

Development of omega-3 rich food products using soybean and flaxseed

Mamta Jaiswal and Shalini Agrahari

The objective of present investigation “Development of omega-3 rich food products using soybean and flaxseed” was to standardize and develop the products using soybean and flaxseed and their organoleptic evaluation. Omega-3 polyunsaturated fatty acids play a crucial role in reduction of cardiovascular disease risk factors. Dietary source of omega-3 polyunsaturated fatty acid as eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) which include fatty fish (salmon and herring), linolenic acid can be obtained from vegetable oils (canola oil, soybean oil and olive oil), walnuts and pistachio. Omega -3 fatty acids improve endothelial function, reduce inflammatory process and ischemic heart disease. Regulation of influx and efflux of sodium and calcium ions through omega-3 fatty acids helps to prevent cardiac arrhythmia. Fish oil may enhance cardiac remodeling in heart failure. Linolenic acid is recommended for an individual without cardiovascular disease whereas at least 1 g per day of omega-3 polyunsaturated fatty acids should be consumed by patient with cardiovascular disease. Developed products of soybean and flaxseed were soybean halwa and soybean and flaxseed pancake. The organoleptic evaluation of products was done by using (9-Point Hedonic Scale). The result of soybean and flaxseed based 2 products for soybean halwa, soybean and flaxseed pancake (T₀) and (T₁) were best in all treatments in case of all sensory attributes.

Key Words : Omega-3, Polyunsaturated fatty acids, Cardiovascular disease, Eicosanoids, Soybean, Flaxseed

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INTRODUCTION

Omega -3 fatty acids are considered essential fatty acids. They are essential to human health but cannot be manufactured by the body. For this reason, omega-3 fatty acids must be obtained from food. Omega-3 fatty acids can be found in fish. Such as salmon, tuna, and halibut, other marine life such as algae and krill, certain plants (including purslane) and nut oils. Omega-3 also known as polyunsaturated fatty acids (PUFAs), omega-3 fatty

acids play a crucial role in brain function as well as normal growth and development. The American Heart Association recommends eating fish (particularly fatty fish such as mackerel lake trout, herring, sardines, albacore tuna and salmon) at least 2 times a week. Extensive research indicates that omega-3 fatty acids reduce inflammation and help prevent risk factors association with chronic diseases such as heart disease, cancer and arthritis. These essential fatty acids are highly concentrated in the brain and appear to be particularly important for cognitive (brain memory and performance) and behavioral function. In fact, infants who do not get enough omega-3 fatty acid deficiency include extreme tiredness (fatigue), poor memory, dry skin, heart problems, mood swings or depression and poor circulation.

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Objective :

- To develop the omega-3 fatty acid rich products.
- Organoleptic evaluation of developed products.

METHODOLOGY

The present investigation entitled “Development of omega-3 rich food products using soybean and flaxseed” was carried out to standardize soybean and flaxseed and its products. The study was conducted in department of food and nutrition, faculty of home science, Kamla Nehru Institute of Physical and Social Science, Sultanpur.

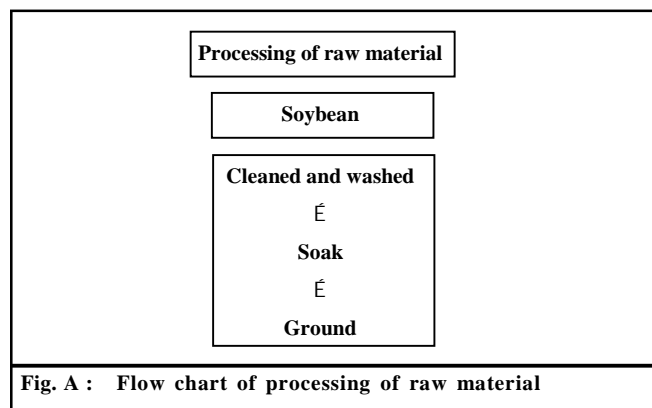
Justified, judicious and scientific methodological consideration is indispensable for any investigation to deduce meaningful interferences concerning the objectives of the study. The study design reflects to the logical manner in which units of the study are assessed and analyzed for the purpose of drawing generalizations. Thus, with the view of available resources, the best procedures for taking correct observation should be first sorted out in a logical manner so that unbiased interference can be drawn. This chapter delineates information pertaining to the research design and methodological steps used for investigation. The research procedure has been distinctly described as under in the following heads:

Procurement of material:

For the present investigation material i.e. soybean and flaxseed was produced from the local market of sultanpur city. The procuring was done in single a lot to avoid variation compositional differences so that the quality differences should be ruled out.

Processing of raw material:

Processing of the raw material is shown by flow chart (Fig. A).

**Method for the preparation of soybean Halwa :**

Wash the soybean with plain clean water and then soak it in plain water atleast 12 hours. Next day wash the soaked soybean again with plain water nicely and then transfer them to a mixer jar. Grind the soaked soybean into a fine paste. Now heat a thick based kadhai and add half of the total amount of *Desi Ghee* to it. Lower the flame to medium level. Then add the soybean paste to the kadhai and start stirring and ingredients from the base of the kadhai. Stir and cook in this manner for 15 minutes. While cooking add the remaining desi ghee to the kadhai and regular intervals. When the soybean paste is cooked well it will not stick to the walls of the kadhai and will attain pinkish colour with granular texture. At this moment add sugar and milk to it. Increase the flame to high level and stir and cook to mix all the ingredients. Cook in this manner until all the milk, getsoked up. Then add a little desi ghee to it and mix again. Transfer the hot and creamy soybean halwa to a serve in bowl. Garnish it with chopped dry fruits and serve hot (Table A).

Table A : Soybean Halwa		
Ingredients	Amount	
	Controlled (T ₀)	Experimental (T ₁)
Soybean flour		1 cup
<i>Desi Ghee</i>	½ cup	½ cup
Sugar	½ cup	½ cup
Dry fruits	2 tbsp	2 tbsp
Milk	½ cup	½ cup

Method for the preparation of soybean and flaxseed pancake :

Rinse the soybeans thoroughly and soak them in water for half an hour. After this remove the excess water and rinse them well twice with water. Now add these to the mixer jar along with water and grind to make paste. Transfer the paste to a bowl. If its to thick then add some water to it and prepare a thin batter same as required

Table B : Soybean and flaxseed pancake		
Ingredients	Amount	
	Controlled (T ₀)	Experimental (T ₁)
Soybean		1 cup
Oil	3-4 tbsp	3-4 tbsp
Green coriander	3-4	3-4
Potato	2	
Besan	2 tbsp	
Salt	½ tsp or to taste	½ tsp or to taste
Green chilly	2 finly chopped	2 finly chopped

for making dosa. Almost one cup of water is used for making this much of batter. Add salt, ginger paste, green chilly, and green coriander and mix every thing really well. Keep whisking for two minutes. Batter is now ready (Table B).

Roast the pancakes :

For preparing pancakes, heat a non stick tawa over flame. Grease tawa with some oil and pour to tsp batter over it. Keep the flame less and also tawa should be less hot. Now spread the batter evenly using a spoon in circular motion. Pour some oil all over the pancake and on the top as well. Cover and cook the pancake on medium flame for three to four minutes. Let it turn little brown in color from beneath. After four minutes, check the pancake from beneath. Pour some oil and flip the side cook the pancake as it is in open till it gets golden brown in color from this side as well. Take off the pancake from tawa when roasted from both the sides and place it on a plate. Similarly, prepare rest of the pancakes as well.

OBSERVATIONS AND ASSESSMENT

The data were collected on the different aspects per plan were tabulated and analyzed statistically. The result from the analysis presented and discussed chapter in the following sequence:

Organoleptic evaluation of soybean and flaxseed based product flavor and taste, body and texture, color and appearance and over all acceptability.

Table 1 shows that the experimental (T_1) obtained maximum 8.7, 8.6, 8.5, and 8.7 for flavor and taste, body and texture, color and appearance and overall acceptability; while control (T_0) 7.7, 7.7, 7.6, and 7.7 for flavor and taste, body and texture, color and appearance and overall acceptability, respectively. This indicated that the experimental (T_1) soybean halwa was found to be fallen under category of “liked very much to liked extremely” (Fig. 1).

Table 1: Organoleptic evaluation of soybean Halwa

Product	Flavor and taste	Body and texture	Color and appearance	Overall acceptability
T_0 - Controlled	7.7	7.7	7.6	7.7
T_1 - Experimental	8.7	8.6	8.5	8.7

Table 2 : Organoleptic evaluation of soybean and flaxseed pancake

Product	Flavor and taste	Body and texture	Color and appearance	Overall acceptability
T_0 - Controlled	8.2	8	7.8	8
T_1 - Experimental	9.0	9.0	9.0	9.0

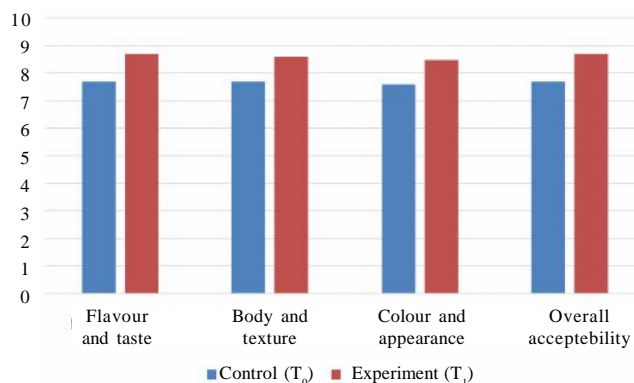


Fig. 1 : Mean overall acceptability of soybean Halwa

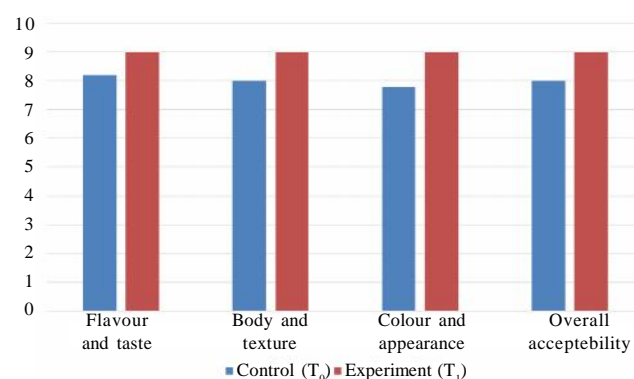


Fig. 2 : Mean overall acceptability of soybean and flaxseed pancake

Table 2 shows that the experimental (T_1) obtained maximum 9.0, 9.0, 9.0, and 9.0 for flavor and taste, body and texture, color and appearance and overall acceptability; while control (T_0) 8.2, 8, 7.8, and 8 for flavor and taste, body and texture, colour and appearance and overall acceptability, respectively. This indicated that the experimental (T_1) soybean and flaxseed pancakes was found to be fallen under category of “liked very much to liked extremely” (Fig. 2). Similar work related to the present investigation was also carried out by Angerer and von Schacky (2000); Calder (2001) and Melanson *et*

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