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Formulation and Quality Evaluation of a Nutritional Taste maker Spice Up from Indigenous Spices

G. Ajitha[1], M. Sivasakthi[2], L. Uthira[3]
[1, 2, 3]*Department of Nutrition and Dietetics, PSG College of Arts and Science, Coimbtore-641014*

Abstract: ***An Instant Dried, Roasted, Powdered Taste Maker with No MSG (Monosodium Glutamate) was Developed Using Dried Vegetables and Spices. Vegetables, Spices, Greens were Used as the Ingredients. The Vegetables, Greens were Dried in a Hot Air Oven and Roasted, The Spices were Roasted and Grinded to a Powder with the Established Procedures and Formulated as Three Different Types of Masala as Spice Up Classic Masala, Spice Up Garam Masala, Spice Up Briyani Masala. Along with it, The Physio-Chemical and Organoleptic Attributes of the Developed Product was Analysed for Consumer Acceptability. Selected Variation from the Three was Evaluated for Physiochemical, Antioxidant Activity, Phytochemical, Proximate Analysis, Microbial Analysis.***

The Results of The Analysis for Spice Up Incorporated Noodles Depicted that the Mean Scores of Sensory Attributes Namely Appearance, Colour, Texture, Taste, Aroma, Chewiness and Over All Acceptability Showed the Significant Increases in their Scores for the Spice Up in Variation II. The Overall Acceptability Score is 8.1± 0.81, For Spice Up Classic Masala Incorporated Vegetable Fried Rice is 7.6 ± 0.72, For Spice Up Classic Masala Along With Drumstick Leaves Powder Incorporated Pasta is 7.4 ± 0.93, For Spice Up Garam Masala Incorporated Cutlet the Highest Score is 7.4 ± 0.93, For Mushroom Curry 8.3 ± 0.61, For Aloo Nuggets 8.3±0.62. The Highest Score of Spice Up Briyani Masala Incorporated Chicken Briyani is 8.1±0.54. For All the Sensory Evaluation Calculated P Value is 0.000 Which is Significant at 5 % Level. It Shows that there is a Significant Difference of Recipes Made with Spice Up. Assessment of the Spices Showed that Spice Up Garam Masala had the Initial Ph of 6.23. The Total Acidity of Spice Up Garam Masala is 0.12%. The Ash Content is 7.2 g. The Moisture Range of the Mix is 10.57±0.89, The Energy Value is 322.17±1.52 Kcal, The Carbohydrate Value is 60.51±1.12 G, The Protein Content of the Product is 9.4±0.84g, The Fat Content is 4.5±1.02g, The Fibre Content of the Product is 18.36±0.62, The Calcium and Iron Content Of the Spice Up is 8.44±0.68 and 693.18±0.74 mg. The Phytochemical Tests Indicated the Presence of Alkaloids 25.4 %, Flavonoids 23.8%, Saponins 2.36% And Tannins 3.21% In the Spice Mix. The Antioxidant Activity of Each Spices Present in the Spice Mix was Analysed by DPPH And FRAP Assay. Total Plate Count at the 30th Day were 49, 41, 37 CFU/G in The Series Dilution Of 10^{-4}, 10^{-5}, 10^{-6} and The Spice Mix can be Stored In Air-Tight Container For 3 Months at Room Temperature. The Cost of the Spice Up was Calculated. From the Results, It Can Be Concluded that the Developed Spice Mix has Great Potential in Today's Market Scenario Where Delicious, Ready-To-Make, Nutrient-Packed, And Low-Fat Products are in Huge Demand. Each of The Ingredients Added Has A Significant Health Property. Its Impact on Society is that it is Easy to Purchase, Nutritious, And Also Imparts Good Health At A Low Cost, and it could be used in a Wide Range Of Food Products, Developed Spice Up Products that Impart a Very Good Taste and are also Nutritious, Which help in Delivering Good Health to Individuals, Families, Societies, and the Nation. This Could be Added to any type Of Dish or Food without the Addition of any other Spices.

Keywords: Instant Taste Maker, Spice Up, Spices, Classic Masala, Garam Masala, Briyani Masala

I. INTRODUCTION

Development of a new product is a challenging area in the field of food processing. Consumers today are very enthusiastic to try ready-to-make products that are delicious as well as nutritious. But there is a huge demand for Nutritious food Supplements to be added with regular food items, it has become a huge Challenging task for workers due to lack of time schedule, People are pushed to prepare readymade or ready mix products and taste also become a must factor in every foods that are consumed and so a synthetic chemical 'Monosodium Glutamate' i.e., ajinomoto has become very common in regular household usage which is hazardous. Keeping these into consideration this study was designed to formulate a Spice mix named **'Spice Up'** developed using traditional nutritional spices that adds a good flavour to the dishes. The taste maker has been developed from the blend of all the ground spices. The best variations out of three formulated masalas was standardized.

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The standardization of Spice Up was named as, Spice Up Classic Masala, Spice Up Garam Masala, Spice Up briyani masala. The product developed which is more nutritious and healthier and also be provided to all group of individuals from Paediatric to geriatric without any side effects. This product is made using only natural spices while most of the products available in the market are made by using number of chemicals which imparts deleterious health effect to the individuals

II. METHODS AND MATERIALS

A. Preparation of Raw materials

Raw materials such as Onion, Ginger, Garlic, Red Chilly, Drumstick leaves, Carrot, Nutmeg, Rosemary, Coriander seeds, Cinnamon, Cloves, Cardamom, Star anise, Pepper, Bay leaf, were purchased from Sri Sri Pazhamudir Super Market, Coimbatore. The vegetables and drumstick leaves were dried in hot air oven. The dried ingredients were roasted to enhance the smell and flavour. Dried ingredients were packed in air tight glass bottle purchased from local market.

B. Product Formulation

The three formulation of the Spice Mix was done with the three variations with the various proportions was mixed in variety of food items according (Farooqui, Sreeramulu.,2001) to blends of different spices would result in good taste, aroma stimulant loaded with potential antioxidants, vitamins, minerals and pungent Principles. The taste maker has been developed from the blend of all the ground spices. The ingredients were mixed in different proportions based on organoleptic trials. The development of Spice Up Masalas comprises three different formulations. Each formulation consists of three variations, which were made to be incorporated into one main recipe to find the best variation. The Spice Up Masalas incorporated into the dishes were subjected to sensory evaluation.



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C. Standardization of Spice Up

The best Variations out of three formulated masalas was Standardized. Different permutations and combinations were made in order to attain the best formulation. The Standardization of Spice Up was named as,
Spice Up Classic Masala, Spice Up Garam Masala, Spice Up Briyani Masala.



Fig. 1 Spice Up Masalas Packed in a air tight Glass bottles

D. Organoleptic Evaluation of Spice Mix

Sensory evaluation is defined as a scientific approach used to evoke, measure, analyse and interpret those responses to products as perceived through the senses of sight, smell, touch, taste and hearing (Stone and Sidle, 2004).The sensory attributes such as appearance, texture, flavour, Aroma, Chewiness and overall acceptability were evaluated by distributing samples randomly among a group of people comprising of 25 semi-trained panel members and the Chef of Star Hotels. Nine-point hedonic scale was used for the evaluation. The most common hedonic scale is the nine-point hedonic scale ranging from 1 = Dislike extremely and 9 = Like extremely. The hedonic scale assumes that participants' preferences exist on a continuum and that their responses can be categorized into like and dislike (Lawless & Heymann, 2013). The data were collected through score cards from the panel members. The feedbacks were tabulated, analysed and represented in graph. Sensory evaluation was done to select the best Variation among the three formulation and finalized the standardized product. Selected Variation from the three was evaluated for physiochemical, antioxidant activity, Phytochemical, Proximate analysis, Microbial Analysis and then later were compared with three commercially available brands (names undisclosed) and labelled as Control for the three variations of Spice Up.

E. Physio-chemical analysis of selected Spice Mix

The physicochemical properties of the food products play an important role and is essential to tackle numerous issues in food processing, including preservation, storage, distribution and consumption (Nadob *etal*., 2015). Various physicochemical parameters like pH, acidity and ash are performed. Moreover, the prepared Spices is analysed for the presence of alkaloids, tannins, saponins andflavonoids using standard procedures.

F. Nutrient analysis of selected Spice Mix

Nutrient analysis refers to the process of determining the nutritional content of foods and food products. The process can be performed through a variety of certified methods (Mihaela Dimitrova, 2019) Nutrients like carbohydrate, Energy, protein, fat, moisture, Fiber, Calcium and Iron content of the Spice Up powders were quantitatively.

G. Estimation of Phytochemical Constituents

Qualitative Phytochemical Constituents such as Alkaloids, Flavonoids, Tannin, Saponin of the Spice mix were done with different extracts (aqueous, acetone, chloroform, and ethanol). (Farina Mujeeb, Preeti Bajpai, and Neelam Pathak"2014) by using the standard procedure.

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H. Estimation of Antioxidant property

Compounds that protect biological systems against the potentially harmful effects of processes or reactions that can cause excessive oxidations. Some phytochemicals like tannin, carotenes, polyphenols, flavonoids etc., have the activity of antioxidants. The analysis of antioxidant present in each ingredient present in the processed Spice Up was estimated by using Diphenyl Picryl Hydrazine (DPPH) test (Katalin *etal*., 2006) and Frap method (Hossain *etal*.,2008)

I. Microbial Analysis of Selected Nutritional Mix

It is important to analyse the microbes present in food, so as to prevent contamination of food which would render and cause health effects if consumed. The analysis of total plate count, Escherichia coli, yeast and mould count were carried out for Spice Up powder. (Jose Lorenzo *Eta*l.,2017) To ensure that microbial hazard is under control, total count was enumerated in the formulated Spice Up.

II. RESULTS AND DISCUSSION

A. Sensory Evaluation

Spice up masalas were prepared with spices and incorporated in one main meal to determine consumer approval. The best formulation was standardised and subsequently processed for analysis. The standardised product was used in a variety of foods to test the sensory features of the recipes without modifying their original characteristics, and the taste improvisation was discovered. Sensory evaluation of the spice up incorporated dishes was carried out by 25 semi-trained panel members and star hotel chef. A nine-point hedonic scale was used for evaluating the attributes like colour, consistency, flavour, taste and its overall acceptability. The results of the analysis for spice up incorporated noodles depicted that the mean scores of sensory attributes namely appearance, colour, texture, taste, aroma, chewiness and over all acceptability showed significant increases in their scores for the spice up in variation ii.

The overall acceptability score is 8.1± 0.81 when compared to variation i and ii. Based on the preference the variation ii is taken as a control and the spice up classic masala was incorporated in various recipes and finalized for further processing and analysis. It can be observed that from above table that there is a significant difference between the overall acceptability of recipes made with instant taste maker.

The calculated *p* value is 0.000 which is significant at 5 % level. the standardised spice up classic masala was incorporated into the fried rice to match the consumer's preference. The results of the analysis showed that the mean scores of sensory attributes, namely appearance, colour, texture, taste, aroma, chewiness, and overall acceptability, showed significant increases in their scores 7.6 ± 0.7 for the variation-1, compared with the control made with branded products available in the market. The overall acceptability of the drumstick leaves powder added spice up classic masala incorporated pasta has the highest value of). (7.4 ± 0.9) followed by curry leaves added spice up. The greens were incorporated to enhance the nutritive value of spice up without changing the flavour of the spice up.

The spice up garam masala was formulated with three variations to find out the best variation it was incorporated in vegetable cutlet along with 4 types of millets to add crispiness to the product and also to improve the nutritive value. The sensory evaluation of the formulated spice up are represented as mean ± sd in the table-9. Off all the variations the overall acceptability of the little millet added spice up incorporated vegetable cutlet had the highest value of (7.8 ± 1.0). Followed by that the kodo millet added spice up incorporated vegetable cutlet variation i (7.7 ± 1.0).

Based on the preference the variation iv is taken as a control and it was incorporated in various recipes and finalized for further processing and analysis.

The standardised spice up garam masala was used to test the consumer acceptability of aloo nuggets. The overall acceptability of the aloo nuggets was 8.3±0.6.the standardised spice up garam masala was incorporated in mushroom curry to inspect the consumer acceptability through sensory attributes.the overall acceptability of the mushroom curry was 8.3 ± 0.6.the overall acceptability of spice up briyani masala incorporated briyani was 8.1±0.5.

The colour of the briyani value is 8.4±0.5, 7.5±0.5 for texture,8.1±0.6 for taste, 8.6±0.5 for aroma, 8.1±0.7 for chewiness. The calculated *p* value is 0.000 which is significant at 5 % level. This shows that there is a significant difference between the overall acceptability of recipes.

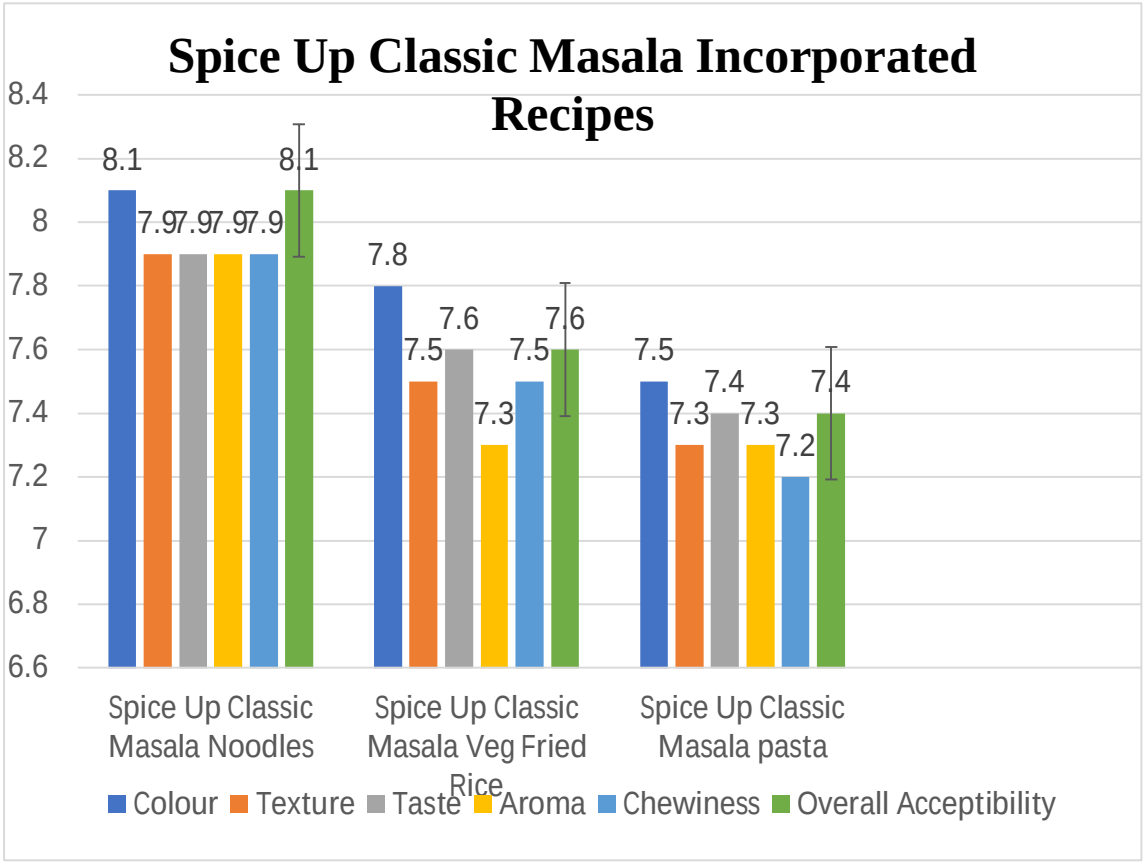


Fig. 2 Spice Up Classic Masala Incorporated Recipes

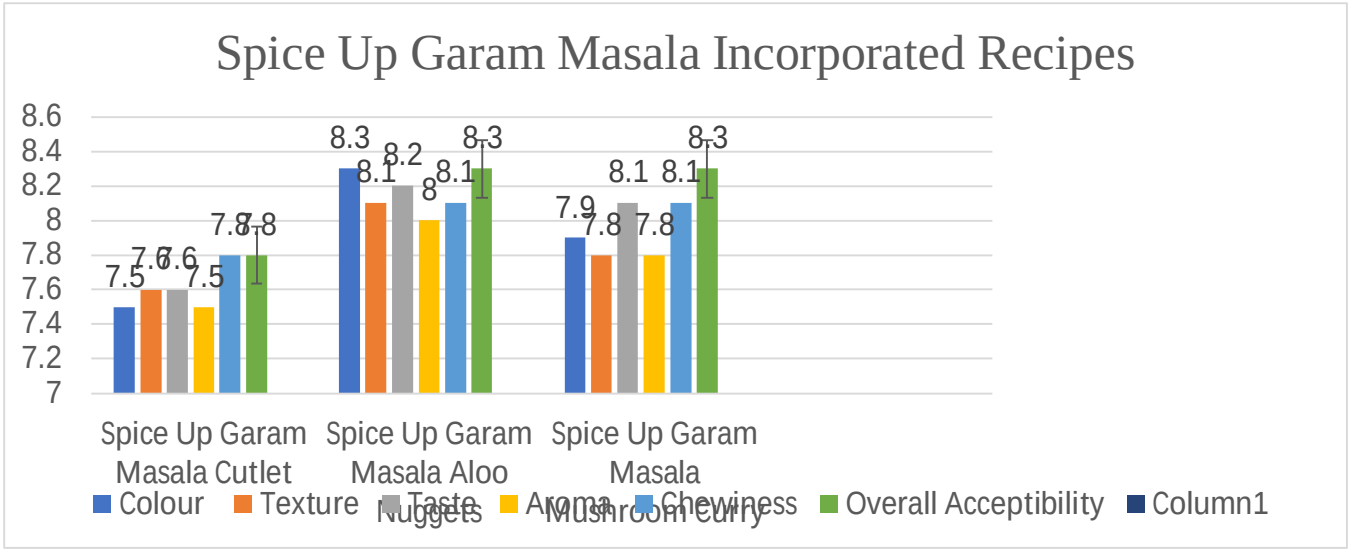


Fig. 3 Spice Up Garam Masala Incorporated Recipes

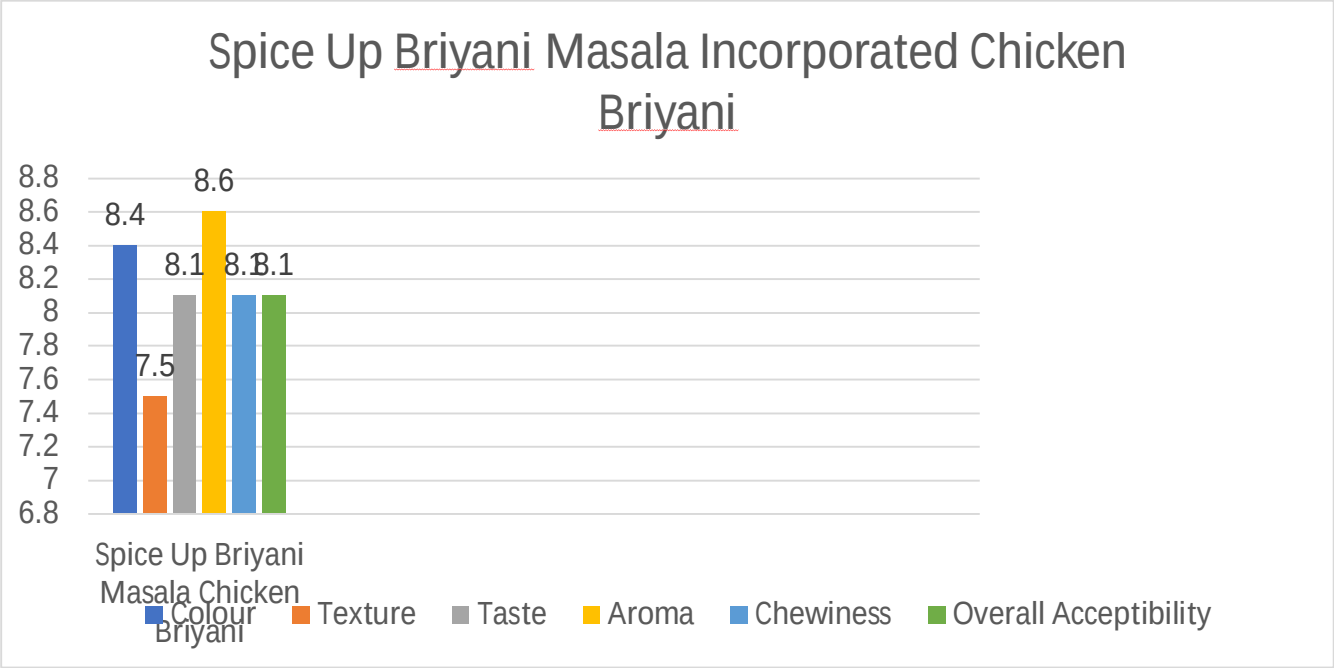


Fig. 4 Spice Up Briyani Masala Incorporated Recipes

B. Physiochemical Analysis of Spice Up Powder

Assessment of the spices showed that spice up garam masala had the initial Ph of 6.23. In foods with a Ph below 4.5, pathogens would not be expected to survive; the organisms present would be limited to yeasts, moulds and a few acid tolerant bacteria. The Ph of the spices can be reduced to prevent the pathogens growth.

The total acidity of spice up garam masala is 0.12%.the normal range of total acidity range from 0.14 to 0.16%. Spice up garam masala freshly prepared by using appropriate ingredient quantities and processing conditions contained 7.2 g of ash content.

C. Nutrient analysis of spice up classic masala

Nutrition composition of the standardized spice up mix. Values are the Mean±SD of three replicates. It is found that the moisture range of the mix is 10.57±0.89, the energy value is 322.17±1.52 kcal, the carbohydrate value is 60.51±1.12 g, the protein content of the product is 9.4±0.84g, the fat content is 4.5±1.02g, the fiber content of the product is 18.36±0.62, the calcium and iron content of the spice up is 8.44±0.68 and 693.18±0.74 mg respectively.

D. Phytochemical analysis of spice up garam masala

The phytochemical tests indicated the presence of alkaloids 25.4 %, flavonoids 23.8%, saponins 2.36% and tannins 3.21% in the spice mix. Several of such compounds are known to possess potent antioxidant activity. The spice up exhibited strong anticancer, hepatoprotective, antiviral and several other activities. These properties may be due to its antioxidant activity.

E. Estimation of antioxidant property of spice up garam masala

The antioxidant activity of each spices present in the spice mix was analysed by DPPH and FRAP assay

The antioxidant activity of any food is assessed to bring out the therapeutic significance and build-up of healthy tissues, cell and free from free radical damage and mutation. (alexander yahwin *etal*.,2017) significant difference found between DPPH and FRAP assays in their values exhibit excellent antioxidant activities with respect to potential ingredients at 5% level.

In DPPH method %inhibition of antioxidant activity rosemary 31.5% ,nutmeg 28.6% ,black pepper 19.5% ,onion 12.3%, garlic 10.6%, ginger 11.3%, cinnamon 9.87%, turmeric 6.52%, chilly 8.63%, cloves 6.23%,cardamom 6.14%,bay leaf 5.8%,drumstick leaves powder 2.95%, carrot powder 1.29%,star anise 0.23%, mango powder 0.58% shows the descending trend in exhibiting antioxidant activity.

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In frap assay %inhibition of antioxidant activity of rosemary 24.8%,nutmeg6.8%,drumstick leaves powder 5.91%,black pepper 4.7%, carrot powder 3.96%,cinnamon 3.56%, turmeric 2.34%, bay leaf 2.11%cloves 3.29%, cardamom 3.19%, mango powder 2.36%,chilly 2.34%,star anise 1.28%, garlic 1.03%, onion 0.13%, onion 0.36%shows the descending trend in exhibiting antioxidant activity.

F. Microbial analysis of spice up classic masala

The presence of total plate count, Escherichia coli, yeast and mould in spice up powder was analyzed. There was no growth of Escherichia coli, and the yeast and mould were less than 1 cfu/g at 30^{th} day. Total plate count at the 30^{th} day were 49, 41, 37 cfu/g in the series dilution of 10^{-4}, 10^{-5}, 10^{-6} and the spice mix can be stored in air-tight container for 3 months at room temperature.

G. Cost evaluation of spice up

100g of spice up classic masala cost rs.150
100g of spice up garam masala cost rs.210
100g of spice up briyani masala costs rs.178

IV. CONCLUSIONS

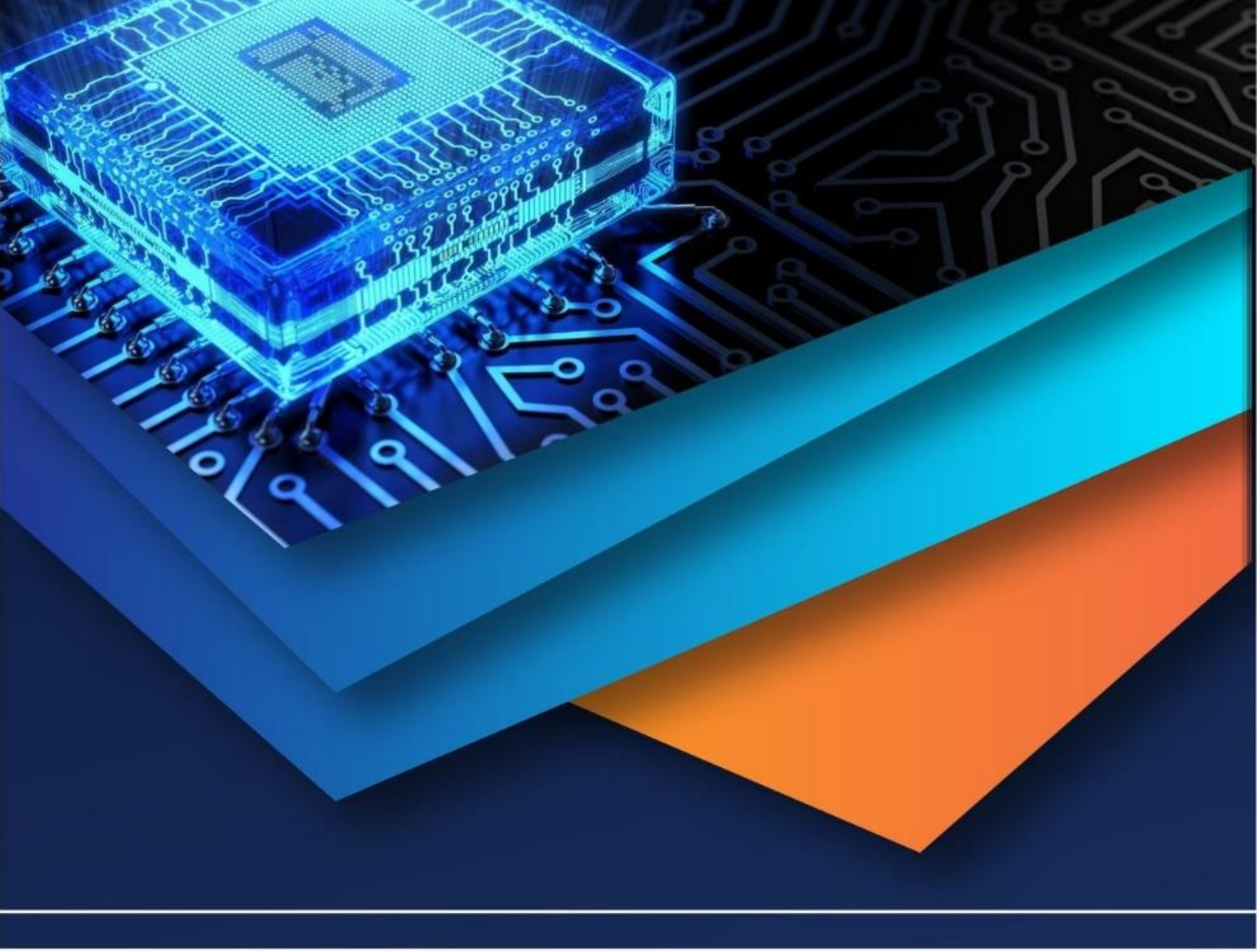
Incorporating Spices in daily diet increases and enriches the nutritive value and can be given for all age group. Spices are good not only for our taste buds but also for our health. They supply calcium, iron, vitamin B, vitamin C, carotene and other antioxidants. Besides spices have very low fat, so can eat them to your hearts pleased. Phytochemical constituents like alkaloids, Flavonoids, Saponins, Tannins which also shows good antioxidant activity. Antioxidants can be given to prevent and cure degenerative diseases. From the Study, it can be concluded that the developed spice Up has great potential in today's market scenario where delicious, ready-to-make, nutrient-packed, and low-fat products are in huge demand. Each of the ingredients added has a significant health property. Its impact on society is that it is easy to purchase, nutritious, and also imparts good health at a low cost, and it could be used in a wide range of food products, developed products that impart a very good taste and are also nutritious, which help in delivering good health to individuals, families, societies, and the nation. This could be added to any type of dish or food without the addition of any other Spices.

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