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Study on sensory evaluation of tarwad (*Cassia tora* L.) seed powder fortified products

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Abstract

Tarwad (*Cassia tora* L.), a leguminous annual herb, is valuable medicinal plant with important nutrients. To harvest the benefits of its properties, to enrich the diet of common public in general and reduce malnutrition of poor in special, a study was undertaken on utilization of *Cassia tora* seed for fortification of mostly consumed food products. Pakoda (snacks) and shira (a sweet dish) was fortified by replacing gram flour and wheat rawa respectively by *Cassia tora* seed powder at the levels of 4, 8 and 12%. The prepared products were evaluated organoleptically. After sensory evaluation by a panel of judges with nine-point Hedonic scale, it was found that adding 4% of *cassia tora* seed powder in pakoda and shira, both obtained the highest score of overall acceptability. Overall acceptability of pakoda and shira fortified with 8% *Cassia tora* seed powder was found statistically at par with control.

Keywords: *Cassia tora* seed powder, fortification, malnutrition, pakoda, shira

Introduction

Cassia tora Linn. Is an annual plant of family *leguminosae*. The seeds grow to develop into pods, is also known as sickle pod, tora, coffee pod, tovara, chakvad, thakara. In Marathi, it is known as Tarwad. It grows wildly in most of the tropics and is considered as a rainy season weed native to South Asia (Anonymous, 2015) [2]. Tarwad with high nutritive value is abundantly available in India. It is an underutilized vegetable plant resistant to pests, diseases and thrives well in minimally nutritive soils. Flowers are pale yellow in color and pods are 4 angled, very slender, 6-12-inch-long, with numerous brown oblong, rhombohedral seeds (Bhandirge *et al.*, 2016) [4]. Seed contains a gum of commercial interest and protein 20-24% and essential amino acids (Victor and Abbott, 2005) [9]. It is used in industrial and food applications, feed, paper, textile, petroleum recovery and pharmaceutical industries. Roasted tarwad seeds have a special flavor, color and most of it is conventionally consumed as a healthy tea beverage in China. Methanol extract from tarwad seeds has demonstrated inhibitory effect on lipid peroxidation (Zhenbao *et al.*, 2006) [10].

Government reports from India stress poor nutritional status (under nutrition) of tribal people with stunting (63%) of children and chronic energy deficiency in adults (49% in men and 55% in women) (Nandi and Bhattacharjee, 2013) [5]. Various medicinal properties of tarwad have been mentioned in the Indian Ayurvedic and Chinese traditional system such as a laxative, antiseptic, antioxidant, antiperiodic and useful in treatment of leprosy, ringworm, bronchitis, cardiac diseases, hepatic disorder, liver tonic, hemorrhoids, and ophthalmic, skin diseases. It also possesses antimicrobial, antihepatotoxic, hepatoprotective antidiuretic, antiarrheal, anti-mutagenic, anti-inflammatory, antidiabetic, hypolipidemic, anti-proliferative, antigenotoxic, immuno-stimulatory activities, etc. (Shukla *et al.*, 2013) [6]. Tarwad seeds contain antinutritional factors such as total free phenolic tannins and trypsin inhibitors of which the effect can be minimized by properly processing of seeds (Vadivel *et al.*, 2005) [7]. It is not used in the common diet to fulfill the nutritional requirements. By using the tarwad seed powder in diet may help the people below poverty line to come out of the malnutrition and cure many diseases and sufferings of the population as a whole. Therefore, the study was undertaken on sensory evaluation of *Cassia tora* seed powder fortified products in the Department of Agriculture Process Engineering, Dr. AS College of Agricultural Engineering and Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri in the year 2017-2019.

Materials and Methods

Tarwad seed (Plate 1.) was procured from Nashik (MS) market was cleaned, graded, ground to powder (Plate 2) and utilized in the study. Gram flour (Plate 3), wheat rava (Plate 4), sugar, ghee, sunflower oil, spices and other ingredients were procured from the local market. Experiment was planned to make two snacks i.e. pakoda and shira by taking three levels of tarwad powder (TSP), gram flour (GF) and wheat rava (WR) each and one control treatment in both the experiments.



Plate 1: *Cassia tora* seeds



Plate 2: *Cassia tora* seed powder



Plate 3: Gram Flour



Plate 4: Wheat Rava

Experimental Details

The detail receipt for preparation of Pakoda and Shira is given in Table. 1.

Table 1: Recipe for Pakoda and Shira

| Sr. No. | Ingredients for Pakoda | Weight (g) | Ingredients for Sheera | Weight (g) |
|---------|------------------------|------------|------------------------|------------|
| 1 | Gram Flour (GF) | 100 | Wheat Rava | 100 |
| 2 | Onion | 50 | Sugar | 50 |
| 3 | Red Chilli Powder | 5 | Ghee | 30 |
| 4 | Coriander | 5 | Almond seeds | 10 |
| 5 | Turmeric | 2 | Cardamom | 3 |
| 6 | Ajwain seeds | 2 | Salt | 2 |
| 7 | Salt | 3 | | |

The Treatments for both the experiments are given in Table 2. Treatments P₀ and S₀ stands for control treatments i.e. 100% GF and WR in pakoda and sheera, respectively. Treatments P₁, P₂, P₃ and S₁S₂, S₃ stands for 4, 6 and 8% of TSP, respectively.

Table 2: Treatments for Pakoda and Sheera

| Treatment | Tarwad Seed Powder (TSP) in % | Gram Flour (GF) in % |
|---------------------------------|-------------------------------|----------------------|
| Pakoda | | |
| P ₀ – Control sample | 0 | 100 |
| P ₁ | 4 | 96 |
| P ₂ | 6 | 92 |
| P ₃ | 8 | 88 |
| Shira | | Maida (Wheat Rava) |
| S ₀ – Control sample | 0 | 100 |
| S ₁ | 4 | 96 |
| S ₂ | 6 | 92 |
| S ₃ | 8 | 88 |

Preparation of Pakoda

Gram flour, TSP, and all other ingredients were mixed thoroughly in four stainless still pans as per the treatments and proportions. Frying oil was kept in metal pan on gas for heating. At certain temperature of oil small slots of batter were released in boiling oil. Pakoda made up of four treatments were well fried till it obtain brownish colour on the outer surface. Well fried Pakoda were kept in a perforated pan to drain out the excess oil adhered to it.

Preparation of Shira

Quality wheat rava and TSP mixture was roasted in ghee with sufficient quantity and all other ingredients were added as normal and sheera was cooked well adding necessary quantity of water in it. When the colour of mixture starts little browning, Sheera was taken out of the pan. Sheera of four treatments was cooked and kept separately in four stainless still pans. Then the code numbered samples were organized on the table for sensory evaluation.

Sensory Evaluation of Products Fortified with TSP

These products were evaluated for colour, texture, flavour, taste and overall acceptability by a panel of 10 judges on the basis of 9- point Hedonic scale.

Results and Discussion

Sensory Evaluation of Pakoda

The sensory score rating for colour (8), taste (8), texture (8), flavor (8) and overall acceptability (8) of pakoda fortified with 4% TSP was found to be statistically at par with the

pakoda of control treatment (Table 3) with 100% GF i.e. normally used ingredients. Treatment P₁ does not differ significantly from treatment P₀. It indicates that adding 4% of TSP can add protein and medicinal value in normal pakoda without affecting on its normal colour, taste, texture, flavor and overall acceptability (8). With increase in the proportion of TSP to 8 and 12, the score of overall acceptability was found to be decreased to 7 and 6 in treatments P₂ and P₃, respectively.

Table 3: Sensory Evaluation of Pakoda

| Parameter | Colour | Taste | Texture | Flavour | Overall Acceptability |
|----------------|--------|-------|---------|---------|-----------------------|
| Treatments | | | | | |
| P ₀ | 8 | 8 | 8 | 8 | 8 |
| P ₁ | 8 | 8 | 8 | 8 | 8 |
| P ₂ | 7 | 7 | 7 | 7 | 7 |
| P ₃ | 7 | 7 | 6 | 6 | 6 |
| SEm (±) | 0.19 | 0.18 | 0.15 | 0.16 | 0.16 |
| CD at 5(%) | 0.56 | 0.53 | 0.45 | 0.47 | 0.47 |

(P₀– control sample, P₁– 4% TSP, P₂– 8% TSP, P₃–12%TSP)



Sensory Evaluation of Sheera fortified with TSP

Sensory score rating for colour, taste, texture, flavour and overall acceptability of treatment S₁ of sheera fortified with 4% TSP was found to have significant difference of mean as compared with the control treatment S₀(Table 4). Other two treatments S₂ and S₃ were found to have the score of overall acceptability lesser than the S₁ and S₀.It indicates that adding 4% of TSP can add protein and medicinal value in normal sheera without affecting on its normal colour, taste, texture, flavor and overall acceptability (8). With increase in the proportion of TSP to 8 and 12, the score of overall acceptability was found to be decreased to 7 and 6 in treatments S₂ and S₃, respectively.

Table 4: Sensory evaluation of Sheera fortified with TSP

| Treatments | Colour | Taste | Texture | Flavour | Overall acceptability |
|----------------|--------|-------|---------|---------|-----------------------|
| S ₀ | 8 | 8 | 8 | 8 | 8 |
| S ₁ | 8 | 8 | 8 | 8 | 8 |
| S ₂ | 7 | 7 | 8 | 7 | 7 |
| S ₃ | 6 | 6 | 6 | 6 | 6 |
| SEm (±) | 0.17 | 0.20 | 0.18 | 0.19 | 0.17 |
| CD at (5%) | 0.49 | 0.60 | 0.52 | 0.56 | 0.49 |

(S₀– control sample, S₁– 4%TSP, S₂- 8% TSP, S₃- 12% TSP)



Summary and Conclusions

Tarwad is annual herb or weed resistant to insect and pest, found aside the roads, fallow land, bunds and as a rainy season in the farm. Although it has valuable nutrients like

protein, carbohydrate, vitamins, minerals and trypsin inhibitors in seed useful in medicines, but it is not used in the common diet to fulfill the nutritional requirements. The study was undertaken to access the feasibility of tarwad seed powder for fortification of the traditional food products for malnutrition control and health benefits. Three levels i.e. 4, 6 and 8% of TSP was used to fortify pakoda and sheera. After thorough analysis of the data obtained from sensory evaluation of both the products following conclusions were drawn.

- Tarwad seed powder 4% can be used successfully to fortify Pakoda and Sheera with good overall acceptability.
- Tarwad seed powder addition in the diet of common people may add in protein and medicinal properties for better health.

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