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Development and Nutritive Analysis of Different Papaya Recipes Incorporated with Locally Available Herbs

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Abstract

At different time throughout the history, those who shape policy have had varying beliefs about the importance of papaya and locally available herbs. Carica papaya belongs to caricaceae family and it is commonly known as 'papaya'. It is used as anti-inflammatory, antioxidant, diuretic, antibacterial, abortifacient, vermifuge, hypoglycemic, antifungal activity, antihelmenthic and immunomodulatory etc. Scientific evidences suggest their versatile biological function that supports its traditional use in different diseases. Since the beginning of human civilization, a number of medicinal plants have been used in the traditional system of medicine, aiming to maintain health and to cure diseases. As plants produce a lot of antioxidants they can represent a source of novel compounds with promising antioxidant activity. The purpose of this work is to present a minireview of the potential of spices and aromatic herbs for the development of functional foods.

Key words:

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I. INTRODUCTION

Papaya (Caricapapaya) is a tropical fruit having commercial importance because of its high nutritive and medicinal value. Papaya is a power house of nutrients and is availablet hroughout the year. It is a rich source of three powerful antioxidant vitamin C, vitamin A and vitamin E; the minerals, magnesium and potassium; the B vitamin pantothenic acid and fiber. Papaya fruit is a rich source of nutrients such as pro vitamin A carotenoids, vitamin C, B vitamins, lycopene and dietary minerals. Papaya provides significant amounts of vitamin C. Typically, this fruit is consumed when ripe, soft, and sweet. This tastyfruit of Papaya is popular among family members of all ages for the delicious dishes derived from it. The papaya, papaw or pawpaw is the fruit of the plant Caricapapaya, in the genus Carica. It is native to the tropics of the Americas, and was first cultivated in Mexico several centuries before the emergence of the Mesoamerican classic cultures. It is a large tree- like plant, with a single stem growing tall, with spirally arranged leaves confined to the top of the trunk. The lowert runk is conspicuously scarred where leaves and fruit were borne.

Herbs are plants with savoury or aromatic properties that are used for flavouring and garnishing food, medicinal purposes, or for fragrances. Herbs are fascinating plants to grow and each has its own traditions and folklore as well as its individual medicinal and culinary uses. It is preferable to use fresh herbs in most recipes but dried herbs can retain some of their essential flavour if care is taken.

Ocimum sanctum L. "Sacred Basil" is the plant grows in a wide variety of soil and climatic conditions, well drained soil, humid weather, long days and high temperature are favourable for good growth of these plants and yield of high essential oil. The leaves and seeds of this plant have medicinal value.

Centella asiatica L. has been used as a medicinal herb for thousands of years in India, China, Srilanka, Nepal and Madagascar. Centella asiatica is one of the chief herbs for treating skin problems, to heal wounds, for revitalizing the nerves and brain cells, hence primarily known as a "Brain food" in India.

Thazhuthama or Punarnava is a famous medicinal herb which is excellent in rejuvenating and purifying the body. The plant belongs to the Nyctaginaceae family and occurs throughout India. Boerhaviadiffusa grows by spreading on the ground up to about 2 meters in area with numerous branches and sub-branches. 2 to 3 leaves emanate from each node and these leaves differ in size. The biggest reach up to 4 cm in length while the smallest is barely 2cm. Boerhavia diffusa is rich in Potassium nitrate which in turn increases urine production.

II. OBJECTIVES

Development of papaya recipes

To prepare a nutrient mix using locally available medicinal herbs

To understand the nutritional value of prepared mix

To incorporate the medicinal herbs into the developed recipes

To conduct the sensory analysis of the prepared product

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III. MATERIALS AND METHODS

The selection of ingredients for the development of nutritious mix was collected from various premises. The medicinal plants were first dried and powdered in a mixer and was sieved using a sieving screen. Weighing balance and mixer were used as the equipment during the project. The medicinal herbs which were collected from local areas were incorporated with papaya. The medicinal herbs collected were tulsi, thazhuthama and kodakan. The processing of this medicinal plant mix along with papaya were the base for the preparation of various recipes.The nutritional mix was prepared using the powdered ingredients. The weighed powdered ingredients (25g) were mixed together along with papaya and the recipes were developed using this mix. Dried and processed powdered medicinal plants were used to incorporate with papaya recipes. Medicinal plants used for the preparation of papaya recipes was kodakan, thazhuthama and tulsi. The processing of this medicinal plant mix include sorting, washing and sun drying.The panel members consisted were teachers and students of assumption college Changanassery. The sensory analysis were done at the food lab of assumption college Changanassery. Panelist were provided with the sample and scoring card. They evaluated the product for acceptability based on appearance, colour, flavour, taste, texture and overall acceptability using 9 point hedonic scale The nutrient content of the final medicinal mix was done in a food analysis lab . The nutrients that was evaluate are carbohydrate, protein, crude fibre, moisture content, vitamin A, vitamin C , iron , calcium. Shelf life study was done in a food analysis lab; shelf life study was done on the basis of moisture content analysis

Certain papaya incorporated recipes along with prepared nutritional mix were developed. After the development of recipes they were undergone organoleptic evaluation by the staff of assumption college. This organoleptic evaluation was done using 9 point hedonic scale. Panelist were provided with the sample and scoring card. They evaluated the product for acceptability based on appearance, colour, flavour, taste m texture and overall acceptability using 9 point hedonic scale. The samples were selected from kurisumoodu area in Kottayam district for easy convenience of the investigator. The willingness of the subject and their co operate mentality was a factor for the selection of this area.Homemakers are the main food handlers in a home, so they are knowing the importance of in cooperating medicinal plants in daily meal pattern. The present study was conducted among 50 homemakers of different age group. There were randomly selected for the study. According to Kothari, 2004 random sampling is by means of certain procedures, which ensure that every unit of the population has a fixed probability of being included in the sample. An interview schedule is basically a list containing set of structured questions that have been prepared, to serve as a guide for interviewers, researchers and investigators in collecting information or data about a specific topic or issue. A structured questionnaire which contained questions that will help to easily identify the knowledge of the subjects was used. A pre structured questionnaire which contained socio economic profile was used to assess the subjects. It contained details regarding the name, gender, employment status, educational status, family income, type of family etc. Assessment of knowledge of home makers about importance of medicinal plants and papaya

The knowledge of the selected sample was collected using a pre structured questionnaire, with yes or no questions and descriptive questions.The collected data were tabulated and consolidated into appropriate tables and diagrams. Statistical measures like mean, percentage analysis were also done. After the analysis and interpretation it was found that most of the subjects had lack of knowledge about importance of in cooperating medicinal plants in daily meal pattern. Considering this fact a nutrition education was given to the samples. The investigator also developed a booklet.

IV. RESULT AND DISCUSSION

Table 1

Formulation of the mix

Sl no	Ingredients
1	Kodakan
2	Tulsi
3	Thazhuthama

The above table 1,discusses the ingredients selected for the preparation of the selected herbpowder. Kodakan,Tulsi and Thazuthama each of 20g were selected for the preparation of the mix

Table 2

Nutrient Content Of The Medicinal Herb Mix

Sample	Carbohydrate	Protein	Crude Fibre	Iron	Calcium	Vitamin A	Vitamin C
Medicinal Herb Mix	74	5.3	12.6	3.8	240	2.9	9.49

The above table describes the nutrient content in the prepared nutrient mix. The nutrient mix contain 74 grams of carbohydrates, 5.3grams of protein, 12.6 grams of crude fibre , 3.8 grams of iron, 240grams of calcium, 2.9 grams of vitamin A and 9.49 grams of vitamin C. From this result it was evident that the formulated herbal mix is nutrient dense, which contained all essential macro and micronutrients. All these value was per 150gram of the mix. The following test are used for the proximal analysis.

Test Methods Include

- Calcium – IS 9497 :1980 (RA 2015)
- Total carbohydrate–AOAC 21stEdn. 2019;986.25;Ch. 50
- Crude fibre – IS 12711 :1989 (RA 2015);Ch.13
- Iron - AOAC 21stEdn. 2019; 944.02
- Protein – AOAC 21stEdn. 2019;920.87;Ch. 32
- Vitamin A – AOAC 21stEdn. 2019;2001.13
- Vitamin C – AOAC 21stEdn. 2019;967.21, Ch.45

Table 3

Moisture Analysis of The Product

SL NO	PARAMETERS	UNIT	RESULT
1	Moisture	%	2.86

It was estimated that the given sample of herb mix contained 2.86 percent of moisture per 150 gm. The test method used was AOAC 21stEdn. 2019; 925.10.

Table 4

Shelf Life Evaluation Of The Product

Period of evaluation	Observable change in odour		Observable change in taste		Observable change in overall appearance	
	Yes	No	Yes	No	Yes	No
10 days		✓		✓		✓
30 days		✓		✓		✓
2 months		✓		✓		✓
3 months		✓		✓		✓

The above table 4.6 demonstrates about the shelf life of the developed herbal mix. In the observation it was found that there is no change in the odour, taste and in the appearance of the product.

Table 5

Nutrient Content Of The Developed Recipes

Recipes	Energy (kcal)	CHO (g)	Protein (g)	Fat (g)	Fibre (g)	Iron (mg)	Calcium (mg)	Vitamin A (mg)	Vitamin C (mg)
Papaya cake	809.3	140.66	11.91	22.73	1.28	3.54	95.56	461.35	23.76
Papaya pudding	220.8	49.39	2.25	2.21	0.94	0.6	87.86	492.75	44.96
Papaya Kesari	616	117.06	12.33	11.57	1.15	2.7	90.86	499.45	40.86
Papaya Jam	178.05	45.2	0.48	0.1	0.7	0.38	12.96	333.05	30.61
Papaya Cutlet	149.55	15.09	8.25	6.88	1.83	2.36	66.13	700.55	58.16
Papaya Pickle	93.45	22.41	1.86	0.21	2.06	5.14	53.46	282.45	27.41
Papaya Smoothie	195.7	39.67	3.11	3.27	0.76	0.64	116.96	442.05	40.46
Papayacookies	579.6	129.56	11.52	2.31	1.2	3.45	80.66	239.45	17.86
Papaya Chapathi	211	44.36	7.47	1.04	1.51	3.1	36.36	150.65	11.56
Papaya Fries	192.8	4.16	0.33	20.04	0.53	0.26	10.96	266.45	22.96

The above table 4 discusses about the nutrient content of the developed recipes. It was found that the energy content of the papaya cake was about 809.3 kcal and the carbohydrate content was 140.66 g. At the same time protein , fat and fibre content of the cake were also calculated, which shows the result of 11.91g, 22.73g and 1.28g respectively. The iron content of the cake was calculated as 3.54mg whereas the calcium content was about 95.56mg.

In the case of papaya pudding the table conveyed about the energy content of the product which was about 220.8kcal and about 49.39g of carbohydrate. The protein content of the recipe was about 2.25g and the fat, fibre , iron and calcium content was also calculated which gives 2.21g, 0.94g, 0.6mg and 87.86mg respectively. The vitamin A content of the papaya pudding was 492.75 on the other hand 44.96 was calculated as vitamin C.

In the row of papaya kesari 616 kcal of energy was found and the carbohydrate was about 117.06g and the protein content were 12.33g. the fat content of the papaya kesari was about 11.57 and fibre is 1.15. the iron and calcium content of the recipe were 2.7 and 90.86 respectively. The vitamin A content was found out to be 499.45 and vitamin C as 40.86.

In papaya jam it was mentioned that the energy content of the product was about 178.05kcal and about 45.2g of carbohydrate. The protein content of the recipe was about 0.48g and the fat, fibre , iron and calcium content was also calculated which gives 0.1g, 0.7 g, 0.38mg and 12.96mg respectively. The vitamin A content of the papaya jam was 333.05mg on the other hand 30.61mg was calculated as vitamin C.

It was mentioned that the energy of the papaya cutlet as 149.55kcal, and the carbohydrate content was about 15.09g whereas the protein and fat content of the recipe was about 8.25g and 6.88. The fibre content of the product was calculated as 1.83g. The iron and calcium content was about 2.36mg and 66.13mg on the other hand the vitamin A and vitamin C as 700.55g and 58.16g respectively.

The energy found in papaya pickle was 93.45kcal. The carbohydrate was found to be 22.41g.protein in the pickle was calculated as 1.86g. Fat content found to be as 0.21g. fibre content of the recipe was about 2.06g. iron content of the recipe was 5.14mg, the calcium content was 53.46 mg, vitamin A as 282.45mg and vitamin C as 27.41mg.

Nutrient content of the papaya smoothie was discussed in the above table. The energy was calculated as 195.7kcal, carbohydrate was 39.67g, protein was calculated as 3.11g. the fat content of the recipe was 3.27 and the fibre , iron and calcium were found as 0.76g, 0.64mg, 116.96mg respectively. Vitamin A of the recipe was 442.05mg and vitamin C as 40.46mg.

The nutrient composition of the papaya cookies were also discussed in the above table. The energy of the recipe was about 579.6 kcal, the carbohydrate content were 129.56g and protein content was 11.52g. The fat content of the recipe was calculated as 2.31g at the same time the fibre were mentioned as 1.2g. the iron and calcium content of the recipe were 3.45mg and 80.66mg respectively. The vitamin A was about 239.45mg and 17.86mg of vitamin C.

In the case of papaya chapati the table conveyed about the energy content of the product which was about 211kcal and about 44.36g of carbohydrate. The protein content of the recipe was about 7.47g and the fat, fibre , iron and calcium content was also calculated which gives 1.04g, 1.51g, 3.1mg and 36.36mg respectively. The vitamin A content of the papaya pudding was 150.65 on the other hand 11.56 was calculated as vitamin C.

In papaya fries it was mentioned that the energy content of the product was about 192.8kcal and about 4.16g of carbohydrate. The protein content of the recipe was about 0.33g and the fat, fibre , iron and calcium content was also calculated which gives 20.04g, 0.53 g, 0.26mg and 10.96mg respectively. The vitamin A content of the papaya jam was 266.45mg on the other hand 22.96mg was calculated as vitamin C.

Table 6

Age of the selected samples

N=50

Age	Frequency	Percentage (%)
25-35	4	8%
35- 45	8	16%
45- 55	16	32%
55 – 65	10	20%
65- 75	12	24%

From the above table it was clear that the majority of the samples (32%) were from the age group of 45- 55, about (24%) of the sample belong to 65- 75 age group, twenty percent of the samples belonged to 55- 65 age group, 8 of the selected samples belonged to 35- 45 age group and the rest of (8%) belonged to 25- 35 age group.

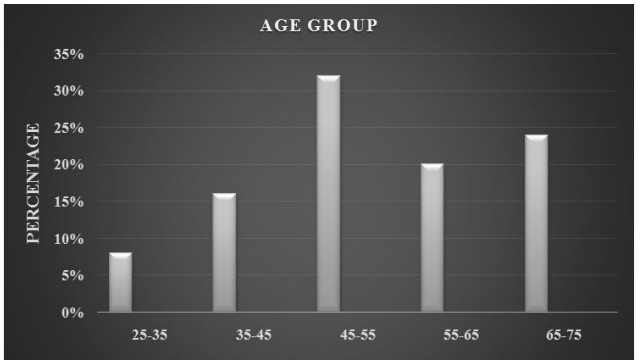

Figure 4.1: Age of the Selected Sample

Table 6

Knowledge of the homemakers

(N=50)

Sl no	Assessing the knowledge of the homemakers	Response			
		Yes		No	
		Frequency	Percentage	Frequency	Percentage
1	Knowledge of local herbs and its uses	34	68%	16	32%
2	Are all herbs medicinal	29	58%	21	42%
3	Can all herbs be consumed as such	16	32%	36	68%
4	Knowledge of local herbs and its uses	14	28%	36	72%
5	Is herbs rich in antioxidants	9	18%	41	82%
6	Grown any herbs in your kitchen garden	13	26%	37	74%
7	Preference of herbs in any disease conditions	32	64%	18	36%
8	Able to identify local herbs in your locality	46	92%	4	8%
9	Know how to in cooperate herbs in daily meal pattern	30	60%	20	40%
10	Is it useful to plant herbs in your kitchen garden	33	66%	17	34%
11	Do herbs have the ability to improve health conditions	38	76%	12	24%
12	Have knowledge on papaya	28	56%	22	44%
13	Know about the nutrients present in papaya	19	38%	31	62%
14	Ever tried recipes using papaya	42	84%	8	16%
15	Is papaya rich in antioxidants	20	40%	30	60%
16	Grown papaya in your kitchen garden	48	96%	2	4%
17	Can papaya create any health benefits in our body	41	82%	9	18%

From the above table 6 the knowledge of the homemakers was assessed, it was clear that sixty eight percent (68%) of the home makers were having knowledge regarding herbs around their kitchen garden. Fifty eight percent (58%) of the selected samples knew that all the herbs are medicinal. Sixty eight percent (68%) of the selected samples responded negatively to the raw consumption of herbs. About seventy two percent (72%) of the selected samples knowledge on medicinal herbs and its uses. Eighty two percent (82%) of the selected samples has not considered herbs as rich in antioxidants. Twenty six percent (26%) of the selected samples have grown some of the herbs in the their kitchen garden. The sixty four percent (64%) of the selected samples responded positively in preferring herbs in any of the disease conditions. Majority ninety two percent (92%) have knowledge on many of the local herbs growing in their locality. Majority sixty percent (60%) have knowledge on incorporating herbs in their daily meal pattern. About sixty six percent (66%) of the homemakers discovers that planting of herbs was very useful in their kitchen garden. Seventy six percent (76%) of the homemakers do believe that herbs have the ability to improve health conditions. Majority of the samples have wide knowledge on papaya. Majority of the samples have poor knowledge about the nutrient content in papaya. Eighty four percent (84%) of the samples have tried out different papaya recipes. Sixty percent (60%) of the homemakers have no knowledge about the antioxidant content in papaya. About ninety six percent (96%) of the samples have grown papaya in their kitchen garden. Eighty two percent (82%) of the homemakers believed that papaya have the ability to create health benefits in the body.

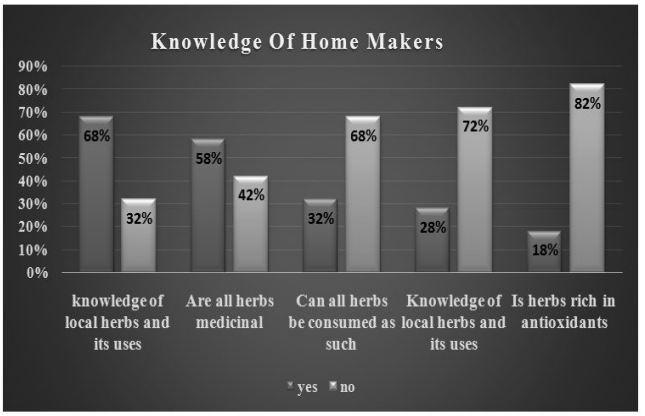

Figure 4.5 (a) : Knowledge of homemakers

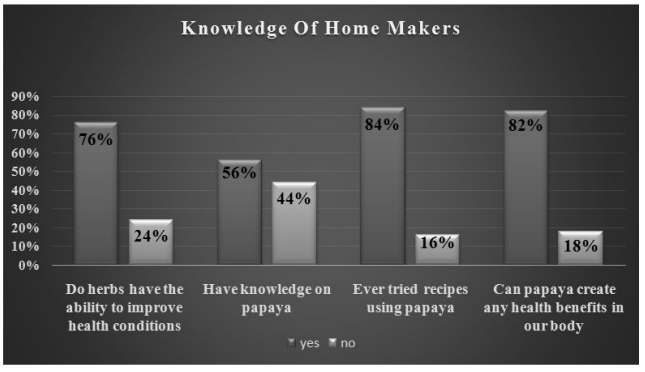

Figure 4.5 (b) : Knowledge of homemakers

Table 7

Knowledge regarding local herbs

Sl no	Assessing the knowledge of the homemakers	Response			
		Yes		No	
		Frequency	Percentage	Frequency	Percentage
1	Knowledge regarding herbs around your kitchen garden	34	68%	16	32%
2	Knowledge regarding Tulsi herb	50	100%	0	0%
3	Knowledge regarding kodakan	30	60%	20	40%
4	Knowledge regarding thazhuthama herb	26	52%	24	48%

From the above table it was observed that (68%) of the total samples have knowledge regarding herbs around the kitchen garden. While thirty two percentage of the selected samples does not know the local herbs around their kitchen garden. It is also mentioned that 100% of all the samples have the idea about the importance of tulsi leaves whereas about 60% of the samples know about kodakan leaves and 52% of the samples know the importance of thazhuthama leaves.

V. CONCLUSION

The study entitled ***"Development and Nutritive analysis of different papaya recipes incorporated with locally available herbs"*** was discussed under different topics. The study was selected on the basis of the importance of locally available medicinal herbs and papaya. On the basis of this, different papaya recipes are developed by incorporating formulated herbal mix.

The study stated that the formulated mix contains 74 grams of carbohydrates, 5.3grams of protein, 12.6 grams of crude fibre , 3.8 grams of iron, 240grams of calcium, 2.9 grams of vitamin A and 9.49 grams of vitamin C. It was evident that the formulated herbal mix is nutrient dense, which contained all essential macro and micronutrients.

The shelf life of the product was also determined. In the observation it was found that there is no change in the odour, taste and in the appearance of the product even after 3 months.

The knowledge assessment of 50 selected samples was done, and it was found that the samples do not have enough knowledge about the nutrients of papaya and importance of the locally available herbs. Nutritional awareness was given to the subjects through nutrition education with developed visual aid, such as booklet. These visual aids describes about the importance of herbs and papaya and details regarding developed recipes. It enhances the knowledge and it can be helpful for the society.

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