Organoleptic Evaluation and Cost analysis of Black Rice Flour and Flax Seed Flour incorporated Value added *"Sev"*

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Abstract:

Customers wants food that is wholesome low in fat organic high in fibre and low in calories that's why customer desire a single cuisine that provides all the advantages as well as one that is pleasant and had good sensory qualities the deep fried "Sev" with black rice and flax seed incorporated will serve as the product that satisfies all consumer demands and will also help in maintaining the low calories diet that people with diabetes as well as overweight can enjoy as people currently have gluten allergies and are unable to consume traditional products like deep fried "Sev" with black rice and flax seed incorporated can be one only substitute for the traditional products.The purpose of the present study Organoleptic Evaluation and Cost analysis of Black Rice Flour and Flax Seed Flour incorporated Value added "Sev". The desired outcome of the present study was assessed the sensory attributes of value-added deep fried "Sev" prepared by incorporation of Black Rice Flour and Flax Seed Flour, organoleptic analysis of value added "Sev" done by AOAC method followed by statistical analysis of variance (ANOVA), (C.D) techniques and "t-test" and cost estimation. Standard recipe "Sev" served as a control (T_0) with three treatment combinations, were prepared by replacing White Rice Flour with different ratio of Black Rice Flour and Flax Seed Flour which were referred as T_1,30:60 :10 gm T_2, 20:65:15 gm and T_3 25:70 :5 gm respectively. Value added "Sev" are distinguished by the crunchy and crispy texture and improved organoleptic characteristics. They were analyzed on Nine Point Hedonic Scale score card for different sensory attributes. The result revealed that T_2 (9) was found to be the most acceptable regards to its overall proportion followed by T_1(6.6), T_0 (6.7) and T_3 (7.0) were liked moderately by the Sensory Panel Members respectively. Thus, it was deduced from the findings that adding Black Rice Flour and Flax Seed Flour to enhanced "Sev" at varying degrees may enhance their sensory qualities. This lowers the expenses without sacrificing their acceptability or reasonableness as compared to the going rate in the market.

Keywords: *Black Rice Flour, Nine Point Hedonic Scale, sensory attributes, Organoleptic Evaluation.*

Introduction:

The deep-fried food products like *"Sev"* are most commonly consumed all over India and it is mostly prepared in the home and sold in the local market, the problem faced by the traditional foods are under the category of deep-fried products. So they are having high-fat content, they are high in calories and low on nutritional components which is widely assumed to be associated with adverse health outcomes, including elevated risk for cardiovascular disease

(CVD), type 2 diabetes, and overweight, but nowadays the consumers want a single food to serve all the benefits and they want it to be tasty and have good sensory properties. Value addition of black rice and flaxseed enhance the nutritional value of the deep fried food was serve as the product which was fulfil all the demands of the consumer and will also help in minting the low calories diet which can be enjoyed by the people on treatment with obesity and as the present scenario the people are also suffering from gluten allergies, and couldn't enjoy the traditional products, the black rice and flax seed incorporated deep fried *"Sev"* can be one of the substitutes for them**. (Sobukola 2017).** Flaxseed has therapeutic properties that make it helpful for serious illnesses like heart ailments, cancer, diabetes, obesity, kidney, and bone issues**. (Katare *et al.*, 2012).** By enhancing patients' lipid profiles, dietary flaxseed reduces cardiovascular risk factors in hyperlipidemic individuals. Flaxseed may protect against breast, colon, and ovarian cancer through preventing the growth of tumours and also reducing the development of blood vessel cells, according to in vivo tests done on rats. **(Truan *et al.*, 2012).** It's possible that flaxseed's high SDG lignin concentration is what causes it to have a breast tumor-reducing effect **(Chen *et al.*, 2011).** Due to the inclusion of dietary fibre, lignan, and -3 fatty acids, flaxseed has a preventive effect against the risk of developing diabetes **(Adlercreutz, 2007).**

Objective of the Study

Keeping in view the following study aimed to assessed the Organoleptic Evaluation and Cost analysis of Black Rice Flour and Flax Seed Flour incorporated Value added *"Sev"*

Materials and Methods

The Present Study was conducted in the Nutrition Research Laboratory, Department of Food Nutrition and Public Health, Ethelind College of Community Science, Sam Higginbottom University of Agriculture Technology and Sciences Prayagraj (U.P)

Procurement of Raw Materials

The raw materials, Chakhao Forbidden Manipur Black Rice was bought online from Amazon shopping website. Flax Seeds (Frutin's), Mustard Oil (Fortune kachchi Ghani), White Rice (Mogra), (Tata Salt Vacuum Evaporated Iodised) Salt. These ingredients required for the preparation of Value-added food product *"Sev",* were bought from the local market of Mahewa, Prayagraj 211007.

Processing of Raw Materials

For processing, Black Rice and Flax Seeds was first cleaned from insects and diseases, then washed in running water for 1 min. They were then dried in Dehydrator at 140 F for 6 hours. The dried Black Rice and Flax Seeds were then roasted for 5 mins at 28-350 C, post which it was grounded into a powder. The grounded material was packed in an airtight container and stored at ambient temperature in a dry place for further use

Product Formulation

Value added deep fried based product such as *"Sev"* was prepared by incorporation of 20 gram of white rice flour, 65 gram of black rice flour and 15 gram of flax seed flour. The experiment was prepared and replicated 3 times to get an average value, the control (T_0) was prepared with 100 percent White Rice Flour. Boiled (200ml) water ($100C^O$) in heavy Bottom Pan. Premixing Black Rice Flour, Flax Seed Flour, White Rice Flour and Salt, Pour the Mixture into (200ml) water(100^0c). Whisk the Mixture till it thickness, Cool the Mixture at (30^0c). Put in a Dough

Extruder, press gently and pipe out coils on a clean mat. Dry under Sunlight for 2 days at 42^0c). Deep Fry at low to moderate temperature (160^0c to 180^0c).

Organoleptic Evaluation

During preliminary trials, prepared value added *"Sev"* were evaluated for sensory characteristics, based on Nine Point Hedonic Scale for colour, taste, texture, flavour and overall acceptability by 5 Sensory Panel Members. The scores were based on the following criteria: Like extremely: 9; Like moderately: 7-8; like slightly: 5-6; dislike slightly: 3-4; and dislike extremely: 0-2. **(Srilakshmi B. 2007)**

Cost of prepared value-added *"Sev"*: -

Cost of the prepared value added *"Sev"* were calculated individually raw ingredients used in preparation of value added *"Sev"* as the prevailing market price.

Statistical Analysis

The data includes mean scores for each sample as tested by both un-trained and semi- trained panelists. The results of sensory evaluation were split by panellist type and each group was individually subjected to analysis of variance two-way (ANOVA) test, 't-test' was used to determine the significant differences of the mean scores for appearance, smell, taste, consistency, and general acceptability at $P < 0.05$. **Gacula, Jr. and Singh (2008)**

Result and Discussion

Table no:1 Sensory acceptability scores of *"Sev"* prepared by using Black Rice Flour and Flax Seed Flour

Control and Treatments	Colour and Appearance	Body and Texture	Taste and Flavour	Overall Acceptability
T_0 Mean ± SE	7±0	6.4±0.14	6.1±0.04	6.7±0.05
T_1 Mean ± SE	6.7±0.05	6.8±0.16	6.7±0.10	6.6±0.14
T_2 Mean ± SE	8.9±0.00	9±0	9±0	9±0
T_3 Mean ± SE	7.0±0.05	6.8±0.10	6.9±0.15	7.0±0.05
F cal (5%) F tab (5%) CD(P≤0.05) S.A.	617.42 4.76 0.184 S*	97.81 4.76 0.545 S*	160.9 4.76 0.450 S*	113.2 4.76 0.483 S*

S.A=Statistical Analysis S*=Significant, NS**=Non-Significant (P<0.05)*

The above table no: 1 show that the average Sensory Score of Value- added *"Sev"* on the basis of all parameters like Colour and Appearance, Body and Texture, Taste and Flavour and Overall Acceptability.

The result was evaluated for sensory characteristics, based on Nine Point Hedonic Scale for colour and appearance, taste and flavour, body and texture and overall acceptability by 5 Sensory Panel members. T_2 had the highest Colour and Appearance score (8.9) followed by T_1 (6.7), T_0 (7), and T_3 (7.0). Due to its golden brown colour, which ascribed it more acceptable and delicious by the 5 sensory panel members due to balance proportion of white Rice Flour 20 gm+ Black Rice Flour 65 gm + Flax Seed Flour 15 gm.

Body and Texture indicates that T_2 had the highest score (9) followed by T_0 (6.4), T_1 (6.8) and T_3 (6.8), which provided crunchy, crispy texture when sensory panel member cracked at the time of testing, which was found most acceptable and delicious by the 5 sensory panel members due to balance proportion of White Rice Flour 20 gm+ Black Rice Flour 65 gm + Flax Seed Flour 15 gm. **Namitha *et.,al* (2019)** who reported that Cereals and grain incorporated "Sev" were crunchier and crispier. This type of characteristic is very good for consumer point of view. Therefore, fifty per cent grains flour sev was more acceptable than the traditional (control) sev.

Taste and Flavour indicates that T_2 had the highest score (9.0) followed by T_0 (6.1), T_1 (6.7) and T_3 (6.9), which seems slightly nutty and little bitter, crunchy and buttery flavour in mouthfeel which was more acceptable by sensory panel member due to balance proportion of White Rice Flour 20 gm+ Black Rice Flour 65 gm + Flax Seed Flour 15 gm.

Sensory Score of overall acceptability indicates that T_2 had highest Overall Acceptability in Colour and Appearance due to its golden brown colour, Body and Texture which provided crunchy and crispy texture, Taste and Flavour provided slightly nutty and little bit bitter flavour, which ascribed it more acceptable and delicious in the ratio of White Rice Flour 20 gm + Black Rice Flour 65 gm + Flax Seed Flour 15 gm by the Sensory Panel Members.

The sensory score of overall acceptability of value added *"Sev"* T_2 had the highest score (9.0) followed by T_0 (6.7), T_1 (6.6) and T_3 (7.0), respectively. The amount of the best treatment T_2 had 20 gm White Rice Flour+ 65 gm Black Rice Flour+ 15 gram Flax Seed Flour.

The statistical analysis carried out on different sensory parameters have shown that the calculated value of 'F' on 4 and 8 degree of freedom at 5% probability level, so it was found significant difference between control and treatments, regarding all sensory attributes such as Colour and Appearance, Body and Texture, Taste and Flavour and Overall Acceptability of the value added *"Sev"*. In relation to Colour and Appearance of calculated value "F" (617.42) due to treatments was higher than tabulated value of F (4.76). Therefore it indicated that there was significant difference in Colour and Appearance between the three treatments of *"Sev"* It compared against Critical Difference in the mean value of (T_1, T_0), (T_2, T_0), (T_2, T_1), (T_3, T_0) (T_3, T_2) was greater than CD (0.184), therefore the difference was significant.

 In relation to Body and Texture of calculated value "F" (97.81) due to treatments was higher than tabulated value of F (4.76). Therefore, it indicated that there was significant difference in Taste and Flavour between the three treatments of *"Sev"* It compared against Critical Difference in the mean value of (T_1, T_0), (T_2, T_0), (T_2, T_1), (T_3, T_0) (T_3, T_2) was greater than CD (0.545), therefore the difference was significant.

In relation to Taste and Flavour of calculated value "F" (160.9) due to treatments was higher than tabulated value of F (4.76). Therefore, it indicated that there was significant difference in Taste and Flavour between the three treatments of *"Sev"* It compared against Critical

Difference in the mean value of (T_1, T_0), (T_2, T_0), (T_2, T_1), (T_3, T_0) (T_3, T_2) was greater than CD (0.450), therefore the difference was significant.

In relation to Overall Acceptability calculated value of "F" (113.2) due to treatments was higher than tabulated value of F (4.76) Therefore, it indicated that there was significant difference in Overall Acceptability between the three treatments of *"Sev"* It compared against Critical Difference in the mean value of (T_1, T_0), (T_2, T_0), (T_2, T_1), (T_3, T_0) (T_3, T_2) was greater than CD (0.483) therefore, the difference was significant. It can be concluded that the average score for all parameters of sensory attributes of value added *"Sev"* differ significantly, which may be ascribed to different ratio of 20 gm White Rice Flour+65 gm Black Rice Flour+15 gm Flax Seed Flour in value added *"Sev"*.

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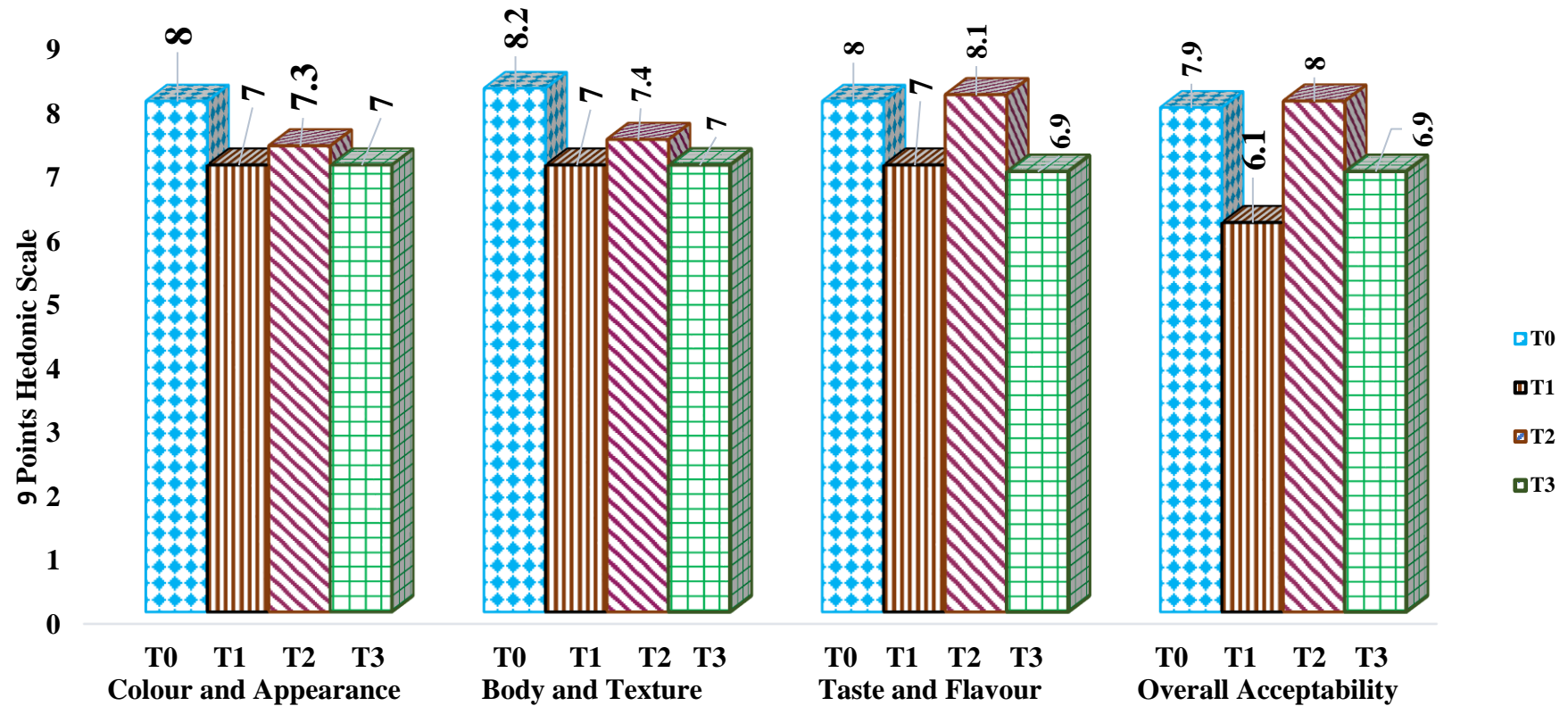
Figure no: 1 Average sensory scores of Control and Experimental Treatment value added *"Sev"*

Table no 2: Cost of the prepared value added food product namely "Sev"/100gm.

Ingredients	Actual rate/kg/L (Rs	T_0 Amt. (g))/min.	Cost (Rs)	T_1 Amt. (g)	Cost (Rs)	T_2 Amt. (g)	Cost (Rs)	T_3 Amt. (g)	Cost (Rs)
White Rice	28	100	2.8	30	0.84	20	0.56	25	0.7
Black Rice	170	-	-	60	10.2	65	11.05	70	11.9
Flax Seeds	115	-	-	10	1.15	15	1.72	5	0.57
Salt	22	2	0.04	2	2	2	0.04	2	0.04
Mustard oil	127	50ml	6.35	50ml	6.35	50ml	6.35	50ml	6.35
Fuel	95	20	19	20	19	20	19	20	19
Labour Charge	20	15	5	15	5	15	5	15	5
Total Amount (Rs.)			33.19		44.54		43.72		43.56

Table. no: 2 It is evident from above table the cost of the ingredients of *"Sev"* was T_0 is Rs. 33.19, T_1 is 44.54, T_2 is 43.72 and T_3 is 43.56 It is therefore concluded that the Control T_1 has the highest cost and T_0, T_2, T_3 had the lowest cost. This was due to the incorporation level of Black Rice Flour and Flax Seed Flour, which only marginally increased the cost of the prepared products.

Conclusion

Among all the experimented treatments T_2 has been highly scored (9) by the panel of judges on the basis of organoleptic properties followed by T_0, T_1, and T_3 respectively. The ratio found most acceptable treatments T_2 was 20 grams of White Rice Flour+65 grams of Black Rice Flour+15 grams of Flax Seed Flour. Due to the amount of flax seed flour and black rice flour integration, the cost was determined to be the minimum. Growing demand from consumers for food items that are affordable, secure, tasty, and nutritious continues to rise.

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