

Value Added Fruit and Vegetable Food Products

- Dr. R. Bharathi



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PREFACE

Fruits and vegetables are the major functional food ingredients need to be explored as being the sources of the essential nutrients and phytochemicals. Being rich source of carbohydrates, minerals, vitamins and dietary fibres these constitute an important part in the regular diets. The benefits relate to their role in kidney functions, prevention of cancer and cardiac disorders through contribution of ascorbic acid, β -carotene and non-starch polysaccharides besides the biochemical constituents like phenols, flavonoids and alkaloids need to be explored. A considerable amount of fruits and vegetables produced in India is lost due to improper post-harvest operations and resulted in considerable gap between the gross production and net availability. In developing countries agriculture is the mainstream of the economy with the focus on fruit and vegetable processing is the most important concern.

Fruit and vegetable processing has been engaging the attention of planners and policy makers as it can contribute to the economic development of rural population. The changing lifestyle patterns resulted in the income growth, increase in population, lifestyle and concern towards health and nutrition with much demand on fruit and vegetable products all over the globe. India is among the topmost vegetable and fruit producer in the world and accounts for about 15 percent of the world's production.

Underutilized vegetables and fruits could be the source of various value-added products. These products are nutritious and high in fibre and antioxidants. The value of wild edible fruits and vegetables in food security has not been given sufficient attention in India. The research is also not extensive to set database which challenges the authenticity of the scientific studies. For many years the importance of wild plants in subsistence agriculture in the developing world as a food supplement and as a means of survival during drought and famine has been overlooked. The concerning socio-economic, cultural, traditional, and nutritional aspects of wild food plants still lack adequate attention. There are at least 3000 edible plant species known to man, with merely 30 crops contributing to more than 90% of the world's calorie intake, and only 120 crops are economically important on a national scale.

Based on the requirement of attention towards postharvest technologies, exploring the underutilized sources as wild plants, by products, convenience and instant foods, the book has elucidated with the research on the value added fruit and vegetable food products.

Dr.R.BHARATHI

CAULIFLOWER LEAVES MISSI ROTI INSTANT MIX:PRODUCT FROM UNDERUTILIZED LEAVES

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BACKGROUND

Cauliflower is one of the cruciferous vegetable belong to the species *Brassicaoleracea* and the family *Brassicaceae*. It is mainly cultivated in north-east from April to December. Generally the leaves are thrown away as waste found to be rich authority of iron and beta carotene. Thus the leaves can be utilized in value added products. The leaves are also rich in dietary fibre, vitamins and minerals which help in preventing various diseases. The leaves constitute about 50 percent of total production of cauliflower. Cauliflower leaves are available only for short time but can be dried and stored which can be used further during lean season. The dried cauliflower green leaves are highly nutritious and a good source of beta-carotene, iron, copper, manganese, zinc. Multiple micro nutrient deficiencies are widely prevalent in developing countries. Indian women between 15 to 49 years of age are anaemic and 79 percent of children of age group between 6 to 35 months age are anaemic. Utilization of cauliflower leaves powder can be helpful in minimizing micro nutrient deficiency¹.

Among the poor people, dietary inadequacy of most nutrients is very common. The inclusion of small amount of dried greens in daily diet improves its nutritive value. Cauliflower as such is widely consumed in India, but its nutritious leaves are commonly thrown away by the people due to ignorance. The leaves can be utilized as a “*natural fortificant*” to enrich the common recipes. Now- a-days dry cauliflower leaf powder is used in variety of value added products like wheat noodles, biscuits, cookies, and chocolates, various types of snacks, chapatti, pancakes, and functional beverages etc. which are well

accepted. Human studies revealed that regular intake of cauliflower leaf powder enriched recipes for protein energy mal nutrition, anaemia, vitamin A deficiency disorders. The nutritional and curative potentials of less utilized cauliflower leaf should be properly utilized to prepare low cost, nutrient dense supplementary foods to improve nutritional status of common people , reducing the vegetable waste generation and widen the food basket² .

The term instant food means simple, fast, convenient, easy and fast food to prepare besides being hygienic, minimal microbial contamination and also convenient to eat. Rapid transformation in the life style of Indians, particularly those living in urban India, has lead to dramatic increase in the demand for instant foods, especially in urban areas due to nuclear family system. Women empowerment, increase in life style and increase in level of affluence in the middle income group resulted changes of food habits. The amount spent by Indians on foods outside home seemed to be more than doubled over the last ten years to nearly 5 billion\$ a year and its likely to double in the next 5 years. These trends entail significant growth potential for the food processing industry of instant foods and add attractiveness of investment in this sector³.

INGREDIENTS

Wheat flour: 65g

Bengal gram flour: 65g

Cauliflower leaf powder: 20g

Onion powder: 5g

Salt: 3g

METHOD OF PREPARATION

- Prepare cauliflower leaf powder by blanching, drying and pulverizing
- Similarly prepare onion powder
- Sift wheat flour, Bengal gram flour, cauliflower leaf powder, onion powder and salt together
- Pack in polythene cover and make missi roti whenever required

Missi Roti Preparation

- Take instant missi roti mix powder
- Add sufficient water to that mixture until it becomes a dough
- Leave the dough for about 10 minutes
- Make the dough into small balls and kneed on chapatti roll
- Roll out each portion thinly to nearly circular shape
- Heat a griddle and bake the roti on both sides
- When both sides are baked, smear a table spoon of fat on top surface
- Turn over press and fry for 3-5 minutes

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PREPARATION OF DELICIOUS FRUIT KHEER

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BACKGROUND

Kheer is popular all time favourite and delicious recipe of every person. In India kheer is commonly prepared in every occasion and festivals. Fruit kheer is also one the classic kheer recipes loaded with the nutritional and therapeutic benefits of multiple fruits. The fruits like apple, banana, and pomegranate in this scrumptious recipe to make dish more delightful. Fruit kheer dessert adds variety colourful and pleasing appeal which creates interest to consume delightfully. Children commonly not prefer to include fruits and in such instances, the dessert preparation like fruit kheer will be helpful to encourage fruit intake

Apples are widely consumed as rich source of phytochemicals. The epidemiological studies have linked the consumption of apples with reduced risk of certain diseases like cancer, cardio vascular diseases, asthma and diabetes. The research also denoted that, apples have been found to have very strong antioxidant activity, inhibit cancer cell proliferation, decreases lipid oxidation and lower cholesterol. They are good sources of phytochemicals including quercetin, catechin, phloridzin and chlorogenic acid, which act as strong antioxidants. The phytochemical composition of apples varies greatly between different varieties of apples and they are also small changes in phytochemicals ¹.

Banana is an edible fruit and herbaceous flowering plant belonging to genus *Musa* and family *Musaceae*, grown widely in tropical rain forest areas. Banana is known to be rich in carbohydrates, dietary fibers, certain vitamins and minerals. The presence of various bioactive phytochemicals and their nutritional significance contribute to add it in the day to day life².

Pomegranates can help to prevent or reduce various diseases risk factors including high blood pressure, high cholesterol, oxidative stress, hyperglycemia and inflammatory activities. It is established that certain components of pomegranates such as polyphenols have potential antioxidant, anti-inflammatory and anti-carcinogenic effects which will be encouraging to promote as a functional ingredient³.

Cherries are rich sources of polyphenols and vitamin C containing antioxidant and anti-inflammatory properties. Increased oxidative stress contributes to development and progression associated with many human chronic inflammatory diseases. The cherry fruit is nutrient dense fruit with relatively less caloric content and good amounts of essential nutrients and bioactive food components including fibre, polyphenols, carotenoids, vitamin C and potassium. The majority of sweet cherries are consumed fresh and remaining 20-25 percent of the fruit is processed as brined, canned, frozen, dried or juiced⁴.

INGREDIENTS

Apple	: 1 medium size
Banana	: 1 medium size
Pomegranate seeds	: 50 grams
Cherries	: 50 grams
Whole milk	: ½ Litre
Sugar	: 4 table spoon
Cardamom powder	: ¼ table spoon
Unsalted pistachios	: 5-6 pieces
Almonds	: 5 pieces

METHOD OF PREPARATION

- Crush the nuts into medium sized coarse pieces
- Boil milk and continue the heat for 10minutes
- Later add sugar, cardamom, crushed nuts and stir well until the sugar grains dissolve and simmer for 2 minutes
- Next add chopped fruits and stir again for boiling. Once it starts boiling, turnoff the flame
- Serve fruit kheer hot or cool to room temperature
- The kheer can be served cool by refrigerating for 1hour

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BANANA PSEUDO STEM CHEESE COOKIES: VALUE ADDED**BAKERY PRODUCT****V. JOTHSNA DEVI* Dr. R. BHARATHI** Dr. N. RAJANI*****

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BACKGROUND

India is the largest producer of banana next to mango and cultivated primarily for its fruit. It is the most important fruit crop that grows all over the tropical regions of the world. The major commercial production of banana in India is around 26.2 million tons, contributing about 23 percent of world banana production. Pseudo stem constitutes a major part of plant biomass and left in plantation or incinerated and wasted. However, it appears to be a rich source of fibre, total carbohydrate and cellulose. Banana pseudo stem flour has a good amount of several important macro nutrients as well as micronutrients like potassium, sodium, calcium, magnesium, phosphorus which are important to maintain body health¹.

Cheese is primarily fermented and concentrated form of milk with the benefit of a prolonged shelf life. The high content of fat and protein in cheese made it an energy dense and nutritious food. Cheese is a rich source of essential nutrients in particular proteins, bio active peptides, aminoacids, fat, fattyacid, vitamins and minerals. Ripened cheese is free from lactose and therefore suitable for lactose intolerance people. The bio active tripeptides were also detected in specific cheese varieties in significant quantities. The high concentration of essential amino acids in cheese particularly contributes to growth and development of human body. Despite of notable amounts of saturated and trans fatty acids, there is no clear evidence relating to the consumption of cheese to any disease. Conjugated linoleic acid and sphingo lipids available in cheese may have anticarcinogenic properties².

Cheese has been gaining popularity commercially in the food industry due to its use as an ingredient, including as a topping on pizza, filling in appetizers, slices on hamburgers, and sauces in pasta dishes. Traditionally cheeses like mozzarella, cheese powders, processed and imitation cheeses are the major cheeses and of course other cheese varieties are also growing in number. Ex: In the USA, these include pizza type, Hispanic and cream cheeses³.

Cookies occupy the largest category of snack item among bakery products. It is one of the popular snack foods of all kinds of people from children to elderly due to their affordable price, convenience, shelf stable and nutritive value. Cookies is a baked product that is commonly prepared using three major ingredients like refined flour, sugar, hydrogenated fats and some minor ingredients such as additives and emulsifiers. Cookies are widely accepted and consumed by almost all profiles of consumers all over the world and therefore offer a valuable supplementation vehicle to enhance nutritional improvement. It provides an excellent means of improving the nutritional quality of foods through incorporation of less expensive non wheat flour and ingredients rich in protein, vitamins and minerals including fruits and vegetables⁴.

INGREDIENTS

Cheese : 50g

Wheat flour : 150g

Banana Pseudo stem flour : 20g

Milk : 60ml

Baking powder : 2 pinch

Fat : 30g

Salt : 2-3g

Mustard powder : a pinch

Pepper : ½ teaspoon

METHOD OF PREPARATION

- Sieve flour,banana pseudo stem flour,baking powder and salt together
- Add mustard powder, rub in fat and add grated cheese
- Make a dough adding milk gradually till dough leaves the vessel or table clean
- Roll out into 1/8 inches thickness of desired shapes
- Place in a greased tin and bake at 375⁰ F for 15 minutes
- Cool,remove cookies and pack in polythene cover or air tight container

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DEVELOPMENT OF MIXED VEGETABLE INSTANT SOUP MIX

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BACKGROUND

Soup is the one of the traditional food which can be categorized as an appetizer warm food during cold and sick. Instant soup nowadays is being served as an alternative food for breakfast due to the associated adequacy of energy and nutrient required by the body, very practical and taking short time to serve which can compensate the busy life schedule. Dry soup contain vegetables in many forms has several advantages. These soup mixes play a major role among the people due to its easiness. Among all dehydrated products, instant mixes gained popularity in the recent years due to certain benefits like providing convenience, hygienic, extensible shelf life and easy to carry¹.

Increasing population and confinement of industries in particular area made more people to stay alone after education for employment less time is available for them to cook food. Hence they prepare to consume what is available or food that requires less preparation time, without considering the health benefits derived out of the food they consume. Hence an attempt is made to prepare an instant mixed vegetable soup mix, providing not only convenience but also nutrition. Such type of instant soups play an important role to balancing the nutrients required, to stay healthy and easy to prepare with least time. The benefits of dehydrated foods, particularly, dry soup mixtures include protection from enzymatic and oxidative spoilage and flavor stability at room temperature over a long period of time. Also, they do not require any preservatives or refrigerator to preserve them with short reconstitution time².

Radish leaves play a crucial role in treating illness. Radish leaves belong to family *Brassicaceae* has been used as a medical plant from ancient time. It has laxative effects on intestine and well known as appetizer, used for curing liver dysfunction and poor digestion, act as antioxidant, anti-tumorigenic, anti-diabetic and anti-proliferative. It is also found its use in the treatment of bronchitis and diarrhoea.

Resistance to anti-infective drugs by bacteria is of the growing problem to be considerative. In such conditions, agents from plant sources may be an alternative mechanism and could therefore be of therapeutic importance in the treatment of bacterial infections³.

INGREDIENTS

Corn starch	: 15g
Onion stalks powder	: 5g
Radish leaf powder	: 5g
Garlic powder	: 5g
Onion powder	: 5g
Coriander-Dehydrated	: 5g
Curry leaves-Dehydrated:	5g
Salt	: 2.5g
Pepper powder	: 2.5g
Dried carrot pieces	: 2g
Dried beans pieces	: 2g
Dried green chillies	: 1g

METHODS OF PREPARATION

- Carrots,beans and green chillies are chopped,balanced and kept for drying
- The remaining vegetables used like radish leaves,onion stalks ,garlic,onion,coriander and curry leaves were chopped, blanched, dried and made into fine powder
- All the dried above vegetable pieces and powder are mixed homogenously with the corn starch
- Pepper powder and salt are also added
- The whole mixture is blended thoroughly into well homogenized mixture
- The instant mixed vegetable soup mix thus prepared is packed and used whenever required by reconstituting with water and cooking for 4-5 minutes
- Serve hot in a soup bowl

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PREPARATION OF THE MANGO PULPY BREAD

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Historically, mango (*Mangifera indica L.*,) has been widely cultivated in tropical areas of India , Africa and Central America. It is known as the King of fruits as it is the most popular fruit in tropical regions. It is the national fruit of India and Philippines and national tree of Bangladesh. They contain fleshy stone fruits rich in phytochemical with good nutritive value and of high polyphenolics and vitamins. The antioxidant, anti – inflammatory and anticancer properties of mango are of concern to include in everyone’s diet in the multifaceted biochemical actions and help enhancing properties¹.

Mango is commercially grown in more than 80 countries and occupies 52 percent of the world’s production which accounts nearly 12.75 million tonnes. The demand for mango in the world market is increasing due to promotion of fruit trade and accessible to transportation. India dominated the world trade of processed mango products, even though only one percent of total production is being processed. The major mango processed product exported is canned mango pulp which is prepared by homogenising peeled ripe mangoes and processed in tin cans for long term storage on marketing².

Bread in Greek “artos” is considered in the past as the most important human good after health and water. The origin of the term “artos” is ancient Greek; it arrives from the verb “ararisko” which means connect, match, put together or “artio” means brew , and prepare. The modern term ‘bread’ derived from the ancient verb ‘Psoo’ meaning rub and it is diminutive of the word “psomys” (→ bread = little bit , bite). The history begins thousands years ago and unfolds in the depths of centuries. It serves as the complete and cheap food poverty. It is the main food Europe but also in the cultures of America, Middle East and North Africa, unlike East Asia, where the main food is rice. The bread, therefore, a food with

awesome variety of flavours and nutrients remains the basis of the daily diet. The bread can be easily modified with the incorporation of functional foods and hence the current study aimed at the development of mango pulp bread.

INGREDIENTS

Maida	:	300g
Mango pulp	:	30g
Fat	:	8g
Salt	:	5g
Sugar	:	10g
Yeast	:	8g
Water	:	180g

METHOD OF PREPARATION

- Mix yeast in lukewarm water and keep aside by adding a tea spoon of sugar
- Dissolve salt and sugar in the remaining water
- Sieve flour and mix with water in which salt and sugar is dissolved
- Add mango pulp and yeast mixture to the flour gradually and knead to smooth and soft dough
- Cream the fat and knead it into dough
- Keep the dough in dry proofing in 1 ½ hour
- Punch and again keep it for dry proofing about 15minutes
- Divide and scale the dough under dry cloth at room temperature at about 15 to 50 minutes
- Roll and mould either by machine or manually
- Put in greased bread tin and keep for wet proofing under wet cloth about hour or till fills the tin
- Spray water and the bread surface and put into the oven
- Inject steam into the oven or put pan with water inside
- Bake bread at 240⁰ C for 30 – 35 minutes
- Remove and brush over with oil

NOTE: If dry proven is not available allow dough to ferment till it becomes double the volume.

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PREPATION OF DRY FRUIT NANKHATAI: MICRONUTRIENT RICH BAKERY FRUIT

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BACKGROUND

Dried fruits are concentrated form of fresh fruits with lower moisture content.Fruits can be dried whole(Ex; Apicort, Berries, Grapes),in halves or in slices (Ex: Kiwis, mangoes, papayas) .Dried fruits are highly delicious and can be used in several recipes, from cakes and pies to pudding and granola.Nutritionists emphasized the healthy benefits of dried fruits and their role in balanced diet.They are available throughout year,healthier and better alternative to salty and sugar snaks.Dry fruits are rich in vitamins and proteins boost immunity and prevent lifestyle disease such as cholestrol and diabetes.Most dry fruits are rich in minerals,protein,fibre and vitamins for which their use not only nutrients but also enhances taste¹.

Nuts are most commonly consumed in mediterranean diet,and infact their consumption has been recommended to population all over the world.The tree nuts like Almonds,Hazelnuts,Cashewnuts,Brazilnuts,Macadamias,Walnuts and Pistachius and also legume seeds,such as peanuts or nutrrient dense food with unique composition.They contain healthy monounsaturated and polyunsaturated fatty acids profile,protein,soluble and insoluble fibres;Vitamin-E and K;folate;thiamine;minerals such as magnesium, copper , potassium and selenium;antioxidants and phytosterol compound which are recognized in healthy promotion.The consumption of nut is frequently associated with reduction in risk factor for chronic disease.Although nuts are high calorie food, several scientists represented beneficial effects after nut consumption, due to fatty acid profile, vegetable,fibres, vitamins, minerals and carotenoids and phytosterols with potential antioxidants².

Bakery products can provide ideal platform by which functionality can be transferred to the consumer in economically and practically feasible manner. Bakery products are cereal based and cereals are cheapest source of hunger satisfaction and nutrition for poor people who are the most vulnerable to nutrient deficiency. Bakery products include bread, biscuits, cookies, rusks, buns, cakes, pizza, muffins etc. Development of bakery products as functional food is the easy made of product quality and high bioavailability inspite of high baking temperatures. Functional foods have one or more physiological benefits and reduce the risk of chronic diseases apart from basic nutrition. Functional foods that their conventional counterparts need to be explored and remain a part of daily diet. The bakery products are still relatively understand are ignored sector for delivering the functional components to consumers which needs to be investigated³.

INGREDIENTS

Wheat Flour	: 120 g
Dry fruits	: 25g
Dry nut powder	: 25g
Butter	: 115g
Egg	: 1/2
Vanilla essence	: few drops
Baking powder	: 1/4 teaspoon
Sugar	: 85g

METHOD OF PREPARATION

- Prepare dry nuts powder
- Cream fat and sugar till light and fluffy
- Beat egg and add essence
- Sieve flour, dry nuts powder and baking powder
- Work in flour to make a smooth dough
- Wet the hands and divide into small portions and round them
- Put chopped dry fruit and on top of each ball and put on a greased and floured baking tray
- Bake at 350⁰ F for 15 to 20 minutes

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**PREPARATION OF WOOD APPLE PINE JAM: A PRESERVED PRODUCT
FROM UNDERUTILIZED FRUIT**

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BACKGROUND

Wood apple popularly known as monkey fruit, curd fruit, elephant fruit and kathbel is native to India and srilanka and belongs to the family rutaceae. the fruits have myriad of phytochemicals such as phytopenoids, phytosterols, saponins, tannins, coumarins, triterpenoids, vitamins, amino acids, tyramine derivatives etc. it is a good functional ingredient with well curative value for various diseases of bones and joints, bilious disease, prevention of capillary bleeding ,piles, cold, influenza, dysentery , habitual constipation and scurvy. The ripe fruits pulp has an excellent flavor and especially delicious when using with sugar; wood apple is found all over the dry parts of india, particularly Andhra Pradesh, Maharastra, Gujarat, Karnataka, Tamilnadu, and Madhya Pradesh¹.

Several fruits grown as wild in India found to be underutilized in spite of many associated nutritional and health benefits. Wood apple is one such underutilized and indigenous fruit plant available in India. it can be grown even at adverse conditions like saline, waste and neglected lands normally unsuitable for cultivation of other fruit crops .In fact, it can flourish well in dry areas and not seriously affected by pests or diseases due to its resistant nature both to biotic and abiotic stresses².

Encouraging the cultivation and exploiting the wider benefits of medical and therapeutic properties may be helpful to extend the utility of underutilized wood apple fruit. Pine apple (*Ananas comosus* (L.) Merr.) belongs to the family bromeliaceae is the most important commercial fruit crop in the world. It is the third most important tropic fruit in the

world after banana and citrus. The excellent flavor and taste found in the pine apple makes it as the queen of fruits. The balance of sugar and acid contributes to the fruits and refreshing flavor. It contains good amounts of various vitamins, carbohydrates, crude fiber, water and different minerals contributing good health. Fresh pine apple is rich in bromelain which acts as anti-inflammatory conditions such as acute sinusitis, sore throat, arthritis, gout³.

The pleasant flavor of pine apple especially suits well to blend into any other fruit and facilitates development of delicious food produce. Hence, the study aimed at the formulation of blended wood apple pine jam. Jam making is the common method of preserving fruits, the main factor being high concentration of sugar that helps in preservation. Jams are thick; sweet spreads made by cooking crushed or chopped fruits with sugar. It is generally known that jams tend to hold their shape, but found to be less firm than jellies. The today's population shows more concern on prevention rather than curative health care. A fruit occupies the special position as an important food with excellent nutritional and functional properties. However, availability of fruits is seasonal, and hence formulation of jams from fruits helps the availability of fruits even during off-seasons. Jam substantially possess good shelf stability and thus can be made available round the year. It requires right proportion of right ingredients to yield desirable results based on fruits, acid, pectin and sugar⁴.

INGREDIENTS

Wood apple pulp	: 500g
Pine apple pulp	: 500g
Sugar	: 1kg
Essence	: 1/2 tsp
Sodium benzoate	: 1/2 tsp
Citric acid	: 8-10g

METHOD OF PREPARATION

- Select sound, fully ripe, fresh fruits and wash thoroughly
- Peel the outer cores and separate out the flesh portions and cut into small pieces
- Add sufficient amount of water and boil till becomes soft
- Cool the boiled pieces and grind into paste
- Measure the pulp and add required amount of sugar and boil the mixture
- When the mixture gets thickened, add citric acid and boil till jam consistency (sheet test or heat up to 105⁰c boiling)
- Add essence and sodium benzoate
- Pour into sterilized glass bottle
- Store in cool and dry place when the jam gets cooled and thickened

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INSTANT VEGETABLE IDLI MIX: MICRO NUTRIENTS RICH FOOD**D. SAMYUKTHA* Dr.R.BHARATHI**Dr.N.RAJANI*****

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BACK GROUND

Remarkable growth in working women segment in India lead to the manufacture of convenience food industry .The working women in india now-a-days are not only just seeking jobs but also are career oriented .Apart from their jobs ,career ,meetings, and targets they are also a part of a family where a working women involves in caring of family dietary needs. She has to spend most of her time in kitchen by cutting, grinding, mixing, and blending and to prepare food daily. This has been her domain for years and settled a routine for her in this domain of her family. Indianhouseholds' today show interest towards convenience and instant foods over the years. Gradually instant food has become one of the fastest growing industries in world as well in India. Convenience food or instant processed food is commercially prepared food designed for ease of consumption¹.

Breakfast is referred as the most important meal of the day during different times throughout history; those who shape policy have had varying benefits on the importance of breakfast in overall diet quality. Today there is a universal recognition that breakfast should play a significant role in such a way that consumers should meet nutritional profile².

Vegetables are the most essential in meeting well balanced diets as they supply vitamins, minerals, dietary fibreand phytochemicals each vegetable group has a unique combination of these phytonutriceuticals which distinguishes them from other groups and vegetables within their own group. they have strong antioxidants and protect against free radical damage , by modifying metabolic activation and detoxification of carcinogens, or even by modifying metabolic processes in the course of tumour cells all the vegetables may offer protection to human against chronic diseases the promotion of healthy vegetable

products has provide in bringing out good health as each vegetable contains a unique combination of phytonutriceuticals mixing of variety vegetables ensures the individual diet with a combination of phytonutriceuticals to obtain health benefits³.

Idli is a traditional fermented rice and black gram based breakfast item idli is a very popular fermented breakfast food consumed in the Indian subcontinent which is prepared mainly by using rice and Bengal gram soyabean,greengram,chickpea can be substituted for the blackgram during fermentation of idli .the natural micro-organisms like leuconostoc,mesenteriodes and streptococcus,thermophilus in grains and legumes grow rapidly and are found to be beneficial the reported changes during fermentation comprises of an increase in the free sugar non protein nitrogen free nicotinic acid methionine and choline in idli these changes during fermentation are highly significant for nutritional point of view. An increase in the methionine a limiting essential amino acid in legumes greatly improves protein value⁴.

INGREDIENTS

Raw rice	: 100g
Parboiled rice	: 100g
Blackgram dhal	: 150g
Dry carrot pieces	: 5g
Dry bean pieces	: 5g
Dry peas	: 3g
Dry curry leaves	: 2g
Dry coriander leaves:	2g
Dry onion pieces	: 2g
Salt	: 5g

METHOD OF PREPARATION

- Select good quality vegetables, blanch and dry in hot air oven at 70⁰c till complete removal of moisture
- Soak rice, remove from water, dry under sun and grind coarsely
- Sift the flours with salt and add dried vegetables
- Blend all the ingredients homogenously and pack in the polythene covers
- Make a batter whenever required, keep aside for one hour and prepare idlies
- Instantly idlies can also be prepared by adding curd slightly

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**POMOGRANATEPEEL BLACK GRAM DHAL MURUKU: VALUE ADDED
EXTRUDED PRODUCT**

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BACKGROUND

India is the largest producer of pomegranate next to Iran. Pomogranate peels constitute around 50 percent of the total fruit weight .The available literature clearly demonstrated that pomegranate peel nutrient rich by product and attracts attention of many scientists .It is an important source of minerals such as pottasium ,calcium, megnisium,and sodium ;complex poly saccharides and diverse range of bio active compounds like phenolics, flavonoids ,proanthocyanidin compounds and ellagitannin. On the other hand, pomegranate peel powder contains higher content of lysine, leucine, aromatic fatty acids (Phenylalanine, tyrosine) threonine and valine¹.

Food and agricultural products processing industries generate sub stained quantities of phenolic rich byproducts which found be valuable sources of anti-oxides .The Pomogranate peels are relatively cheap and abundant by products from the juice industry .The well-known fact that they are rich sources of Bio-compounds especially polyphenols with potential health promoting properties Value added products may be generated from those Agro-wastes and employed in food preparation and nutraceutical purposes unfortunetley pomegranate peel is still underutilized due to its astringent taste which became limiting factor in its utilization as food despite of outstanding nutritional and ethnopharmalogical potential ².

People now- a -days prefer to consume snack food because of the light and quick meal that can be consumed anywhere and anytime compared to the main meal .The present generation people live in hectic and busy lifestyle schedules which lead to choose snack foods to relive from hunger .Traditional foods occupy crucial role in local identity ,consumer

behavior ,transfer of heritage and interaction with rest of the world .Muruku is one of the Indian Traditional savory snack product obtained by extrusion technology³.

INGEREDIENTS

Blackgram Dhal : 90 g

Pomegranate peel powder:10g

Rice flour:1tsp

Red chilli powder:1tsp

Salt :to taste

Oil: to fry

METHOD OF PREPARATION

- Lightly fry the black gram dhal and then powder it
- Prepare pomegranate peel powder ahead by balancing peel, drying ,(sundry/hot air oven dry)and pulverizing
- Mix blackgram flour, riceflour, peel powder with salt, chilli powder ,adding heated
- Add sufficient water to make a dough
- Put the dough into muruku mold and press into hot oil and fry till crisp and golden brown
- Cool the product and store in air tight container

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ALLOE GRAPE JELLEY : A FUNCTIONAL FOOD**S.LAKSHMI* Dr.R.BHARATHI** Dr.N.RAJINI*****

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BACKGROUND

Aloe Vera is well known, since many centuries for its curative as well as therapeutic properties in countries, like Greece, Egypt, India, Mexico and China. Aloe is derived from the Arabic word "Alloeh" meaning "shining bitter substance" and Vera from Latin word meaning "True". The Greek scientists considered it as the universal panacea and Egyptians as the plant of immortality. Consumers often demand for new food products offering health benefits and potential to minimize the risk of disease and labeled as 'functional foods'. Aloe vera more than 75 active components and rich in Nutrients like Vitamin A, C, E, B₁₂, Folic acid and choline. It has several health benefits as Antitumor, Anti obesity, Anti diabetic, Ulcer treatment, Healing wounds and burns, immune modulatory and Antimicrobial Etc¹.

Grapes have been used thousands of years due to the associated nutritional and medical benefits. They are found to be rich in sugar, flavonoids, anthocyanins and prostaglandins, organic acids, tannins, minerals salts and vitamins. Grape especially red and black species are rich in preservative, derivative of which is a Natural Anti oxidant. The ripe fruit is Laxative and purgative, diuretic, appetizer and cures thirst Asthma "vata" and "vatarakta", jaundice etc. The active components in the grapes play a crucial role as Functional food and gains attention of the scientist towards several pharmacological and therapeutic studies².

Fruit jellies are semi solid, preserved mixtures of fruit juice and sugar. The technology of jelly making is the good way to preserve the fruit flavors and to enjoy throughout the year. It is easy to prepare even domestically without much special equipment. The essential substances for many fruit jellies are fruit flavour, pectin, sugar, acid and water. Pectin gel or Firm gel forms only when suitable concentrations of pectin, sugar, water and acid are

employed. A perfect jelly should be transparent, well net, but not too stiff and should have the original flavour of the fruit. It should be attractive colour and retains shape when removed from the mould. The jelly should be firm enough in the way to retain sharp edge but tender energy to quiver when pressed. It has total soluble solids (TSS) of 65 %, 0.5 to 0.75 % acid and 45% fruit juice³.

INGREDIENTS

Pectin extract: 1/2 kg

Sugar : 1/2 kg

Citric acid : 2g per kg of fruit

Sodium benzoate : 1/4 table spoons

METHOD OF PREPARATION

- Select black grapes of firm but not over ripe
- Discard unripe and decayed fruits
- Wash thoroughly and remove the seeds
- Similarly select good quality aloe vera leaves and separate the flesh portion by cutting the leaf margin
- Cover the pieces with water and add citric acid
(Note: Aloe vera is incorporated at 10% level to black grapes)
- Cut the flesh portion into small pieces
- Cover the pieces with water and add citric acid (water: 1 1/2 times the weight of weight of fruit)
- Boil the mixture thoroughly crushing it occasionally with laddle for about half an hour
- Strain the mass through coarse muslin cloth to separate the extract and decant carefully
- To the pectin extract add required amount of sugar
- Pour the finished product into clean and dry sterilized bottle
- Allow the jelly to cool and settle
- Store in cool and dry place

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PREPARATION OF BETEL LEAVES FRYUMS: VALUE ADDED**DEHYDRATED PRODUCT****L.CHANDANA* Dr.R.BHARATHI** Dr.N.RAJANI*****

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BACKGROUND

In India Betel Leaf plays an important role since ancient culture and dates back to 400BC. As per ancient books of ayurveda, charaka, sushruta samhitas and kashyapa bhojanakalpa, the practice of chewing betel leaves after meals became more common between 75AD and 300AD. In Chinese folk medicine betel leaves are used mainly for the treatment of various disorders and claimed to have detoxification, antioxidation and antimutagenic properties. There are number of research experiments on betel leaves where the leaf extract, fractions, and purified compounds are found to play a crucial role in oral hygiene and found to be anti-diabetic, cardiovascular, anti-inflammatory, immunomodulatory, anti-ulcer, hepato-protective, anti-infective etc. Betel leaves are used as a stimulant, an antiseptic and a breath freshener¹.

Fryums is widely used dehydrated Indian traditional “ready to fry” Indian snack which is prepared using flour and corn/potato starch. They are of different shapes, colours and variety of combinations. It can be combined with sago, tapioca flour and variety of ingredients².

Food dehydration is a process of removal of moisture to the maximum level to extend the shelf life. Sundrying and mechanical drying are being popularly employed in food preparation. The process of food dehydration is by the transfer of mass and heat within the food and the medium employed to transfer energy to the food. The dehydrated foods can be

easily preserved and transported. In today's food market, dehydrated food products occupy a major place in the food supply chain³.

INGREDIENTS

Sago	: 90g
Betel leaves powder	: 10g
Water	: 400g
Salt	: 20g
Green chillies	: 4g
Cumin seeds	: 5g

METHOD OF PREPARATION

- Select good quality betel leaves, blanch, dry and make into a powder
- Soak the sago in water for 5-10 minutes and drain all the water
- Put the soaked sago and betel leaves powder in water and cook till results in thick fluid
- Mean while add green chillies, cumin seeds and salt also
- Take the batter with a spoon and pour on a plastic sheet or wet cotton cloth
- Let it dry in the hot sunlight
- When dried well, store in an air tight container
- Deep fry the papad in hot oil before serving

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BASELLA PANEER CURRY :BRINGING VARIETY TO TRADITIONAL PRESERVATION

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BACKGROUND

Basella alba is a good source of fibre, vitamins A, B and C iron, calcium and saponins. The phytochemicals, statins having the ability to fight against cancer and cardiovascular diseases. It is also used in treating head ache inflammation and ulcers. The research also indicates that basella leaves are good sources of essential amino acids such as arginine, isoleucine, leucine, lysine, threonine, and tryptophan and also a low percentage of soluble oxalates. The leaves contain carotenoids, organic acids, water soluble polysaccharides and bioflavonoids, betacyanins and vitamins all these increase nutritive value of food when these leaves are used¹.

Paneer is an indigenous popular dairy product of India which is similar to an unripened variety of soft cheese used in the preparation of a variety of culinary dishes and snacks. It is produced through acid coagulation of milk. Paneer is marble white in appearance having firm cohesive and spongy body the standards on paneer recommends that it shall not contain more than 70 percent moisture and the milk fat content shall not be less than 50 percent it is a good source of fat soluble vitamins A and D and also a rich source of essential amino acids. Owing to its high nutritive value paneer is an ideal food for expectant mothers, infants, growing children, adolescents and adults. Paneer is also recommended by the clinicians for diabetic and coronary heart disease patients².

Curry is an Indian dish known for centuries. The word curry by itself is rarely used, instead the terms “bean curry, potato curry, spinach curry”, etc which signifies the dish.

Eating curry is thought to be beneficial to human health. The epidemiologic investigations on curry have revealed incidence of cancer and other diseases in immigrants in western countries presumably a consequence of a cessation of eating curry, the adoption of poor diet or both one specific epidemiological study reported an association between better cognitive performance and increased curry consumption in an elderly people however, no published work has documented a direct effect of curry consumption on human health³.

INGREDIENTS

Paneer : 150g

Butter : 2 tbsp

Green chillies : 2-3

Basella leaves : 100g

Onions finely chopped: $\frac{3}{4}$ cup

Onion paste : 2 medium sized

Ginger garlic paste : 1 tbsp

Tomatoes : $\frac{1}{2}$ cup

Cashew nuts : 8-10

Garam masala : $\frac{1}{2}$ tbsp

Kasuri methi : tbsp

Salt: as needed

METHOD OF PREPARATION

- Select good quality of basella leaves and wash them thoroughly
- Heat 1 tbsp oil in a pan fry green chillies and add basella leaves for three to four minutes
- Cool this completely, add ¼ tsp salt blend this along with cashew to a smooth puree
- Heat in another pan with 1.5 tsp oil and fry cinnamon, cardamoms, clove, until they sizzle then add onions and fry till they turn into golden
- Fry ginger garlic paste until the raw smell goes away, then fry tomatoes
- Add kasuri methi and garam masala, saute the mixture
- Pour half cup of water in that and cook the mixture thickens lower the flame add the basella leaves mixture, mix well and cook until it begins to bubble for about 2 – 3 minutes
- Avoid over cooking, add paneer and mix well
- If using cream pour it now and serve basella paneer curry with naan or roti or rice

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ATIKAMAMIDI LEAFY POWDER INCORPORATED PAPPU BILLALLU: VALUE ADDED SNACK PRODUCT

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BACKGROUND

Atikamamidi is a telugu word of the plant, *boerhavia diffusa* which is well-known medical plant in traditional Indian medicine. Wild edible plants have tremendous influence since before cultivation due to the association nutritional value as well as medical importance. They play a major role in the livelihood of rural people and forest inhabitants as an integral part of subsistence strategy in many developing countries. the wild edible portions of plants serve as an alternative to staple food during periods of food deficit but found to be valuable supplement for a nutritionally balanced diet. traditionally knowledge on wild edible plants is rapidly eroding as they are largely stored by the people. such situation demands for exploring the wild edible plants and to focus on the developing of food products for extending the utility. Atikamamidi in one and type of plant grow as wild in and around the field, waste lands and as weed¹.

Boerhaavia species have been attracted interest in phytochemical and pharmacological India owing to their excellent medicinal properties. they are the sources of alkaloids, steroids and flower. Boerhaavia diffuse especially created lot of attention due to its wider usage in ayurvedic system of medicine. it is commonly used to treat jaundice, hepatitis, odema, oligurea, anemia, inflammation, eye diseases etc. it acts as hepato protective diuretic, anti-inflammatory, anti-stress and immunomodulation antifertility, antimicrobial, antiviral and insecticidal activities. the biologically active compounds present in it may provide a scope, for extensive research in the field of food product development, nutritional, therapeutic and pharmacological inventions².

Whether eating a “snack” is considered as beneficial or detrimental behaviour is largely based on how “snack” is defined. The term “snack food” tends to cannot energy dense, nutrient-poor foods high in nutrients to limit (sugar, sodium, and/or fats and an cake, cookies, chips, and other salty snacks and sugar – sweetened beverages the nutritive value of the snacks can be enhanced by the addition of underutilized and nutrient with foods. Atikamamidi serve as one of the green leafy underutilized vegetable helpful in enriching the nutritional and pharmacological benefits³.

INGREDIENTS

Rice flour : 90g

Atikamamidi leafy powder : 10g

Groundnuts : 40g

Red chilli powder : 1 tea spoon

Salt : to taste

Oil : to fry

Curry leaves : few

METHODS OF PREPARATION

- Dry roast the groundnuts, remove the skin and make into a fine powder
- Prepare atikamamidi leafy powder by blanching, drying (sun drying) or hot air oven drying and grinding to fine powder
- Mix the rice flour, groundnut and leafy powder, then add chilli powder, salt, curry leaves and two tea spoons of oil
- Make it as thick dough using sufficient water like chapathi dough
- Take small portions of about 20 -30g, spread on plastic cover or wet cloth and press the dough with hands thinly near to circular shape
- Heat the oil, deep fry till golden brown
- Cool and store in air tight container or plastic cover

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**BANANA BLOSSOMS NUTRI LADDU: A VALUE ADDED PRODUCT
FROM BIOWASTE**

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BACKGROUND

Blossom of the banana plant [musa acuminata colla], by product of banana cultivation is commonly consumed as a vegetable in many parts of Asian countries such as Sri Lanka, Malaysia, Indonesia and the Philippines. Banana blossoms have tremendous nutritional value and found to be rich sources of dietary fibre and some biologically active compounds like vitamin-C, tannin, myoinositol phosphates, and alpha tocopherol. High levels of dietary fibre intake significantly lower prevalence rates of coronary heart disease, stroke, and peripheral vascular disease. Food components with antioxidant properties are helpful to prevent cardiovascular diseases by inhibiting the oxidative damage to LDL-Cholesterol. Friction of *musa sapientum* showed high amounts of total polyphenols and total antioxidants, denoting that banana blossom is a rich source of dietary fibre associated with polyphenols which contribute health promotion¹.

The plant wastes or by-products are an excellent source of nutraceuticals, bioactive, inherently functional and possess many components that are good for human health. Food wastes or by-products convert to the functional food ingredients is the healthy trends in the food industrial sector. The waste management is one of the major challenging task for food industries. The large volume of the low cost by-products is economically advantage of its potentially valuable components and environmental benefits. The people in the recent year are increasingly aware of the relation between diet and good health. Consumer attitude towards health foods is promising development and the scope of functional foods is the fast growing in world food markets which are not only used to satisfy the hunger but also to provide

essential nutrients for protecting and controlling from the disease. Food wastes are produced by a variety of sources, such as during harvesting as well as vegetables-derived processing food wastes from include unused plants parts, peelings, stems, seeds, shells, bran, trimmings residues after extraction of oil, starch, juice and sugars. Many fruits and plants by products contain bioactive compounds, phenolic and flavonoids. Which aid in removal of free radicals and reduce the risk of heart attack and cancer disease².

Ladoo is a ball shaped popular sweet in Indian subcontinent. It is prepared with the various kinds of flour and sugar with other ingredients that depends on the variety of recipe ladoo often served in festivals and occasions it is a highly acceptable product. It is not only popular in India but also in the regions with immigrants from the subcontinent such as Hijaz. The common flours used for laddu include besan [chickpea flour], rava [wheat semolina] and ground coconut. The ladoo being the familiar and universally acceptable product, it can be served as an easy means of value addition with any type of ingredients³.

INGREDIENTS

Black gram dhal: 200g

Banana blossom powder: 20g

Jaggery: 100g

Ghee: 50g

METHOD OF PREPARATION

- Separate the banana blossom, blanch, dry and powder it
- Black gram dhal is slightly roasted and then powdered it
- Jaggery is also powdered
- Mix the powdered jaggery with black gram dhal and banana blossom powder
- Add ghee to this mixture, make the mixture into even sized balls
- Store in an air tight container

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GUAVA BANANA CHEESE: READY TO EAT FOOD

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BACKGROUND

India is the second largest producer of fruits 30 to 40 percent of total production is spoiled. The high water content in the fruits facilitates easy invasion of microorganisms due to high water activity. Recently the demand of the fruits is being increased as they have been recognized as the potential sources of essential dietary nutrients and phytochemicals. Nevertheless, many of fruits are reasons and perishable which require approximate preservation technique to utilize the nutritional benefits and extend shelf life. The fruits are widely preserved with sugar as it produces variety and add delicious taste to the fruit based products. Based on this background the present study focused on the development of Guava, Banana cheese¹.

Guava belongs to the family Myrtaceae grown throughout the tropics and sub-tropics of the world due to its wide availability. It has promising nutritive value, particularly rich in vitamin C, pectin, phosphorous, iron etc. Guava is considered as one of the nutritionally valuable fruit crop in India available from rural to urban people and popularly known as 'apple of the tropics'. The fruit is easily fits in the new functional foods category and categorized as 'super fruits'. It occupies an importance place in food process industry owing to its unique pleasant aroma, good flavour, taste and health promoting factors².

Banana is herbaceous flowering plant belonging to the genus musa and the ripe fruits are edible. The flesh is rich in starch which changes into sugar on ripening. It is a rich source of carbohydrates dietary fibres, certain vitamins and minerals. Banana is also rich in several bio active compounds like flavonoids, carotenoids, phenolics, amines, vitamin C and vitamin E possessing Anti oxidant activities playing a crucial role in health promotion. The data from 2016 denotes that around 28 percent of the total world's production comes from India. Converting the banana into shelf table food products is an intelligence tank of preserving the health benefits of banana by extending shelf life³.

INGREDIENTS

Guava Pulp	:	500g
Banana Pulp	:	500g
Sugar	:	600g
Butter	:	80g
Cashew nuts	:	20g
Raisins	:	20g
Table salt	:	½ tsp
Citric Acid	:	½ tsp

METHOD OF PREPARATION

- Select fresh soft fully ripe firm fruit of good quality
- Use only sound portions of the fruit and cut into small pieces
- Pour equal quantity of water and boil till the fruit pieces become quite soft
- Strain the pulp through fine muslin cloth to remove seeds and coarse skin
- Add sugar, butter to the pulp and heat the mixture till sufficiently thick
- Just before finishing add the remaining ingredients previously dissolved in small quantity of water
- Smear the china plate with butter and spread the finished product over it to form a layer about 0.6cm thick
- Allow the product to cool and then cut into pieces of desired size and shape
- Wrap the cheese pieces in a butter paper
- Store in a clean air tight container

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LEAFY VADA MIX : AN INSTANT VALUE ADDED PRODUCT

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BACKGROUND

The today's society, snacking contributes close to nearly one third of daily energy intake, with many snacks consisting of energy-dense and nutrient- poor fruits choices are depend on a multitude of factors on individual, social and environmental levels and social norms .In addition, satiety, the feeling of fullness is an important factor in suppressing over consumption, which can lead to overweight and obesity. The processed foods to include protein, fiber or complex carbohydrates might also facilitate satiety when consumed as snacks. However, studies that examined the consequences of snack foods on obesity did not always account for satiety, the dietary quality and portion size of the snacks consumed. Snack foods on obesity risk, the consumption of healthful snacks likely affects satiety and promotes appetite control, which could reduce obesity¹.

Vada is a category of savoury fried snacks which is most popular in India. Different types of vadas can be described differently as fritters, cutlets , doughnuts or dumplings .The other alternative names for this snack include vada , vade , vadai ,wadeh and bara .The various several types of vadas are prepared with different ingredients ,ranging from legumes [such as medu vada of South India] to potatoes [such as batata vada of West India].They are often served as a breakfast item or a snack and also used in other food preparations such as dahi vada ,vada pav, vada curry etc² .

Green leafy vegetables are used since ancient periods as source of food due to many nutrients and minerals which are helpful in maintaining human health .The health and nutrition concerns are of expanding world populations are major upcoming challenges especially in developing countries .In addition to phytochemicals with further health benefits including glycemic control ,immuno-stimulation or antioxidant activity. Traditional vegetables are valuable sources of nutrition in rural areas where exotic sp are not available .Leafy vegetables hold an important place in well- balanced diets .Green leafy vegetables are the cheapest of all the vegetables even in reach to the poor man, being richest in their nutritional value .The lack of knowledge on the importance of nutritive value of green leafy vegetables among the public is the main drawback in their low consumption. The ingestion of phytochemicals found in traditional foods has direct implications on the wellbeing of people.

Plants used for their medicinal attributes contain phytochemicals with pharmacological and physiological activities³.

Value addition to foods may be done in several ways which may be through preservative food ingredients is capable of eliciting functionalities and by fortification using micronutrients. There are novel and emerging food processing technologies play a crucial role in bringing value addition .Food processing industries in many of the countries across the world generates huge quantity of by-products in the use of value addition. These by-products have less use which creates considerable environmental pollution. The adverse effects associated with by-products of the fruits,vegetables etc may be reduced through value addition adapting commercially viable approaches. It is also important to note on the regulatory aspects of foods whenever the foods are preserved by value addition⁴.

INGREDIENTS

Black gram dhal powder	: 100 g
Coarsely dried spinach leaves	: 5g
Coarsely dried mint leaves	: 5g
Dry coriander leaves	: 2 g
Dry curry leaves	: 2g
Jeera powder	: 2g
Salt	: 2g
Green chillies	: 2g

METHOD OF PREPARATION

- Soak the black gram dhal , remove from water , sun dried and make to coarsely grind powder
- Select good quality green leafy vegetables, wash thoroughly, separate leaves , dry in hot air oven at 70⁰c till maximum removal of moisture
- Mix all the ingredients homogeneously and blend well
- Store in polythene cover and make into vadas whenever required

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BABY CORN PAPADS : A DEHYDRATED VALUE ADDED PRODUCT**S. MOUNIKA * Dr.R.BHARATHI** Dr.N.RAJANI*****

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BACKGROUND

Baby corn (also known as young corn, mini corn or candle corn) is the ear of maize (*Zea mays L*) plant harvested as young, when the silks have either not emerged or just emerged and no fertilization has occurred. Baby corn is found to be the most important dual purpose crop grown round the year in India. Baby corn is becoming popular both in domestic and foreign markets which has enormous processing and export potential. The major interesting recent development is of growing maize for vegetable purpose currently, Thailand and China are the world leaders in baby corn production, where as in India baby corn is being cultivated in Meghalaya, Western Uttar Pradesh, Haryana, Maharashtra, Karnataka and Andhrapradesh¹.

Babycorn is unique for its delicious, decorative and nutritious vegetable with out cholesterol. It is low calorie vegetable and rich in fibre content. Infact one baby corn can be compared with an egg in terms of minerals. Probably it is the only possible vegetable with out any pesticide residues. Babycorn is free from insect pests and diseases and the nutritional value is quite comparable with several high priced vegetables².

Papad is a thin, crisp, disc shaped food of the Indian sub continent, typically based on a seasoned dough commonly made from peeled blackgram flour (urad flour), either fried or cooked with dry heat (usually flipping it over an open flame). Flours made up of other ingredients such as lentils, chickpeas, rice, tapioca, certain millets or potato can be used³.

Papadums are specially served as an accompaniment to a meal in India, Bangladesh, Nepal and Srilanka or as an appetizer or snack, sometimes with toppings such as chopped onions, chopped carrots, and chutneys or other dips and condiments. In certain parts of India, papadums which are subjected to drying but not cooked, are used in curries and vegetable dishes. They have become part of the Indian subcontinent since generations and occupy as an intrinsic part of everyday meals for its unique delicious taste⁴.

INGREDIENTS

Black gram dhal flour: 100g

Baby corn flour : 50g

Water : 300ml

Chilli powder : 4g

Salt : 20g

Asafoetida : 5g

METHOD OF PREPARATION

- Prepare baby corn flour by separating seeds, blanching, drying and powdering
- Similarly prepare black gram dhal flour by soaking dhal, straining, drying and powdering
- Make smooth dough with black gram dhal flour and baby corn flour by adding water gradually
- Make small balls and roll them into thin round shape
- Dry them thoroughly under sun
- Deep fry the papads whenever required

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FORMULATION AND DEVELOPMENT OF FRUIT DIAMOND CUTS

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BACKGROUND

Sapota being to family sapotaceae is one of the major fruit crop will good source of digestible sugar ranges between 12 to 14 percent The fruits have an appreciable amount of proteins , fats ,fibres ,calcium, phosphorus , iron , carotene and vitamin.Several medicinal properties have been ascribed to various parts of sapota tree and sapota.Being climeteric fruit, sapota undergoes rapid ripeningchanges within week of harvesting for which it becomes soft,sweet , and produces excellent aroma with decrease in tannins , latex sapotin , aldehydes and acidity . These changes are associated with activation of enzymes like catalase and peroxidases which lead to top shelf – life. In such instances, value addition through processing will be of economic concern to increase the utility and conversion of fruits to suitable products¹.

Banana is the common name given for herbaceous plants of the genus musa and for the fruit they produce which are the oldest cultivated plants. Fruits are important functional ingredients play a crucial role in a healthy diet. Especially banana offer great medicinal benefits as it aids in the body's retention of calcium, nitrogen and phosphorus which facilitate healthy built and regenerated tissues. Bananas are excellent source of potassium and magnesium which aid in lowering blood pressure levels and heart stroke. The fruits are also used for treating burns and wounds. For instant pain relief from burn or wound, beat a ripe banana into a paste and spread over the areas².

Human desires well for the sweet taste at all ages, races and cultures. Throughout evolution, sweetness has had special role in human nutrition, helping to orient feeding behaviour towards foods providing both energy and essential nutrients. Infants and young children in particular rely interestingly on food choices preferring towards sweet taste. Infact the low cost and ready availability of energy – containing consumption of added sugars is the driving force behind the obesity epidemic. However, Indian sweets are significant in Indian culture which pays attention during festivals, occasions and ceremonies signifying good omen, happiness and prosperity. Especially in India, every happy occasion is marked with distribution of sweets³.

INGREDIENTS

Wheat flour : 150 g

Powder sugar: 75 g

Sapota pulp : 15 g

Banana pulp : 15 g

Ghee : 2tbsp

Salt : pinch

Cardamon seeds: 3g

Oil: To fry

METHOD OF PREPARATION

- Mix the maida flour, sugar powder and 2tsp of oil in sufficient water
- Prepare sapota pulp by washing fruit,peeling,deseeding and makes sapota pulp through mashing
- Similar make banana pulp by peeling and mashing
- Gradually mix the ingredients and make a dough
- Divide the dough into small portions and roll into chapathies
- Cut into small rectangular pieces with a knife and deep pan fry them in oil
- Whenever turn into golden brown, drain oil and remove
- Cool and then pack it in air tight containers or in polythene covers

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WATERMELON RIND –CUCUM SQUASH: VALUE ADDITION TO THE BY –PRODUCT

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BACKGROUND

Agricultural production, post harvest treatments and food processing industries produce high amounts of by-products and bio waste. Especially, the fruit by-products such as peels, trimming, stems, shells, bran and seeds account for more than 50 percent and at times they also contain nutritional and health benefits. The growing interest of consumers on fruits juices, nectars, frozen and minimally processed products resulted in increased production of by-products and wastes in recent year. Many of the biomaterials generated are not utilized which are disposed in municipal landfill creating much of serious environmental problems. The wise alternative is to utilize nutritional benefits of bio waste as one of dimension of global food security since 805 million people across the globe suffer from hunger.¹

Watermelon rind constitutes around 33 percent of the total fruit weight with 29 percent of inner white portion. The rind is edible, tastes good and provides good health. It is very good source of vitamin A, C, B₆, magnesium and potassium. Watermelon rind comprised of higher concentration of non-proteinaceous amino acids called cofrulline which will be converted to arginine, precursor for nitric oxide. Arginine, an amino acid vital to the heart, circulating and immune system. The citrullin compound acts as an antioxidant and protects from free-radical damage. Thus the estimated watermelon fruit waste around 35 to 40 percent with major portion of rind. In fact, the rind is nutrition which highlights the need of utilization of its by bringing out value added product. Hence the current research concentrated towards the development of watermelon rind cucum squash².

Cucumber fruit is widely cultivated plant in the gourd family of *Cucurbitaceae*, which also constitutes as with the important crops like melon, watermelon and squash. Cucumber offers superior hydration and they contain about 95 percent of water. It is familiar for decades for anti-inflammatory benefits on certain properties for digestion, and ageing, cardiovascular and cancerous diseases, bone health, inflammation and connective tissue disorders. It has high levels of lignans, vitamin K, cucurbitacins and their derivatives [triterpenoids], flavonoids [apigenin, luteolin, quercetin and kaempferol], antioxidants such as beta carotene and vitamin

C, B vitamins and minerals. Cucumber is literally one of the most versatile fruits known for its therapeutic value which warrants for extensive research on the basis of many scientific avenues³.

Squash is a non-alcoholic concentrated juice used in the beverage industry. It is a fruit beverage that contains at least 25 percent fruit juice or pulp and 40 to 50 percent total soluble solids. It also contains about 1 percent acid and 350 ppm sulphur dioxide, 600 ppm sodium benzoate. The squash is diluted before serving.

INGREDIENTS

Watermelon rind juice : 500 ml

Cucumber juice: 500 ml

Sugar: 2 kg

Water: 1 l

Citric acid : 30-35 g

Essence : 3-4 tsp

Potassium meta sulphate: 2-5 g

METHOD OF PREPARATION

- Separate watermelon rind and make into pieces
- Crush them with their own juice for 6 to 7 minutes
- Similarly wash cucumber fruit, peel, crush the white portion for 6 to 7 minutes
- Strain the juice of each by using a strainer and extract the juice
- Measure and keep the sugar aside
- Measure and keep juices aside
- Prepare syrup by required amount of water and sugar.
- When sugar gets completely dissolved, add citric acid
- Strain the syrup through muslin cloth and cool it
- In the syrup, add cucumber juice, grape juice, essence, sodium benzoate and in the sterilized bottle

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CRUNCHY VEGGIE CULLENT MIX: NUTRIENT RICH SNACK FOOD**A.KHYATHI * DR.R.BHARATHI** DR.N.RAJANI*****

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BACK GROUND

The demand for instant or convenient or ready-to-eat food items is raising due to the changing life style patterns. The fast minimally processing foods cater the needs of the consumers who strive for convenience in terms of time of food preparing, decreasing family size, increased levels of disposable income, travel abroad and adaptability of the consumers towards variety of cuisines. Snack foods have been emerged as the main entries in the food market to meet the consumer's demand¹.

Vegetable cutlet is a popular snack on the Indian restaurant menus .Cutlets one basically patties or cake made of any veggie or mixed any vegetables,paneer,corn, tofu ,lentils , mushrooms,chicken, lamb ,fish etc. It is a crisp and absolutely delicious easy Indian snack recipe which can be served with chutney or sauce. The cutlets can be baked, deep fried or shallow fried to suit one's diet and taste .It is made with combination of vegetables with potato as base².

Pulses including peas have long been important components of the human diet being the source of starch, protein and other than nutrients. More recently, the healthy benefits other than nutrition associated with pulse consumption have attracted much interest .The peas, *pisum sativum* specifically green and yellow cotyledon dry peas have healthy benefits derived mainly from the concentration and properties of starch, protein, fibre, vitamins, minerals and phytochemicals in peas. Fibre from the seed coat, the cell walls of the cotyledon contribute to gastrointestinal function and health³.

Potato is an economically staple crop available all across the world with successful large –scale production, consumption, and affordability in the open market. Potatoes vegetable provides basic nutrients such as carbohydrates, dietary fiber (skin), several vitamin, and mineral (eg. potassium, magnesium, iron). Dietary intake of potatoes especially coloured potatoes play an important role in the production of antioxidant defense system by providing essential nutrients such as vitamins, beta carotene, poly phenols and minerals. This may help lower the incidence of wide range of chronic and acute disease processes like hypertension, heart disease, cancer, neuro degenerative, and other diseases.

INGREDIENTS

Beaten rice (poha):50g

Oats: 50g

Potato powder: 20g

Corn starch: 5g

Dehydrated carrots, peas: 20g

Dehydrated onion: 10g

Dehydrated coriander leaves: 3g

Dehydrated curry leaves: 2g

Peanuts: 2tbsp

Chilly powder: 1tbsp

Salt: 5g

Bread crumbs: 25g

METHOD OF PREPARTION

- Coarsly grind poha,oats and peanuts
- Prepare potato powder by peeling ,blanching,drying and dehydrating
- Dehydrate the vegetables by washing ,cutting ,blanching and drying
- Mix above all the ingredients homogenously with chilli powder and salt
- Pack it in polythene cover or air tight container
- Provide the bread crumbs separately
- Prepare cutlet whenever required by making dough ,making into small balls ,patting and rolling into them bread crumbs provided and then either deep fried or shallow fried

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BLACK JAMUN SEED POWDER INCORPORATED SEV :VALUE ADDED EXTRADED PRODUCT FROM BY PRODUCT

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BACK GROUND

Jamun is the tropical tree belongs to Myrtaceae family and known by synonyms Jambolan or Black plum. All the parts of the jamun or jambul tree contain variety of uses. The seeds of jamun has several benefits mainly in lowering of blood glucose level and reduces glycosuria. On the other it has vitamins C and A, riboflavin, nicotinic acid, choline, folic acid, malic acid, sodium, calcium, potassium, phosphorus, manganese, zinc and iron. Jamun seed powder is used mainly to treat diabetes. Anti-diabetic effects of jamun seed, recommend that it holds significant potential to produce safer drugs for diabetes treatment.

The seed is associated with lowered risk of secondary complications of diabetes. The actual benefit is at the stage of IFG(Impaired fasting glucose) which can be well controlled with jamun seed powder regulation of IFG. Especially prevents the early onset of diabetes

Jamun seed powder has been of utility through not popular for centuries as a natural ingredient to control the healthy blood sugar levels, control cardio vascular diseases and gastro intestinal disorders. The needs of jamun are associated with glucoside, jamboline and ellagic acid which have the ability to control the conversion of starch into sugar when it found in excess of glucose production in the body. However very less findings regarding its processing and utility in foods are available

Food extrusion is a form of extrusion used in food processing. It is a process by which is a combination of mixed ingredients are forced through an aperture in a perforated plate or die with a design specific to the food and are then cut into a specific size by the blades. The machine which is used to force the mix through the die is called an extruder and the mix is referred as the extrudate.

Extrusion enables mass production of food via a continuous efficient system that ensures uniformity of the final product. Food products manufactured using extrusion usually have good amount of starch content. Many breakfast cereals and ready to eat snacks, confectionary, pre made. Cookie dough, some baby foods, full-fat soy, textured vegetable protein, comes

under extruded products . At homes muruku, sev, vadiyalu etc., are prepared using extrusion technology

INGREDIENTS

Basin flour -:90gs

Chilli powder: 2 to 3g

Salt: to taste

Water: as required

Oil: for frying

METHOD OF PREPARATION

- Make black jamun seed powder by thorough washing , blanching , drying and grinding to fine powder
- Rub little oil into the flours add chilli powder , salt and make a stiff dough
- Press through a tiny holed mould in to a hot oil
- Fry till crisp on both sides
- Remove and drain oil
- Allow the prepared sev to cool in open vessels and later on store in dried Air tight containers

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PREPARATION OF MORINGA MASALA BISCUITS: VALUE ADDED**BAKERY PRODUCT****K.CHAITANYA BHARATHI* Dr.R.BHARATHI** Dr.N.RAJINI*****

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BACKGROUND

Moringa Olifera is native of India, grows in both the tropical sub-tropical regions of the world. It is commonly referred as Drumstick tree or 'hoseradish tree'. Moringa can withstand for severe drought and mild forest conditions which facilitate widely cultivated across the world. The leaves found to be rich in minerals, vitamins and other essential phytochemicals. Extracts from the leaves are used to treat malnutrition, augment breast milk in lactating mothers. It is generally has its application as potential antioxidant, anticancer, anti-inflammatory, antidiabetic and antimicrobial agent. Infact, the research represents that moringa provides 7 times more vitamin C than oranges, 10 times more vitamin A more than carrots, 17 times more calcium than milk, 9 times more protein than yoghurt, 15 times more potassium than Banana and 25 times more than spinach ¹.

Biscuits industry in India is the largest among all the food industries. India is identified as the second largest manufacturer of biscuits after the USA. Biscuit is hygienically packaged nutritious snack food available at very affordable prices, volumes and different tastes. Rising incidence of health conditions, growing media coverage on health, increasing concerns on physical appearance, changing lifestyle and soaring costs of healthcare led the biscuits and cookies market to move towards a healthier path. In view of the demand and potential for nutritious biscuits, the present study found a development of nutritive biscuits with moringa leaves. The Indian bakery industry is on the largest food processing industry with the estimated production about \$1400 millions ².

Species are increasingly finding other useful roles in healthcare aside, from their preparation, the primary use as organoleptic enhancers in culinary. Several herbs and species are currently being investigated for their potential health benefits, hence there is an increasing explosion in scientific literature in the fields of nutraceuticals and functional foods. The rise in interest on medical properties of herbs and species is consequent on the failing efficacy and toxicity associated with conventional drugs and their inaccessibility to poor rural dwellers³.

INGREDIENTS

Flour	: 200g
Moringa leaf powder:	20g
Fat	: 100g
Sugar	: 50g
Baking powder	: 1/8 tsp
Water	: 25ml
Jeera	: 3g
Green chillies	: 2-3
Curry leaves	: 1 bunch
Ammonium	: 4g
Egg	: 1

METHOD OF PREPARATION

- Roast jeera and pound it coarsely
- Chop green chillies and curry leaves
- Make a solution of salt, ammonium, baking powder in 25ml of water
- Add masala to the sieved flour
- Cream fat and sugar together till light and fluffy
- Hold in flour lightly into creamed mixture
- Add ammonium solution, make dough
- Roll out into 1/8" and cut with cutter
- Apply egg on top
- Prick biscuits and bake them at 350⁰F for 15 to 20 minutes

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PREPARATION OF TUTTI FRUITTI: DELICIOUS FRUITY**FUNCTIONAL PRODUCT****T.ASMA HUMERA * Dr.BHARATHI** Dr.RAJANI*****

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BACKGROUND

Papaya is recognized as the power house of nutrients and is available throughout the year. It is a rich source of the powerful antioxidant vitamin C, vitamin A, and vitamin E, the minerals magnesium and potassium, the B vitamin pantoic acid, folate and fiber. It contains digestive enzymes papain which effectively treats causes of trauma, allergies and sports injury. The nutrients in it aid in the improvement of cardiovascular system, protect against heart diseases, heart attacks, strokes and prevent colon cancer. The fruit is especially excellent sources of beta carotene that prevent damage caused by free radicals which cause some forms of cancer. It also reduces the glucose levels in diabetic patient. Papaya being the source of high cholesterol levels and lowers the fibre. Papaya found to be effective improving all types of digestive and abdominal disorders. It is like medicine for dyspepsia, hyperacidity, dysentery and constipation due to an enzyme papain¹.

The pumpkin is a vegetable crop belonging to the family cucurbitaceae. This family is known for chemicals such as tetracyclic triterpene, saponins, protein, fibers, polysaccharides and minerals (iron, zinc, manganese, copper). It is regarded as valuable vegetables primarily due to high carotenoid content, the low calorific value, high carbohydrate and minerals. Consumption of pumpkin helps in maintaining skin diseases, eye disorders, reducing cell damage in the body, the cancer and improve immune function. Pumpkin has biologically active components like polysaccharides, para-aminobenzoic acid, fixed oils, sterol, protein and peptides. It has hypercholesterolemia, intestinal parasite and anti-inflammation.

Tutti frutti is a colourful confectionery containing various colours usually candied fruits ,or an artificial or natural flavouring simulating the combined flavours of various fruits which is mostly used in western countries .fruits used in tutti frutti ice cream include cherries,raisins ,and pineapple often augmented with nuts. In the Netherlands tutti frutti is comprised of dried fruits ,served as desert or a side dish to meal .Typically it has a combination of raisins ,currants,apricots ,prunes ,dates and figs .However in Indian English titti frutti usually refers to caned raw papaya .These are commonly small cubical pieces with popular colours as red green yellow .Tuttin frutti is used in various bakery products including cakes,breads,cookies ,dilkush and buns.Tutti frutti is as well as used in cold desserts as topping for ice creams and sundaes .They are familiar in sweet paans and sangeet(or paper – masala)

INGREDIENTS

Raw papaya cubes : 1/2kg

Raw pumpkin cubes : 1/2kg

Sugar : 1 1/2 kg

Water : 1 1/2lit

Citric acid : 5g

Colour (of choice) : 1/4tsp

Sodium bicarbonate powder: 1/4gm

METHOD OF PREPARATION

- Select fully mature unripe fruit
- Peel the skin and remove the seeds
- Pinch with a fork on all sides so that the pieces will absorb citric acid or CaCO_3 solution
- Then cut the fruits into small pieces of 0.5×0.5 cm size
- Prepare a solution of citric acid or CaCO_3 and soak the pieces for 3-4 hours
- After soaking wash the pieces 3-4 times with water
- Tie the cubes in a pieces of cloth

- Keep the bundle in boiling water for about 5-6 minutes , cool immediately under running water
- Next day according to weight of pieces take needed sugar ,water,citric acid and prepare syrup
- Mix colour fruit pieces to the syrup and boil until a single string consistency
- Leave the cubes overnight
- Next day tutti frutti is kept on fire till it gets two stirring consistency
- Mix sodium bicarbonate powder ,remove from fire and kept for 2-3days aside
- After 2-3 days separate the pieces from syrup
- Sundry the pieces by covering the pieces
- Pack the product in sealed container

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GUAVA LEAVES BASED MASALA TEA POWDER: A HERBAL TEA POWDER**K.GAYATHRI,* and Dr.R.BHARATHI****

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BACKGROUND

Guava (*Psidium guajava L*) is one of the important fruit crop in India belongs to *Myrtaceae* family. Guavas leaves have quercetin, ferulic acid, protocatechuic acid, guavin and beta carotene which have antioxidant activity. Both invitro and invivo studies demonstrate the potential benefits of guava leaves extract for treatment of several ailments especially diabetes mellitus, cardiovascular diseases, cancer and parasitic infections¹.

Tulasi known as holy basil is an indigenous herb in India which is highly revered for its medicinal uses in Ayurvedic and Siddha medicinal systems. It has multiple therapeutic actions including adaptogenic, anti microbial, anti inflammatory, cardio protective and immune modulatory effects².

Mint leaves occupy specific role and more popular folk remedy. The pharmacological and therapeutic effects are of wider range such as antimicrobial, gastrointestinal and neurological effects. Pulegone is the major compound responsible for pharmacological effect followed by menthane, isomenthone, menthol, 1, 8-Cineole, bornol and piperitenone³.

Herbalist and folk practitioners have focused on plant remedies for centuries but the research on the powers of common herbs and species have recently elucidated. Spices continued to be used since middle ages in flavoring, food preservation and/or medicinal purposes. Adding spices in the food and culinary preparation serve as delicious sensible way of improving quality and appetite to the beverage⁴.

Tea is the most widely consumed beverage worldwide after water. Herbal teas can be formulated from green and dried herbs leaves, flowers, fruits, seeds, bark and medical plant formulations. The herbal teas and medical plant formulations are widely consumed in India and also throughout the world due to their therapeutic and healing properties. Tea becomes a rapidly expanding market of beverage sector especially guava leaves and herbs to enhance taste, aroma and health promoting properties⁵.

INGREDIENTS

Dried guava leaves : 5

Mint leaves powder : 10

Tulasi leaves powder: 10

Masala mix powder : 3g

Dried ginger powder : 2g

METHOD OF PREPARATION

- Select good quality leaves and masala ingredients
- Wash the leaves thoroughly to remove adherent surface dust and dirt
- Shade dry the leaves
- Crush the dried guava leaves coarse, whereas powder mint and tulasi leaves finely
- Prepare masala mix with desirable spice ingredients
- Powder the dry ginger
- Mix all the dried ingredients thoroughly and pack in polythene covers or in air tight container
- Make delicious aromatic herbal tea as per the regular tea preparation whenever required and serve hot

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