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Product development and sensory evaluation of foetid cassia (*Cassia tora* L) leaves

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ABSTRACT

Green leafy vegetables have been used as medicine since ancient times and have been playing a very important role in our diet and nutrition. The diverse agro-climatic conditions have blessed India with vast resources of greeneries many of which are still under exploited. *Cassia tora* is one such green leafy vegetable. The study was aimed to formulate products using *Cassia tora* leaves. Ten products were developed and evaluated for sensory quality by a panel of ten members. However stastical analysis showed no significant difference between the scores. Consumer preference was assessed for five convenient products. Results revealed that 52 per cent liked chutney powder extremely from the present study it can be concluded that a more awareness raising campaign and nutrition education needed in order to influence people in green leafy vegetable consumption.

Key Words : *Cassia tora* leaf, Foetid cassia, Sensory evaluation

INTRODUCTION

India is a country with a vast reserve of natural resources and a rich history of traditional medicines. Medicinal plants contain numerous biologically active compounds which are helpful in improving the life and treatment of diseases (Handral *et al.*, 2012). WHO was listed 21,000 plants series, which are used for medicinal purpose around the world. Among these, 2500 species are in India, out of which 150 species are used commercially on a fairly large scale (Seth and Sharma, 2004).

Green leafy vegetables have been used as medicine since ancient times and have been playing a very important role in our diet and nutrition (Sharma and Kumar, 2013). Plant foods are sources of energy, micronutrients and nutrients essential to health, in addition to providing phytochemicals with further health benefits like glycemic control, immune stimulation or antioxidant activity (Belanger *et al*., 2004).

Maisuthisakul *et al*. (2007) revealed that increasing research on under utilized vegetables in different regions showed that most of these wild greens have great nutritional value and antioxidant properties which are comparable to those commercially cultivated vegetables.

The diverse agro climate conditions have blessed India with vast resources of greeneries many of which are still under exploited. There are some less commonly used and inexpensive leafy

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vegetables whose nutritive potential has not been exploited and documented well with sufficient support even though it is abundantly available. *Cassia tora* is one such green leafy vegetable, It is a popular Indian medicinal plant, has long been used in Ayurvedic system of medicine. *Cassia tora* L is generally distributed throughout India, Srilanka, West China and tropics. Traditionally it is used as bitter tonic, mild laxative, anhelmintic, antidiabetic and in liver disorders, skin and eye diseases (Satish and Rani, 2014)

Owing to high moisture content, green leafy vegetables are highly perishable and are sold at throwaway prices in the peak season resulting in heavy losses to the growers due to non-availability of sufficient storage, transport and proper processing facilities at the production point (Pande *et al*., 2000).

Dehydration is one of the traditional methods of preservation of vegetables, which converts the vegetable into light weight, easily transportable and storable product (Prakash and Gupta, 2011). In addition to increasing variety in the menu, reducing wastage, labour and storage space, dehydrated vegetables are simple to use and have longer shelf life than fresh vegetables (Chauhan and Sharma, 1993). It is also essential to convert the traditional products into attractive, value added acceptable products with enhanced content of blood forming nutrients. (Karva, 2008). Green leafy vegetables can be utilized in multiple ways by incorporating into existing products and formulation of healthy foods using techniques of dehydration (Prakash and Gupta, 2011). The present study was therefore planned with an objective to develop traditional and convenient foods using *Cassia tora* leaf.

METHODOLOGY

Ten food products were standardized using *Cassia tora* leaves; five traditional foods and five convenient foods. In standardization procedures, five combinations were tried out for developing each food products, their acceptability was studied by a sensory panel composed of ten members who had previous experience in tasting. Chutney, spicy adai, steamedragiadai, steemedputtu and leaf-egg white thoran are the five traditional foods. Chutney powder, porridge powder mix, rasam mix, murukku mix and soup mix are the five convenient foods.

Fresh *Cassia tora* leaves were collected and washed under clean water to remove dirt and dust and then allowed to drain. For the preparation of traditional food products, it was then weighed and cut into small pieces. In the case of preparation of convenient food products, the leaves were washed, dried (in a cabinet drier 50^0C for 5-6 hrs) and then powdered, the powder was then sieved through a 0.5mm sieve to get fine particles. It was then incorporated into various products.

A traditional diet based on plants and animal species provides significant source of energy, calcium, iron, zinc, niacin, PUFA and lesser amount of fat. A traditional diet is not only relatively low cost but also contribute to the other aspects of well being through economic and socio cultures activities (AFNESU, 2007). Ingredients like *Cassia tora* leaves, grated coconut, oil, tamarind, pepper, cumin seeds and ginger were used in different combinations as five treatments for chutney. Ingredients like *Cassia tora* leaves, raw rice, toor dal, small onion, red chilly, cumin seed, asafoetida and curry leaves were used in different combinations as five treatments for spicy adai. Ingrediants like *Cassia tora* leaves, ragi flour, coconut and jeera were used in different combinations as five treatments for ragiadai. Ingredients like *Cassia tora* leaves, rice flour, grated coconut, carrot and small onions were used in different combinations as five treatments for steamedputtu. Ingredients namely *Cassia tora* leaves, grated coconut, egg white, pepper powder, turmeric powder and green chillies were used in different combinations as five treatments for leaf egg white thoran.

Convenient foods are defined as "fully or partially prepared foods in which significant preparation time culinary skills or energy inputs have been transferred from the home kitchen to the food process and the distributor. They include ready meals from fast foods, meals from restaurants and take a ways (Celnik *et al*., 2012) Ingredients namely *Cassia tora* leaf powder, channa dal, rice, chilli powder asafoetida, and pepper powder were used in different combinations as five treatments for chutney powder. Ingredients namely *Cassia tora* leaf powder, wheat, ragi, channa dal, corn flour and sugar were used in different combinations as five treatments for porridge mix. Ingredients namely *Cassia tora* leaf powder, red gram dal, chilli powder, pepper powder, turmeric and asafoetida were used in different combinations as fine treatment for rasam mix. Ingrediants namely *Cassia tora* leaf powder, rice flour, black gram dal and channa dal were used in five combinations as five treatments for murukku mix. Ingredients namely *Cassia tora* leaf powder, onion powder, tomato powder, corn flour and pepper powder were used in different combinations as five treatment for soup mix. The different treatments formulated were evaluated by a sensory panel of ten members and the scores were analysed to identify the best treatment.

Statistical analysis :

"Goodness of fit" test was used to analyse the data and were compared at 5 per cent level of significance.

RESULTS AND DISCUSSION

According to Poduval (2002) one foremost purpose of standardization is to facilitate the smooth movements of materials and products through all stages of production in any industrial activity, starting from the raw material to the finished products, then to the dealer and finally to the retailers and consumers. The standardized recipes were subjected to sensory evaluation. A sensory panel evaluated the various formulations with respect to five parameters namely appearance, colour, flavor, texture and overall acceptability.

From the five treatments (CC_1, CC_2, CC_3, CC_4 and CC_5) of chutney, CC_5 obtained maximum mean score (4.6) in overall acceptability and was selected the best combination. From five treatments (CSA_1, CSA_2, CSA_3, CSA_4 and CSA_5) of spicy adai, CSA_3 obtained highest mean score (4.7) in overall acceptability and was elected as the best combination. From five treatments ($CSRA_1$, $CSRA_2$, $CSRA_3$, CSRA4 and $CSRA_5$) of ragiadai $CSRA_1$ obtained the highest mean score (4.4) and was selected as the best combination from five treatments (CSP_1, CSP_2, CSP_3, CSP_4 and CSP_5) of steamedputtu, highest mean score was observed for CSP_4 (4.6) and was selected as the best formulation. From five treatments (CET_1, CET_2, CET_3, CET_4 and CET_5) of Leaf egg white thoran, the highest mean score was observed for CET_1 (4.6) and was selected as the best formulation.

Table 1 : Consumer preferences of convenient mixes (N = 50)

Parameters	Chutney Powder	Porridge Powder	Rasam Mix	Murukku Mix	Soup Mix
Like Extremely	26(52)	4(8)	4(8)	6(12)	12(24)
Like Very much	17(34)	3(6)	12(24)	15(30)	28(56)
Like Moderately	2(4)	7(14)	23(46)	8(16)	5(10)
Like Slightly	1(2)	34(68)	7(14)	19(38)	3(6)
Neither Like nor Dislike	4(8)	2(4)	4(8)	2(4)	2(4)

(Figures in parenthesis indicate percentage score of respondents.)

From five treatments (CCP_1, CCP_2, CCP_3, CCP_4 and CCP_5) of chutney powder, CCP_4 (4.6) and was selected as the best combinations. From five treatments (CPM_1, CPM_2, CPM_3, CPM_4 and CPM_5) of porridge mix, CPM_2 (4.7) obtained highest mean score and was selected as the best combination. From five treatments (CRM_1, CRM_2, CRM_3, CRM_4 and CRM_5) of rasam mix, CRM_3 (4.7) obtained highest mean score and was selected as the best combination. From five treatments (CMM_1, CMM_2, CMM_3, CMM_4 and CMM_5) of murukku mix, highest mean score was obtained for CMM_3 (4.6) and was selected as the best combination. From five treatments (CSM_1, CSM_2, CSM_3, CSM_4 and CSM_5) of soup mix, CSM_1 (4.6) obtained highest mean score and was selected as the best combination. However, statistical analysis showed no significant difference between the scores of all products.

Packaging and storage :

Food packaging plays a vital role in preserving food throughout the distribution chain (Langowski and Wani, 2014). The standardized convenient foods namely chutney powder, porridge mix, rasam mix, murukku mix and soup mix were packed in laminated pouches and stored in ambient conditions.

Assessment and consumer preference.

Preference tests allow consumers to express a choice between samples, one sample preferred and chosen over other samples (Watt *et al*., 1989). A preference test was conducted among the consumers by ranking the products served in the sequences of their liking. Fifty adult females were randomly selected from the immediate neighbourhood who formed a heterogenous population. Consumer preference for five convenient products developed were assessed using five point hedonic rating scale. The result of hedonic rating scale is depicted in Table 1.

When 52 per cent of the respondents like convenient food chutney powder mix extremely, 24 per cent of the respondents liked soup mix to that extent. Only 12 per cent liked the murukku mix in that degree. Porrdige mix and rasam mix were extremely preferred by 8 per cent of the respondents.

Conclusion :

It can be concluded that the preparation of *Cassia tora* leaf powder for addition into various processed food products and to ascertain acceptability needs further investigation. Dehydration was one of the most possible way for preservation of green leafy vegetables, which were seasonal and perishable, *Cassia tora* serve as a pool house of nutrients and can be used to combat deficiency diseases.

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