameter Analysed	Result
Total antioxidant activity (As ascorbic acid)	567mg/100g

Table 7: Physiochemical Properties of Developed Instant Soup Mix

PARAMETER ANALYSED	SAMPLES							
	SAMPLE 1		SAMPLE 2		SAMPLE 3		SAMPLE 4	
	ml/g	%	ml/g	%	ml/g	%	ml/g	%
Water absorption capacity	1.8	18%	2.6	26%	1.6	16%	2	20%
Swelling capacity	0.1	10%	0.6	60%	0.6	60%	0.2	20%
Soluble solids	0.014	0.7%	0.005	0.25%	0.004	0.2%	0.022	1.1%

covers and aluminium foil covers till the 40th day. The organoleptic evaluation and microbial analysis have been conducted during this shelf life period.

A) Shelf life Assessment by the Organoleptic Evaluation During the Storage Period.

The organoleptic evaluation was done for the selected variant of the developed instant soup mix on day 10, day 20, day 30 and day 40 which was stored in four different packaging materials such as glass bottles, PET bottle, zip lock covers and aluminium foil covers.

The developed instant soup mix kept in glass bottles had shown less change in all the attributes from the 1st day to the 40th day. The developed instant soup mix kept in glass bottles almost remained the same without any significant changes. The developed instant soup mix remains safe and organoleptically acceptable in glass bottles.

The developed instant soup mix kept in PET bottle has less change in all the attributes from the 1st day to the 40th day. The mean score of overall acceptability was seen from 3.80 to 3.70, which was seen as acceptable.

The mean score of overall acceptability was seen as acceptable and less change was seen in overall acceptability from 3.80 to 3.70. The developed instant soup mix kept in zip lock covers was overall seen as acceptable but some slight changes were seen in the other attributes.

The mean score of overall acceptability was seen as less acceptable and change occurred from 3.80 to 3.65. The developed instant soup mix kept in aluminium foil covers was seen as less acceptable and some slight changes had occurred in all its attributes.

Determination of Best Packaging Material Appropriate for Developed Instant Soup Mix by Organoleptic Evaluation

The developed instant soup mix kept in different packaging materials has been organoleptically evaluated till the 40th day. Based on the organoleptic score best packaging material has been selected.

Table 8: Sensory Attribute Mean Score of the Developed Instant Soup Mix Kept in Glass Bottles

Attributes	1 st Day	10 th Day	20 th Day	30 th Day	40 th Day
Appearance	3.94±1.06	3.90±0.31	3.80±0.42	3.70±0.48	3.70±0.48
Colour	3.94±0.91	3.90±0.31	3.80±0.42	3.80±0.42	3.80±0.42
Texture	3.80±1.06	3.80±1.06	3.80±0.42	3.75±0.54	3.75±0.54
Flavour	3.61±1.11	3.60±0.51	3.58±0.50	3.58±0.50	3.58±0.50
Taste	3.71±1.27	3.70±0.48	3.70±0.48	3.70±0.48	3.70±0.48
Overall acceptability	3.80±1.01	3.80±1.01	3.75±0.54	3.75±0.54	3.75±0.54

Table 9: Sensory Attribute Mean Score of the Developed Instant Soup Mix Kept in PET Bottles

Attributes	1 st Day	10 th Day	20 th Day	30 th Day	40 th Day
Appearance	3.94±1.06	3.94±0.91	3.80±0.42	3.75±0.54	3.71±1.27
Colour	3.94±0.91	3.94±0.91	3.80±0.42	3.75±0.54	3.71±1.27
Texture	3.80±1.06	3.75±0.54	3.70±0.48	3.60±0.51	3.58±0.50
Flavour	3.61±1.11	3.61±1.11	3.60±0.51	3.58±0.50	3.50±0.52
Taste	3.71±1.27	3.71±1.27	3.70±0.48	3.61±1.11	3.61±1.11
Overall acceptability	3.80±1.01	3.80±1.01	3.75±0.54	3.75±0.54	3.70±0.48

Table 10: Sensory Attribute Mean Score of the Developed Instant Soup Mix Kept in Zip Lock Covers

Attributes	1 st Day	10 th Day	20 th Day	30 th Day	40 th Day
Appearance	3.94±1.06	3.90±0.31	3.80±1.06	3.70±0.48	3.65±0.41
Colour	3.94±0.91	3.90±0.31	3.80±1.06	3.70±0.48	3.65±0.41
Texture	3.80±1.06	3.80±1.06	3.70±0.48	3.60±0.51	3.50±0.52
Flavour	3.61±1.11	3.60±0.51	3.58±0.50	3.50±0.52	3.50±0.52
Taste	3.71±1.27	3.70±0.48	3.61±1.11	3.58±0.50	3.58±0.50
Overall acceptability	3.80±1.01	3.80±1.01	3.75±0.54	3.70±0.48	3.70±0.48

For the developed instant soup mix glass bottle was selected as the best packaging material because the product remains safe and more palatable without any microbial spoilage. Glass has a very low rate of chemical reactions, ensuring that the contents of a glass bottle maintain their strength, aroma, and flavour.

Shelf life Assessment by Microbial Analysis

The shelf life assessment by microbial analysis has been conducted during the shelf life period of the developed instant soup mix. The standard plate count was seen as 13,80,000 cfu/g and yeast and mould count was 61000 cfu/g.

Nutrient Comparison of Developed Instant Soup Mix with Commercial Instant Soup Mix

The nutrients present in the developed instant soup mix which were obtained by lab analysis were compared with the commercially available instant soup mix. The developed instant soup mix contains a higher amount of energy, protein, carbohydrate, and dietary fiber content in them. The amount of fat was seen as similar in both the products with only a 0.3g difference, indicating that both instant soup mixes had less fat. In the terms of minerals, the developed instant soup mix had iron and calcium of 0.96mg and 4mg, which were not present in the commercial instant soup mix. The developed soup mix contains vitamin C of 11.34 mg which was absent in the commercial instant soup mix.

Table 11: Sensory Attribute Mean Score of the Developed Instant Soup Mix Kept in Aluminium Foil Covers

Attributes	1 st Day	10 th Day	20 th Day	30 th Day	40 th Day
Appearance	3.94±1.06	3.90±0.31	3.80±1.01	3.75±0.42	3.65±0.41
Colour	3.94±0.91	3.90±0.31	3.61±1.11	3.50±0.52	3.60±0.51
Texture	3.80±1.06	3.75±0.42	3.61±1.11	3.58±0.50	3.50±0.52
Flavour	3.61±1.11	3.58±0.50	3.50±0.52	3.45±0.49	3.45±0.49
Taste	3.71±1.27	3.70±0.48	3.60±0.51	3.58±0.50	3.58±0.50
Overall acceptability	3.80±1.01	3.75±0.42	3.70±0.48	3.60±0.51	3.65±0.41

Table 12: Determination of Best Packaging Material Appropriate for Developed Instant Soup Mix by Organoleptic Evaluation

Packaging Materials	Attributes	Mean Score of Sensory Attribute on 40th Day
Glass Bottle	Appearance	3.70±0.48
	Colour	3.80±0.42
	Texture	3.75±0.54
	Flavour	3.58±0.50
	Taste	3.70±0.48
	Overall acceptability	3.75±0.54
PET Bottle	Appearance	3.71±1.27
	Colour	3.71±1.27
	Texture	3.58±0.50
	Flavour	3.50±0.52
	Taste	3.61±1.11
	Overall acceptability	3.70±0.48
Zip Lock Cover	Appearance	3.65±0.41
	Colour	3.65±0.41
	Texture	3.50±0.52
	Flavour	3.50±0.52
	Taste	3.58±0.50
	Overall acceptability	3.70±0.48
Aluminium Foil Cover	Appearance	3.65±0.41
	Colour	3.60±0.51
	Texture	3.50±0.52
	Flavour	3.45±0.49
	Taste	3.58±0.50
	Overall acceptability	3.65±0.41

Table 13: Shelf life Assessment by Microbial Analysis

PARAMETER ANALYSED	RESULT
Standard plate count	13,80,000 cfu/g
Yeast and mould	61000 cfu/g

Table 14: Nutrient Comparison of Developed Instant Soup Mix with Commercial Instant Soup Mix

Nutrients	Developed Instant Soup Mix (Per Serving - 20g)	Commercial Instant Soup Mix (Per Serving - 11g)
Energy	54.98kcal	35kcal
Protein	2.34g	0.5g
Carbohydrate	8.80g	7.6g
Dietary fiber	1.41g	0.2g
Fat	1.22g	0.3g
Iron	4.62mg	-
Calcium	56.40mg	-
Vitamin C	19.23mg	-

Table 15: Cost Comparison of Developed Instant Soup Mix with Commercial Instant Soup Mix

Cost Per Serving of the Instant Soup Mix	Commercial Instant Soup Mix	Developed Instant Soup Mix
	10 Rs	6.5 Rs

All these findings led to the conclusion that the developed instant soup mix was perceived as being more nutrient-dense than the commercial instant soup mix.

Cost Comparison of Developed Instant Soup Mix with Commercial Instant Soup Mix

The cost of the developed instant soup mix was calculated and it was compared with the commercially available instant soup mix. The developed instant soup mix has a price of 6.5 Rs which was less than the 10 Rs cost of commercial instant soup. The developed instant soup mix was deemed more profitable because it is inexpensive and rich in nutrients.

Conclusion

On the basis of the findings, it can be concluded that the developed instant soup mix is more nutritional and healthier than the commercially available soup mixes. The developed instant mix contains a high amount of energy, protein, carbohydrate, iron, calcium, and vitamin C than that of commercial ones, and also they are free from additives and preservatives. The cost of the developed instant soup mix is profitable and inexpensive as compared to commercial ones. In the developed instant soup mix, the nutrient content is retained to its maximum by minimal processing and it will help to increase the nutritional status of an individual.

Acknowledgement

First of all I owe my sincere gratitude towards God Almighty for bestowing his grace, wisdom, knowledge and courage on me for the successful completion of the study.

I extend one earnest and wholehearted gratitude to Dr. Varghese C. Joshua, Principal, CMS College, Kottayam (Autonomous) for the valuable cooperation extended during this study.

I am deeply indebted to Mrs. Kavitha Vijayan, Head of the

Department of Dietetics and Food Service Management, for her valuable help, necessary directions and encouragement during the period of study.

I would like to express my heartfelt gratitude to Mrs. Kavitha Vijayan, the guide of the study, for giving me insight into all the aspects of my study, constant encouragement, expert guidance, valuable corrections and constant support since the planning till the completion of the project.

I am also thankful to all other faculty members of the department for their cooperation and constant support throughout the study. I am also thankful to Mr. Shinu Peter, Assistant Professor, Department of Chemistry, CMS College, Kottayam for his kind cooperation and constant support throughout the study.

I am also thankful to Mrs. Maneesha George, Assistant Professor, Department of Statistics, CMS College, Kottayam for her kind cooperation and constant support throughout the study.

Grateful acknowledgment is also offered to all the staff of Accurate Analytic Lab, Thoppumpady, Cochin for their kind cooperation.

I am conveying my heartfelt thanks to my classmates for their kind cooperation and help during the course of the study.

Words are not enough to thank my beloved parents and my family, for the unfailing support, constant help and cooperation in the completion of the project.

I express my sincere thanks to all those who helped me in the successful completion of the research work.

References

- Sudarsan SM, Santhanam SG, Visalachi V (2017) Development and formulation of instant soup mix from sprouted horse gram and radish leaves. *International Journal of Home Science* 3: 346-349.
- Anon (2007) Soup.
- Oluwafemi GI, Adesina EIOK (2020) Development and evaluation of instant clove basil soup (*Officium gratissimum*). *Development* 99.
- Sachin M, KadamShahaji SS, Thorat PP (2019) Extraction and shelf life study of garden cress seed oil. *IJCS* 7: 750-753.
- Tripathi P, Gujar K (2017) Development of Iron Rich Flour Using Garden cress seeds. *International Journal of Applied and Natural Sciences* 6: 155-162.
- Kimothi S, Dhaliwal Y (2020) Nutritional and health promoting attribute of kidney beans (*Phaseolus vulgaris* L.): A review. *Int J Curr Microbiol. Appl Sci* 9: 1201-1209.
- Minj P, Mahilang KKS, Raj JD, Sonboier K (2018) Studies on some drying characteristics of amla. *Int J Curr Microbiol App Sci* 7: 2113-2118.
- Bogati, K (2021) Formulation of Gundruk Soup Mix and Its Evaluation (Doctoral Dissertation, Department of Food Technology Central Campus of Technology Institute Of Science And Technology Tribhuvan University, Nepal 2021)
- Abeyasinghe CP, Illeperuma CK (2006) Formulation of an MSG (Monosodium Glutamate) free instant vegetable soup mix.
- Farzana T, Mohajan S, Saha T, Hossain MN, Haque MZ (2017) Formulation and nutritional evaluation of a healthy vegetable soup powder supplemented with soy flour, mushroom, and moringa leaf. *Food science & nutrition* 5: 911-920.