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Utilization of dehydrated herbs in the formulation of value added food products

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Abstract

In Ayurveda, immunity is known as *Ojas*, or supreme resilience of the body against diseases. Current scenario depicts that world has been clenched by COVID-19 pandemic, so there has been a lot of interest in ways to boosting our immune system, Since ancient times, medicinal plants, herbs and spices were well known for their medicinal properties, therefore, the medicinal plants and herbs playing a critical role to boosting our immunity during the COVID-19 pandemic. The present investigation was undertaken with an objective to prepare Papaya laddoo, Papaya mix jam and Herbalprash is based on traditional polyherbal formulation, which can widely used as preserved food, immunomodulator and memory enhancer, ayurvedic antiaging, dietary supplement and immunity booster food products fortified with various herbs, seeds, herbal extracts that are rich in antioxidants and minerals. Papaya laddoo incorporated antioxidant and mineral T₂ (Raw Papaya, Lemongrass powder + Basil + Sesame powder + Cinnamon powder in the ratio of 90: 2.5: 2.5 4: 1) had highest score followed by T₁ (90: 2: 2: 3: 1) and T₃ (90: 3: 3: 3:1.5), papaya mix jam T₂ (raw papaya, amla, lemongrass powder, basil and sesame seed powder (55: 35: 2.5: 2.5: 5) and in Herbalprash also had highest score T₂ (Raw Papaya powder, Amla, Lemongrass powder, Basil and Sesame seed powder in the ratio of (5: 85: 3: 2.5: 5). This value added food is increased in protein, fiber, calcium, phosphorus, iron and vitamin C. These value added food should be recommended for all age groups as it helps to boost immunity and also improves physical growth, good memory, control infectious seasonal disease and it also helps in preventing covid-19 by boosting immune system.

Keywords: Immune boosting herbs, papaya laddoo, papaya mix jam and herbalprash

Introduction

Herbal medicine is the use of medicinal plants for prevention and treatment of diseases. Medicinal plants have been used in healthcare since time immemorial it ranges from traditional and popular medicines of every country to the use of standardize herbal extracts like leaves, flowers, roots, seeds or bark. There are currently about 250,000 registered medical practitioners of the Ayurvedic system, around 20,000 medicinal plants have been recorded (Pandey *et al.*, 2013) [8]. India is the second largest producer of fruits and vegetables in the world after China. It accounts for about 69.82 lakh hactar and production of fruits is about 812.85 lakh MT (NHB 2012-13). Papaya is the most economically important fruit in the Caricaceae family, two potent biochemically active compounds of the papaya are chymopapain and papain, which are known to aid digestion. Papain supplements, or high doses of papain may cause: trought irritation, allergic reaction, Pregnant and breastfeeding women should avoid papain supplement because it can cause fetal poisoning or birth defects when consumed in large amounts, So before using raw papaya processing is most important. Methods used for inactivation of papain is achieved by raising the temperature to 90-100 °C for few minutes. Temperature above 70 °C outside the range of ph 3.0 and 9.0 rapidly inactivates the enzymes. Customized brewing solution (2010) [11]. The post harvest losses of papaya in India are estimated at 5-30 percent of total production. Presently allover world is facing with Corona virus disease 2019 (COVID-19) as a life threatening disease is caused by severe acute respiratory syndrom, it global public health concern, herbs and spices such as aswagandha, giloy, tulsi, lemongrass, ginger and cinnamon etc. are building immunity and also curing pathogenic invasion.

The number of people also suffering from diseases like diabetes, diarrhoea, cancer, rheumatism, inflammation, jaundice, hepatic obstruction, pain, cold, cough, etc. deals with herbal medicines which are taken as food not as medicine or drug such products include chyawanprash, hajma goli, herbal tea, amla candy, herbalprash also called chyawanprash remedies from medicinal plants are used with success to treat the disease. The specific objectives included for the following study are as follows:

1. To prepare value added food products by using papaya and herbs.
2. To evaluate sensory attributes of the prepared value added food products.
3. To find out the nutritive value of the developed food products by the calculation method.
4. To calculate the costs of prepared food products.

Materials and Methods

1. Experimental site

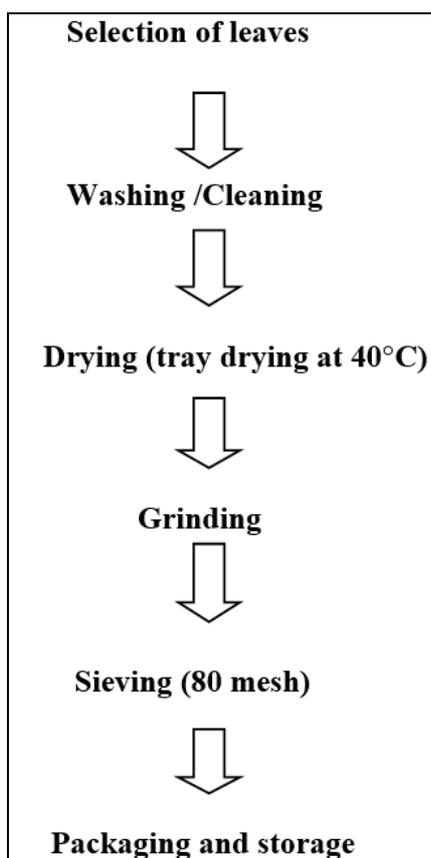
The study was carried out in the Department of Food Nutrition and Public Health, Ethelind College of Home Science, SHUATS, Prayagraj-211007.U.P.India.

2. Procurement of raw material

Raw Papaya, Indian gooseberry, Cinnamon and Sesame seed were purchased from the local market of Prayagraj (U.P.). Lemongrass and Basil (Tulsi) leaves were taken from the garden of Forestry Department, SHUATS, (U.P.) India.

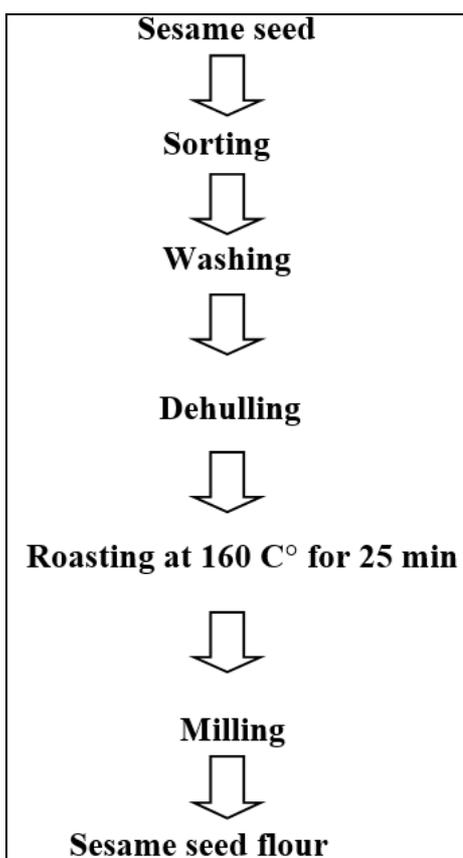
3. Preparation of lemongrass powder and tulsi powder

Flow diagram for preparation of Lemongrass and Basil (*Tulsi*) powder



Sources: Lonkar et al., (2013)

Fig a): Preparation of Sesame Seed Powder



Sources: Animashaun et al., 2017

Fig b): Preparation of sesame powder

4. Preparation of Value Added Food Products

Preparation of value added preserved food products such as *Papaya ladoo*, *Papaya Jam* and *Herbalprash* with the incorporation of Indian raw Papaya, Gooseberry, Lemongrass, Basil (*Tulsi*), Cinnamon, Sesame powder and other raw materials.

Ratio for the preparation of “Papaya ladoo”

From picture 1 shows that the *Papaya ladoo* T₂ (Raw Papaya, Lemongrass powder + Basil + Sesame powder + Cinnamon powder in the ratio of 90: 2.5: 2.5: 4: 1) had highest score followed by T₁ (90: 2: 2: 3: 1) and T₃ (90: 3: 3: 3: 1.5).



Picture 1: Papaya ladoo

Ratio for the preparation of “Papaya mix jam”

From picture 2 indicates that the *Papaya mix jam* T₂ (raw papaya, Amla, Lemongrass powder, Basil and Sesame seed powder in the ratio of (55: 35: 2.5: 2.5: 5) had highest score followed by T₁ (50: 40: 1.5: 1.5: 5) and T₃.



Picture 2: Papaya mix jam

Ratio for the preparation of “Herbalprash”

From picture 3 shows that the Herbalprash T₂ (Raw Papaya powder, Amla, Lemongrass powder, Basil and Sesame seed powder in the ratio of (5: 85: 3: 2.5: 5) had highest score followed by T₁ (Raw Papaya powder, Amla, Lemongrass powder, Basil and Sesame seed, in the ratio of (5: 80: 2.5: 2.5: 5) and T₃ (5: 90: 2.5: 2.5: 1.5).



Picture 3: Herbalprash

5. Sensory Evaluations of Developed Herbal Food Products

Sensory evaluation of food products for their acceptability done by a 10 panel of judges. The score card based on the 9 point hedonic scale was used for sensory evaluation on the basis of evaluation of attributes like colour and appearance, texture, taste and flavor and all over acceptability.

6. Nutritional Composition of the Value Added Food Products:

The nutritive of the developed food products were determined by the calculation method by using *C.Gopalan Book of ‘Nutritive Value of Indian Foods’* 2015.

7. Stastical Analysis

The data were analyzed by Analysis of Variance Technique (ANOVA) Two way classifications with ‘n’ observation per cell and Critical Difference also found (Gupta *et al.*, 2002) [12]

Results and Discussion

Value added food products were prepared by using different ratios of papaya, gooseberry, herbs and sesame seed powder. The acceptability of food products was judges by the panel of 10 semi-trained members. Sensory evaluation was done by using Nine point Hedonic Scale revealed that 70%of panelist liked extremely the herbal food (*Papaya ladoo*, mixed jam and *herbalprash*). *Papaya ladoo* incorporated with T₂ (Raw Papaya, Lemongrass powder + Basil + Sesame powder + Cinnamon powder in the ratio of 90: 2.5:2.5 4: 1) had highest score. The mean score of “*papaya ladoo*” in relation to sensory attributes such as colour and appearance, body texture, taste and flavour and overall acceptability followed by T₁ (Raw papaya + Lemongrass powder + Basil powder + Sesame powder+ Cinnamon powder in the ratio of 90: 2: 2:3 1), T₃ (raw Papya, lemongrass powder, basil, sesame seed, cinnamon powder in the ratio of 90: 3: 3: 3: 1.5). In case of *papaya ladoo* T₂ scores the best with regard to all sensory characteristic viz colour and appearance (7.9± 0.27), (7.9± 0.17), (8.1 ± 0.20), (8.3± 0.40). fig 1.

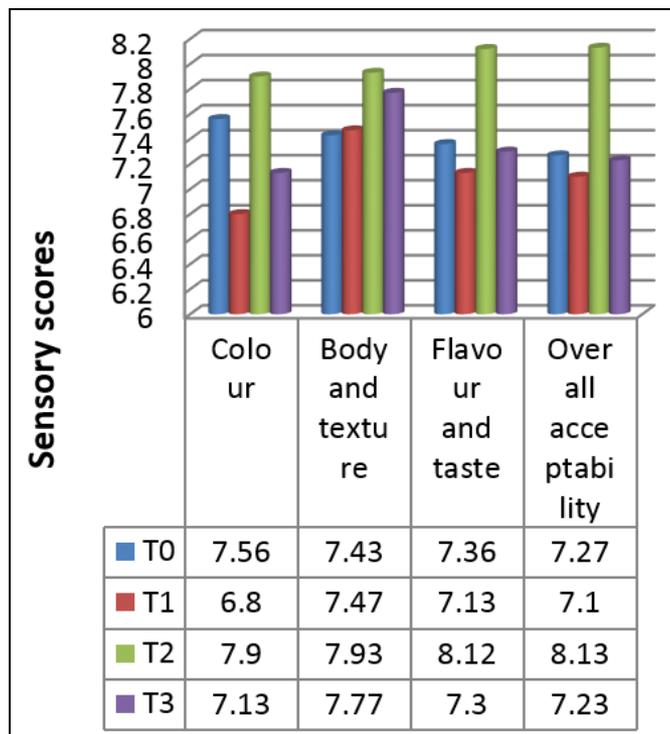


Fig 1: Average sensory scores for different attributes of papaya ladoo and papaya mix jam

Fig. 2 shows that the mix jam incorporated with T₂ (raw papaya + amla + lemongrass powder+ basil and sesame seed powder in the ratio of (55: 35: 2.5: 2.5:5) had highest score followed by T₁ (raw papya + amla + lemongrass powder, + basil and sesame seed 50: 40: 1.5: 1.5: 5), T₃ (raw papya + amla + lemongrass powder + basil and sesame seed 6 0: 30: 3.5: 3.5: 5). In case of *mix jam* T₂ scores the best with regard

to all sensory characteristic viz colour and appearance (7.3 ± 0.16), (7.7 ± 0.26), (7.8 ± 0.20), (8.1 ± 0.31).

The result are supported by the finding Olorode *et al.*, (2013). The investigated effect of basil (*Moringaoliefera*) leaf powder on the quality characteristics OF ‘Ogi’, a sour gruel indigenous to the whole of West Africa. It was mixed with Benoil leaf powder at ratio of 100:0, 95:5, 90:10, 85:15, 80:20, and 75:25, Sensory quality evaluated shows that, there was a significant difference ($p < .05$) in all the attributes. Ben oil leaf powder substantially increased nutrients /energy – density of ‘Ogi’ up to ratio 90:10 as the preferred mix. The results of these researches show clearly that addition of benoil leaf powder ‘Ogi’ led to a substantial increase in the nutrient/energy density of the mix.

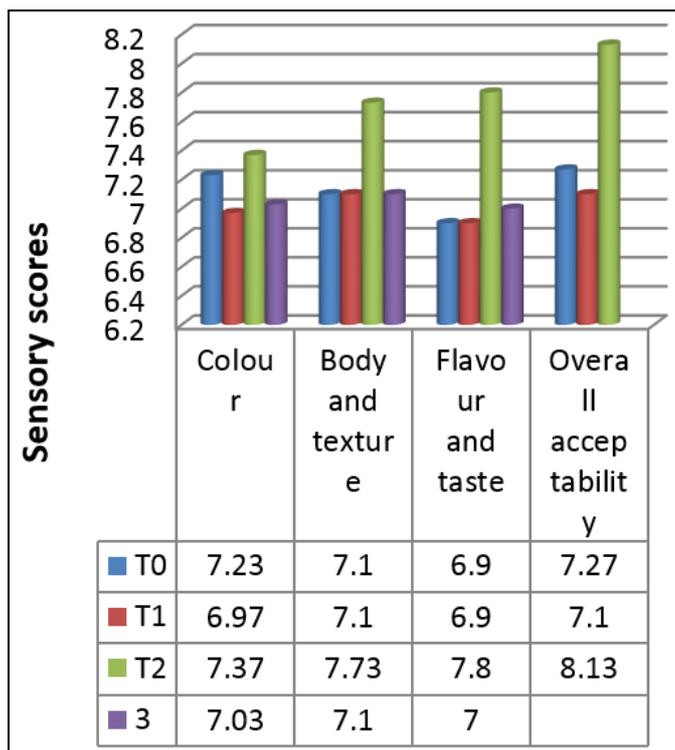


Fig 2: Average sensory scores for different attributes of papaya laddo and papaya mix jam

(Raw Papaya powder + Amla + Lemongrass powder + Basil and Sesame seed powder in the ratio of 5: 85: 3: 2.5: 5) had highest score followed by T₁ (Raw Papaya powder + Amla + Lemongrass powder + Basil and sesame seed, in the ratio of 5: 80: 2.5: 2.5: 5) T₃ (Raw Papaya powder + Amla + Lemongrass powder + Basil and Sesame seed in the ratio of 5: 90: 2.5: 2.5: 1.5). In case of Herbalprash T₂ scores the best with regard to all sensory characteristic viz colour and appearance (7.6 ± 0.31), (7.8 ± 0.19), (7.8 ± 0.24), (8.3 ± 0.27). The result are supported by the finding of Harsha and Aarti (2015) the intention was to incorporate the maximum possible quantity of basil extract in the juice blends with higher sensory scores and adjustment of acidity to get good taste, utilization of the medicinal plants in diet or by incorporation and optimizing their use in fruit beverages, an individual will get all the benefits related to health and also reduces the risk of serious diseases like diabetes and other cardiovascular diseases. It was observed that the highest sensory score was obtained with maximum incorporation of 20% of basil extract i.e. juice blends 20% with the composition of lime juice, holy basil, and ginger and sugar syrup in the ratio of 30: 20: 5: 45.

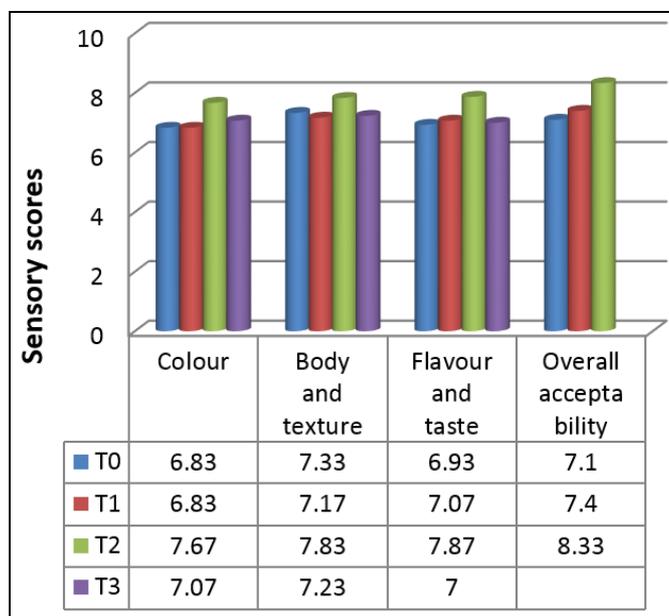


Fig 3: Average sensory scores for different attributes of Herbalprash

Fig. 8.c shows that the Herbalprash incorporated with that T₂

Table 1: Shows that the nutritional composition of the developed value added food products

Nutrient content	Papaya laddo		Papaya mix jam		Herbalprash	
	T ₀	T ₂	T ₀	T ₂	T ₀	T ₂
Moisture (%)	92.0	83.42	86.9	79.23	91.51	84.0
Protein (g)	0.7	1.54	0.6	1.54	0.58	1.58
Fat (g)	0.2	1.98	0.15	2.31	0.12	2.33
Crude fiber (g)	0.3	1.59	2.15	2.04	3.37	3.31
CHO(g)	5.7	7.62	9.7	9.99	13.87	14.43
Energy (Kcal)	27	52.36	42.5	66.6	59.15	84.52
Calcium (mg)	28	83.21	39	110.2	51.7	119.2
Phosphorus (mg)	40	58.81	30	57.3	25	51.51
Iron (mg)	0.9	1.24	1.05	1.45	1.27	1.67
Vitamin-C (mg)	0.06	1.05	0.33	1.05	0.57	1.03

The result supported by the findings of manjula *et al.*, (2017) reported that Indian pennywort one such herbs consist of many active principles such as vallarine, Asisticoside, sistosterol, tannin, and oxy- asisticoside. In view of this, an attempt was made to utilize pennywort leaves to develop and standardize value added health mix with pennywort leaves and to assess the sensory quality of developed products.

Biochemical analysis of value added health mix revealed moisture 3.11%, protein 12.8%, fat 6.12gm, CHO 29.8% and iron 0.67mg (value as per 100gm). The prepared recipes were found to be acceptable at 10g incorporation of Indian pennywort leaves in recipes was increasing acceptability. The cost of the Papaya laddo per 100g of dry ingredients at the prevailing cost of the raw materials was T₀ (control) Rs

7.10, Rs 6.90 for T₁, Rs 7.00 for T₂, Rs. 7.15 for T₃. This shows that as the incorporation levels of basil powder, lemongrass powder, sesame seed powder and cinnamon powder increased, the cost also increased but it is cheaper than the control comparatively even though it was marginal, the cost of the *Papaya mix jam* per 100g was T₀ (control) Rs 9.3, Rs 8.6 for T₁, Rs 8.3 for T₂ and Rs 8.1 for T₃. This shows that as the incorporation levels of flax seed powder, basil powder, lemongrass powder, sesame seed powder and cinnamon powder increased, the cost also increased but it is cheaper than the control comparatively even though it was marginal, the cost of *Herbalprash* per 100g was T₀ (control) Rs. 33.7, Rs. 31.9 for T₁, Rs. 33 for T₂, Rs. 32. For T₃.

4. Conclusion

On the basis of findings, it is concluded that raw papaya, amla, lemongrass powder, *tulsi* powder, sesame powder and cinnamon powder was successfully incorporated in the preparation of the herbal food products like *Papaya ladoo*, *Papaya mix jam* and *Herbalprash* these herbal food products are enriched with iron, calcium, phosphorus, fiber, vitamin C and antioxidant. Sesame seed powder and cinnamon powder works as medicines for its therapeutic properties and ability to fight against inflammatory and infectious diseases. *Herbalprash* could be recommended for all age groups as it helps to boost the immune system, improve physical growth, good memory and control infectious seasonal disease. Herbal compounds are assumed to have capacity to modulate the immune response and have beneficial effects on preventing COVID-19, while taking a kadha or decoction twice a day are more effective.

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