Development of Value Added "SEV" by Incorporating Periwinkle (Catharanthus Roseus) Leaves and Lemon Grass (Cymbopogon Citratus) Powder

HOME SCIENCE

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ABSTRACT — *The present study was carried out with the objective to develop "Sev" by incorporating dehydrated mixed leaves powder of Periwinkle (Catharanthus roseus) and Lemon grass (Cymbopogon citratus) in the ratio of 1:4 and to find out its sensory acceptability and nutritional composition. In 'Sev', Three treatments were developed i.e. T1 (Gram flour + potato + mixed leaves powder in ratio of 65:30:5), T2 (Gram flour + potato + composite leaves powder in ratio of 60:30:10) and T3 (Gram flour + potato + composite leaves powder in ratio of 55:30:15) respectively. Treatment coded with T0 was developed without incorporating anything and was served as control. It was observed that value addition at 10 percent incorporation level with the mixed leaves powder was regarded as the best product. Incorporation of mixed leaves powder enhanced the composition of prepared food products. Protein content of sev was not affected by incorporation. Iron content was highest in the treatment (T2) i.e 15 mg/100g and lowest in treatment (T0) i.e 12.61mg/100g. Calcium content in 'sev 'was highest in the treatment (T2) i.e 165 mg/100g as compared to (T0) i.e 140 mg/100g. Hence the incorporation of periwinkle and lemongrass leaves increases the iron, calcium content of the prepared product. Total phenol content was highest in treatment (T2) i.e 72.30mg/100g and lowest (T0) i.e 58.53mg/100g in 'sev' and good percentage of DPPH radical scavenging activity of treatment T2 (73.60%) is better than product T1 (69.26%).*

INTRODUCTION

Sev is a popular Indian snack food consisting of small pieces of crunchy noodles made from chickpea flour paste, which are seasoned with turmeric, cayenne, and ajwain before being deep-fried in oil. These noodles vary in thickness. Ready-to-eat varieties of Sev, including flavoured Sev, are available in Indian stores. Medicinal plants, since times immemorial, have been used in virtually all cultures as a source of medicine. The widespread use of herbal remedies and healthcare preparations, as those described in ancient texts such as the Vedas and the Bible, are obtained from commonly used traditional herbs and medicinal plants. The medicinal value of plants lies in some chemical substances that produce a definite physiological action in human body. The most important of these bioactive constituents are alkaloids, tannins, flavonoids and phenol. Medicinal plant products could prove useful in minimizing the adverse effects of various chemotherapeutic agents as well as in prolonging longevity and attaining positive general health. The increasing global interest in the medicinal potential of plants during the last few decades is therefore quite logical. **(Edeoga** *et al.,* **2005 ; Abubakar** *et al.,* **2008)**

Lemon grass (*Cymbopogon citratus***)** *is an aromatic perennial tall grass with rhizomes and densely tufted fibrous root. It has short underground stems with ringed segments, coarse, green slightly leathery leaves in dense clusters. The plant is a native herb from India and is cultivated in other tropical and subtropical countries. (***Figueirinha** *et al.,***2008). The leaves of Lemongrass** (*Cymbopogon Citratus*) *present lemony characteristic flavour due to its main content, citral which present great importance to the industry. Citral, a combination of neral and geranial isomers, is used as a raw material for the production of ionone, vitamin A and beta-carotene* **(Carlson** *et al.,* **2001).**

Catharanthus roseus, the Madagascar periwinkle or rosy periwinkle, is an attractive small sub shrub with graceful pink or white salver form flowers. Native to south eastern and eastern Madagascar, the plant is easily cultivated, and European colonists exported it widely as an ornamental. It is now grown almost worldwide, and is found naturalized in most tropical and subtropical regions following escapes from cultivation. Madagascar periwinkle was used in traditional medicine, the periwinkle has been used for relieving muscle pain, depression of the central nervous system, also used for applying to wasp stings and to heal wounds. Its application ranges widely from the prevention of diabetes to treatment of stomach ache. **(Gajalakshmi** *et al.,* **2013).**

MATERIALS AND METHODS

The experiment was conducted in the Nutritional Research Laboratory, Department of Foods and Nutrition, Ethelind School of Home Science, Sam Higginbottom Institute of Agriculture, Technology and Sciences (Deemed to be University) Allahabad, U.P.

The details of the materials, experimental procedure and techniques to be adopted during the course of the investigation were as follows:

2.1. *Experimental site: The present investigation was carried out in the Nutrition Research Laboratory, Foods and Nutrition, Ethelind School of Home Science, SHIATS, Allahabad.*

2.2. Procurement of raw materials:
Periwinkle (Catharanthus roseus) leaves and Lemongrass (Cymbopogon citrates) were collected from the field of Department of Horticulture, Sam Higgingottom Institute of Agriculture, Technology and Sciences. Leaves were washed with the help of clean water so as to remove the dirt and other disease causing organisms.

2.3. Dehydration process of periwinkle and lemongrass leaves:
Periwinkle/lemon grass leaves, after washed and trimmed, were spread on flat wooden trays and allowed to dry for 15 hours at 60◉ -65◉ C. Dehydration process was continued till the moisture becomes 6-8%. Then these leaves were ground into powder form and packed in air tight containers.

2.4. Preparation of Mixed Leaf Powder:
Mixed leaf powder was developed by incorporating the dehydrated leaf powder of periwinkle (*Catharanthus roseus*) and lemon grass (*Cymbopogon citratus*) in the ratio of 1:4.

2.5. Development of Sev: Sev was prepared with the incorporation of periwinkle leaves and lemongrass powder.
The basic recipes (control T0) have three variations T1, T2, T3 respectively where the amount of composite leaf powder was varied.

2.6. Sensory Evaluation:
Sensory evaluation of the food products for their acceptability was done by a panel of 5 judges from the Ethelind School of Home Science. 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, Body and Texture, Taste & Flavour and Overall Acceptability **(Srilakshmi, 2007)**.

Nutritional Composition of the value added Food products developed by incorporating lemongrass and periwinkle leaves powder:

i. Proximate analysis:
Chemical estimation of moisture, ash, protein, fat and fibre content was done by AOAC, using standard procedure. Methods described by AOAC, was used for determination of chemical composition of selected product, this included estimation of moisture, ash, crude fat, protein, crude fiber and carbohydrate was calculated by difference method and energy was estimated by calculation method.

ii. Minerals content: Iron and calcium was estimated by using standard procedures.

iii. Vitamin C: Vitamin C was estimated using standard procedures.

iv. Antioxidant composition: **Determination of Total Phenol Content by (Singleton** *et al.,*) and Determination of Radical scavenging Activity by DPPH Radical Scavenging Method **(Brand** *et al.,***1995)**

RESULTS AND DISCUSSION
ORGANOLEPTIC CHARACTERISTICS OF THE "*Sev***"**
Table: 1. Average sensory score of different parameters in control and treated sample of "*sev'***"**

Parameters	T_0 Mean ± SE	T_1 Mean ± SE	T_2 Mean ± SE	T_3 Mean ± SE
Colour and appearance	7.6 ± 0.02	7.8 ± 0.07	7.5 ± 0.04	7.0 ± 0.04
Body and texture	7.6 ± 0.035	7.5 ± 0.04	7.8 ± 0.14	7.1 ± 0.04
Taste and flavour	7.8 ± 0.09	7.6 ± 0.06	8.2 ± 0.02	6 ± 0.03
Overall acceptability	7.7 ± 0.03	7.6 ± 0.04	7.8 ± 0.07	6.6 ± 0.03

S= significant, NS= non-significant,

Table 1 shows that the mean score of *sev* in relation to which indicates that the treatments T1 (Gram flour + potato + mixed leaves powder in ratio of 65:30:5), T2 (Gram flour + potato + composite leaves powder in ratio of 60:30:10) and T3 (Gram flour + potato + composite leaves powder in ratio of 55:30:15) respectively. Scoring shows that the treatment T1 was liked very much while control and T₀, T2 and T3 were moderately like by panel of judges. Texture of Sev clearly indicates that the treatment T2 had highest score of texture followed by the T₀, T1 and T3 respectively. The mean score

of Sev in relation to taste and flavor obtained by T2 and T₀ followed by the T1 and T3 Indicated that the T₀ and T2 gave the best taste and flavor to Sev. The mean score of Sev in relation to overall acceptability indicating that the treatment T2 score maximum followed by the treatment T₀, T1 and T3 respectively. It is seen that the addition of 10% dehydrated mixed leaves consisting of periwinkle leaves and lemon grass in the ratio of 1:4 in the treatment T2 improved overall acceptability. Verma and Jain (2012) estimated fortification of mathri with fresh and dehydrated vegetables and assessment of nutritional quality. Levels of incorporation of fresh greens (spinach, mint and carrot) in mathri were 8 per cent whereas powder of dry green vegetables (spinach, mint, carrot and lotus stem) was added in mathri at 7 per cent.

NUTRITIONAL COMPOSITION OF THE DEVELOPED VALUE ADDED FOOD PRODUCTS
Table: 2. Best treatment of "Sev" based on sensory acceptability:

Nutrients	(T_0)	(T_2)	Difference (T_2-T_0=D)	t (calculated)	t(tabulated value at 5%)	Result
Moisture (%)	35.30	36.27	1.97	6.3	4.303	S
Ash (g)	8	8.5	0.5	3.04	4.303	NS
Protein (g)	12.70	11.00	1.7	1.4	4.303	NS
Fat (g)	10.15	9.9	-0.15	3.49	4.303	NS
Crude fiber(g)	2.3	2.9	0.6	2.1	4.303	NS
Iron (mg)	12.61	14.90	2.9	5.7	4.303	S
Calcium (mg)	139.55	164.56	25.01	37.39	4.303	S
Vitamin C (mg)	0.89	1.50	0.61	2.3	4.303	NS
Carbohydrates(g)	31.55	31.43	0.48	4.04	4.303	NS
Energy (Kcal)	268.35	258.82	12.87	11.26	4.303	S

From proximate analysis it was found that a wide range of variation was observed in the nutrient content of the prepared food products. These were because of the difference in the incorporation of medicinal leaf powder enhanced the composition of prepared food products. Present information regarding the mean nutrients composition of control and best treatment of product (per 100g). Result showed that the moisture content was the highest in the treatment (T2) i.e 36.27% in 'Sev' comparison to control (T0) i.e. 35.30%. Incorporation of dehydrated leaves in T2 increases moisture content in prepared products. Ash content was non significantly higher in the treatment (T2) i.e 8.5g/100g and least in control (T0) i.e 8g/100g of the 'Sev'. So incorporation of medicinal leaves powder doesn't make much difference in ash content in prepared products. Protein content of the prepared product when compared, it was found that the incorporation of these medicinal leaves doesn't affect much in the value of protein in the product. Protein content was found higher in (T0) i.e 12.20g/100g and lowest in (T2) i.e 11.22g/100g.

Iron content was highest in the treatment (T2) i.e 14.90 mg/100g and lowest in treatment (T0) i.e 12.61mg/100g in the 'Sev' incorporated with periwinkle and lemon grass leaves. Calcium content in 'Sev 'was highest in the treatment (T2) i.e 164.56mg/100g as comparison with the (T0) i.e 139.55mg/100g hence the incorporation of periwinkle and lemongrass leaves increases the calcium content of the prepared product. Similar results were recorded by Joshi and Mathur (2010) also as they have stated that the iron and calcium content of the products was directly proportional to the leaf mixture incorporated. As the level of the LM

increased the iron and calcium content of the recipes also showed a significant ($p < 0.05$) improvement which shows that these leaves are rich in iron and calcium.

According to Park et al.,(2011) few researches have promoted the intake of plant-based diet such as soybean and green leafy vegetable as a source of calcium instead of dairy or animal products. This is because animal protein could increase bone loss and risk of fracture through promoting calcium excretion and acid-base metabolism.

Carbohydrate content was found significantly higher in the treatment T0 (31.55/100g) in comparison with treatment T1 (31.43 g/100g). This is due to incorporation of the leaves mixture in the product. Likewise energy value of treatment T2 (250.42 kcal/100g) was found higher in comparison with treatment T1 (237.55 kcal/100g). So it proves to be a good source of energy.

Table: 3 Antioxidant composition of the Sev (per 100 gm).

Nutrients	(T_0)	(T_2)	($T-T_0=D$)	t(calculated)	t (tabulated value at 5%)	Result
Poly phenols (mg)	58.53	72.30	13.77	55.03	4.303	S
DPPH (%)	69.26	73.60	4.34	7.44	4.303	S

Total phenol content was highest in treatment (T2) i.e 72.30mg/100g and least in control (T0) i.e 58.53mg/100g in 'sev' incorporated with periwinkle and lemon grass leaves. Lemon grass is rich in total phenol content so it provides a good amount of poly phenols in the prepared product ,like wise good percentage of DPPH radical scavenging activity of periwinkle and lemon grass leaves makes the product T2 (73.60%) better than product T1 (69.26%). Tangkanakul (2009), conducted a comparative study on Antioxidant capacity and total phenolic content of herbs, spices and vegetables and found that Lemon Grass has better antioxidant capacity than Coriander (leave and stem) Ginger, Tomato and Garlic. And less Total Antioxidant Capacity than Turmeric, Cumin, dried Curry powder. Order of total antioxidant capacity of herbs analyzed in the study was Turmeric > Cumin, dried > Curry powder > Lemon Gras > Coriander (leave and stem) > Ginger > Tomato > Garlic (1126.12 ± 94.2 > 302.26 ± 0.9 > 236.55 ± 7.9 > 120.57 ± 5.46 >92.18 ± 62.9 > 62.24 ± 0.19 > 22.97 ± 4.8 > 8.77 ± 1.93 mg VCE/100 g respectively).

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