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Sharma Megha
Research Scholar, Foods Nutrition and Public Health, Ethelind College of Home Science, Allahabad, Uttar Pradesh, India

Prasad Ranu
Professor and Dean, Foods Nutrition and Public Health, Ethelind College of Home Science, Allahabad, Uttar Pradesh, India

Gupta Alka
Assistant Professor, Foods Nutrition and Public Health, Ethelind College of Home Science, Allahabad, Uttar Pradesh, India

Correspondence
Sharma Megha
Research Scholar, Foods Nutrition and Public Health, Ethelind College of Home Science, Allahabad, Uttar Pradesh, India

Development of sev from composite flour of pumpkin seed, watermelon seeds and bottle gourd seed

Sharma Megha, Prasad Ranu and Gupta Alka

Abstract
Pumpkin, Watermelon and Bottlegourd belongs to genus Cucurbita of the family Cucurbitaceae is one of the largest families of vegetable kingdom. They are widely grown and consumed in many tropical and sub-tropical countries around the world. Cucurbitaceae family vegetables and fruits such as cucumber, squash, cantaloupes etc. It is one of the most popular field crops cultivated around the world, including the USA at the commercial scale for its fruit, and seeds. These seeds are a great source of protein, minerals, vitamins, and omega-3 fatty acids. Trace elements such as Zinc, Vitamins such as carotenoids, tocopherol and other substances like phytosterols, Polly-unsaturated fatty acids and antioxidants are naturally present in pumpkin that can be important to human health and also has pharmacological activities such as anti-diabetic, antifungal, antibacterial, anti-inflammation activities and antioxidant effects. The seeds can be cooked and dried and served as snacks and fermented for use as a flavour enhancer in gravies and soups. These seed is a rich source of dietary fiber which is desired in developing functional foods and is an underutilized fruit by-product and is reported to be high in protein and has excellent functional properties and has been found to be effective in baking. The present study was carried out "Development of Sev from Composite Flour of Pumpkin seed, Watermelon seeds and Bottlegourd seed" with the objectives to incorporation of composite flour (pumpkin, watermelon and bottlegourd seeds) product at different levels and to assess the organoleptic evaluation of Sev and Nutritional composition of prepared products were analyzed. Cucurbit seeds have high nutritional quality mainly in terms of its protein and oil content and hence creating considerable interest for its study.

Keywords: composite flour, nutritional composition, sensory evaluation

1. Introduction
Pumpkin seeds, also known as pepitas, are small, flat, green, edible seeds. Most pumpkin seeds are covered by a white husk, although some pumpkin varieties produce seeds without them. Pumpkin seeds are a popular snack that can be found hulled or semi-hulled at most grocery stores. Pumpkin's most valuable elements are included in its part which is most commonly disregarded as waste, namely pumpkin seeds. Pumpkin seeds are rich in medicinal and nutritive components, due to which reason they are applied in therapeutic purposes across the globe. Food is one of our most basic needs, which provides us energy for everything we do and also for all involuntary functions of our internal organs. All the vast variety of food we eat comes either from plants or animals. Pumpkin (Cucurbita pepo) has received considerable attention in recent years because of the nutritional and health protective values of the seeds (Sabitha, 2013) [1]. Watermelon seed low in calories and contains 93.4% water, 0.5% protein, 5.3% carbohydrate, fat 0.1%, fiber 0.2%, ash 0.5%, and vitamins (A, B and C). In addition, it contains amino acids sitrullin (C6H13N3O3), aminoasetat acid, malic acid, phosphoric acid, arginine, betaine, lycopene (C40H56), carotene, bromine, sodium, potassium, sylvite, lysine, fructose, dextrose, and sucrose. Citrulline and arginine play a role in the formation of urea in the liver from ammonia and CO2 that increases urine. High content of potassium which can help the heart and normalize blood pressure. Kukurbositrin active compounds in watermelon seed can stimulate the kidneys and keeping blood pressure remained normal**.** The cucurbitacea family has about 800 species noted mainly for their usefulness more than a vegetable. It is a commonly cultivated plant in tropical and subtropical areas of the world, not believed by some to have spread or originated from wild populations in southern Africa. Bottle gourd is a vine grown for its fruits which can either be harvested young or used as a vegetable or harvested when mature, dried and used as a bottle utensil or pipe.

2. Material and Method

The present investigation was carried out in the Research Laboratory of Foods and Nutrition, Ethelind college of Home Science, (SHUATS), Allahabad. Seeds of pumpkin, watermelon and bottle gourd required for the experiment were collected from the local area of Allahabad district. Seeds were carefully clean and remove from dust.

Nutritional composition, antioxidant and antinutritional analysis of composite flour:

Methods describe by AOAC (2017) was used for determination of chemical composition of selected product, this included estimation of moisture, ash, fat, protein, iron, calcium, crude fibre and zinc. Energy and carbohydrate were calculated by difference method.

Development and Sensory eveluation of traditional food product from selected seeds.

Preparation of products such as *Sev* was prepared. The basic recipe was standardized and served as control T_0 (Control without seed flour) five treatment i.e. incorporation of composite flour at different levels will be referred as T_1 (10% of composite flour), T_2 (20% of composite flour) and T_3 (30% of composite flour) and T_4 (40% of composite flour) respectively. Organoleptic evaluation was done by a panel of 10-12 judges to assess the acceptability of the products based on the various sensory attributes like colour, appearance, texture, flavour and taste. Hedonic scale (9-like extremely and 1-dislike extremely) in order to determine the nutritional characteristics of these, standard methods described.

Nutritional analysis of traditional developed products

Proximate analysis, antnutritional and antioxidant value of control and enriched traditional food product was assessed by using of AOAC (2017) included moisture, ash, fat, protein, iron, calcium, crude fiber and zinc. Energy and carbohydrate were calculated by difference method.

Statistical analysis: The data obtained from sensory evaluation were statistically analyzed by using analysis of variance technique (one way classification). Significant difference between the treatments was determined by using CD (critical difference) test.

3. Result and Discussion

The data recorded of the present study "Development of Sev from Composite Flour of Pumpkin seed, Watermelon seeds and Bottle gourd seed" on different aspect as per the methodology have been tabulated and analyzed statistically. The result obtained from the analysis are presented and discussed in this chapter in the following.

Table 1: The average sensory scores of different parameters in control and treated sample of *Sev*' (Per 100 gm).

Sensory Characteristic/Treatments	Scores on 9 point hedonic scale			
	Colour and appearance	Texture	Taste and flavour	Overall acceptability
T_0 (Control)	8.1±0.62	7.3±0.49	7.3±0.49	7.8±0.63
T_1	7±0.47	6.6±0.60	6.6±0.60	5.6±0.74
T_2	6.8±0.73	6.3±0.46	6.3±0.81	6±0.82
T_3	8.6±0.68	8.03±0.13	8.9±0.51	8.5±0.16
T_4	7.6±0.63	7.4±0.48	6.5±0.60	7.7±0.50
F%	3.54 (NS)	4.22(S)	5.30(S)	4.61(S)
C.D	-	0.58	0.83	1.063

S= Significant, NS= Non- Significant, ±= S.E

The data illustrated in the table. 3 and figure. 3 the effect of composite flour on the colour and appearance of sev indicates that the treatment T_3 (8.6±0.68) got the highest score for the colour of sev followed by, T_4 (7.6±0.63), T_1 (7±0.47), and T_2 (6.8±0.73). It is concluded that the concentration of composite flour influences the appearance of beverages.

The mean score to the effect of addition of composite flour in the texture of sev shows that the treatment T_3 scored the maximum marks of T_3 (8.3±0.13) followed by T_4 (7.4±0.48), T_1 (6.6±0.60) and T_2 (6.3±0.46) respectively. Therefore it is concluded that the treatments were liked moderately while T_3 was liked very much by the panel of judges.

The above table shows that the mean scores of sev in relation to taste and flavour indicates that T_3 (8.9±0.51) had the highest score followed by T_1 (6.6±0.60) T_4 (6.5±0.60) and T_2 (6.3±0.81) respectively.

The above table shows that the mean scores of in relation to overall acceptability indicates that T_3 (8.5±0.16) had the highest score followed by T_4 (7.7±0.50) T_2 (6±0.82), and T_1 (5.6±0.74) respectively. A recent Study shows that a weaning mix was developed from a combination of germinated sorghum, germinated green gram, and rice flour with incorporation of pumpkin flour at 10%, 20% and 30% concentrations. The mix was studied for its sensory, nutritional and physical parameters. Mix highlighted that an increase in incorporation of pumpkin flour increased the energy, fat, protein, *ß*-carotene, fibre, and antioxidant levels (Usha *et al*. 2010) [2].

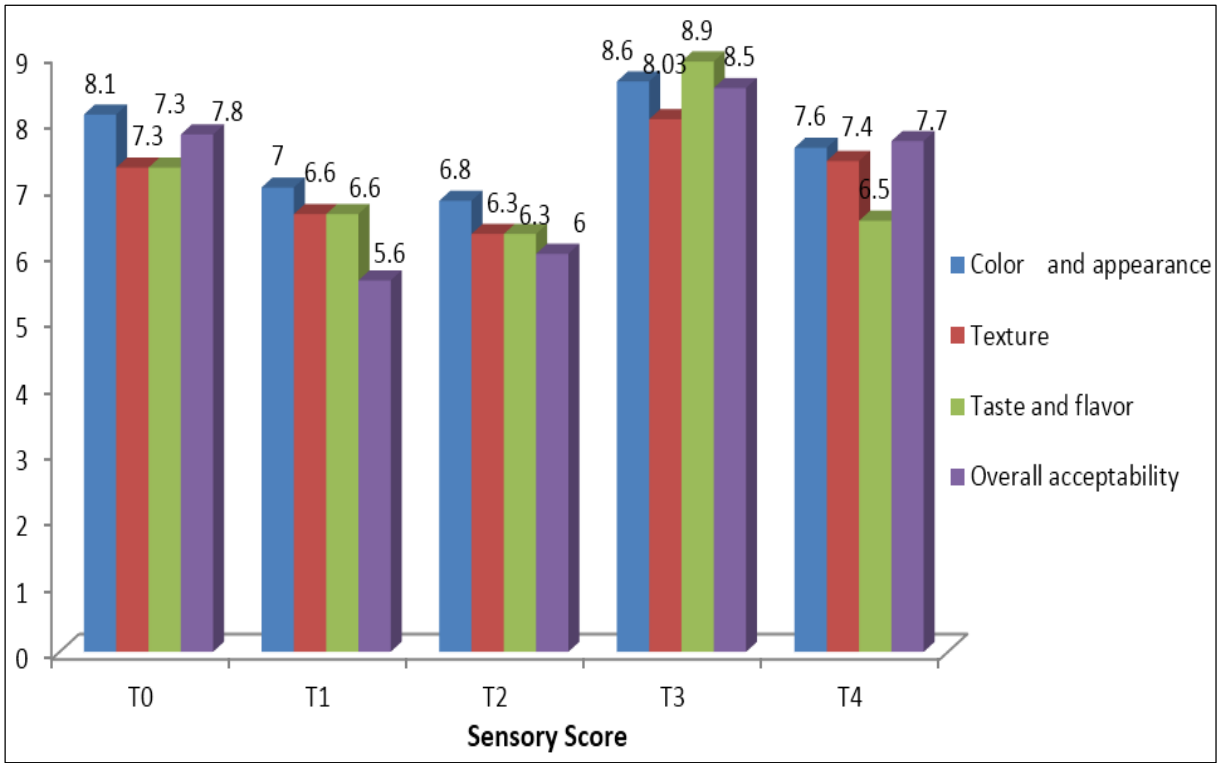

Fig 1: The average sensory scores of different parameters in control and treated sample of *Sev*'

Table 2: Average amount of nutrients in control and treated sample of "*Sev"* prepared from Composite flour per 100g

Nutrients (100g)	Control	Best Treatment
	T_0	T_3
Moisture %	6.1	8.3
Protein (g)	14.1	15.1
Fat (g)	12.7	13.1
Crude Fibre (g)	3.1	6.91
Ash (g)	3.6	4.04
Carbohydrate (g)	50.8	51.2
Energy (kcal)	397	410
Iron (mg)	3.19	4.9
Calcium	41.0	41.9
Zinc (mg)	4.39	5.7
Tannin (mg)	0.1	1.1
Flavonoids (mg)	0.91	2.95
Total Phenol (mg)	1.2	5.31
Nitrate (mg)	0.49	2.02
Oxalate (mg)	3.95	60.9

Table.2 and fig.2 shows that protein content was highest in T_3 (15.1g) and least in T_0 (14.1g), fat content was highest in T_4 (13.1g) and least in T_0 (12.7g), carbohydrate content was highest in T_3 (51.2g) and least in T_0 (50.8g), energy content was highest in T_4 (410 kcal) and least in T_0 (397 kcal), Zinc content was highest in T_3 (5.7mg) and least in T_0 (4.39mg), iron content was highest in T_3 (4.9mg) and least T_0 (3.19mg) and Crude Fibre content was highest in T_3 (6.91mg) and least in T_0 (3.1 mg). Moisture content was highest in T_3 (8.3%) and least in T_0 (6.1%), Ash content was highest in T_3 (4.04) and least in T_0 (3.6), Nitrate content was highest in T_3 (2.02g) and least in T_0 (0.49g), Oxalate content was highest in T_3 (60.9 kcal) and least in T_0 (3.95kcal), Flavonoids content was highest in T_3 (2.95g) and least in T_0 (0.91g) Total Phenol content was highest in T_3 (5.31g) and least in T_0 (1.2g), Tannin content was highest in T_4 (1.1) and least in T_0 (0.1). (Racheal and Margaret, 2016) [3] found that the cookies produced from the flour blends revealed significantly ($p \leq 0.05$) higher iron, zinc, and phosphorus level content than the control (Table 6). This is may be due to the addition of plantain flour which contains higher amount of iron and zinc However, the calcium and sodium content were of no significant difference. Proteins are building blocks of the body and foods that are rich in protein are known to reduce protein energy malnutrition. The protein content of the composite flour blend ranged from 2.44%-3.04%. There was significant difference in the result.

4. Conclusion

From the result it is being concluded that the composite flour incorporated in *Sev* was well acceptable on the basis of sensory evaluation. Sev shows that protein content was highest in T_3 (15.1g) and least in T_0 (14.1g), fat content was highest in T_4 (13.1g) and least in T_0 (12.7g), carbohydrate content was highest in T_3 (51.2g) and least in T_0 (50.8g), energy content was highest in T_4 (410 kcal) and least in T_0 (397 kcal), Zinc content was highest in T_3 (5.7mg) and least in T_0 (4.39mg), iron content was highest in T_3 (4.9mg) and least T_0 (3.19mg) and Crude Fibre content was highest in T_3 (6.91mg) and least in T_0 (3.1 mg). Moisture content was highest in T_3 (8.3%) and least in T_0 (6.1%), Ash content was highest in T_3 (4.04) and least in T_0 (3.6), Nitrate content was highest in T_3 (2.02g) and least in T_0 (0.49g), Oxalate content was highest in T_3 (60.9 kcal) and least in T_0 (3.95kcal), Flavonoids content was highest in T_3 (2.95g) and least in T_0 (0.91g) Total Phenol content was highest in T_3 (5.31g) and least in T_0 (1.2g), Tannin content was highest in T_4 (1.1) and least in T_0 (0.1). From the result it can be shows that the addition of composite flour increased nutrient density of all prepared beverages.

5. Recommendations

- Incorporation of composite flour of seeds gives nutrient dense products, with acceptable taste which should be consumed by all age groups to address their daily nutritional needs

- The nutrient dense products can be helpful from therapeutic point of view for those people suffering from deficiencies, Malnourished, Vitamin E problems, and other iron deficiencies diseases.

5. Acknowledgement
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