



INTERNATIONAL RESEARCH JOURNAL OF HUMANITIES AND INTERDISCIPLINARY STUDIES

(Peer-reviewed, Refereed, Indexed & Open Access Journal)

DOI : 03.2021-11278686

ISSN : 2582-8568

IMPACT FACTOR : 5.71 (SJIF 2021)

DEVELOPMENT & STANDARDIZATION OF NUTRIBAR FOR POST RECOVERY OF IMMUNE DEFICIENT COVID AFFECTED PATIENTS

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DOI No. **03.2021-11278686** DOI Link::<https://doi-ds.org/doi/10.2021-11278686>

Abstract:

The severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) and its mitigation responses are severely impacting people's lives and livelihood at an unpredictable scale. Existing nutritional challenges especially in Low- and middle-income group have been amplified due to pandemic situation. Present study aims at developing and standardizing nutribar for the post recovery of immune deficient Covid affected patients, Nutribar were formulated using different proportions of Oats, Cornflakes and honey along with various other ingredients such as Milk powder, Flax seeds, Almonds, ghee Gum acacia (edible gum) and Black raisins. The prepared samples were assessed for proximate analysis and sensory evaluation. From this assessment it was found that sample S2 was acceptable as compared to all other formulated samples. The proximate composition of S2 sample is Moisture 7.81 %, Protein 15.61 %, Fat 3.0 % Carbohydrate 64.38 %, Iron 3.9 %, Calcium 228.69 mg and Fiber 3.3 %. Hence it can be found that nutribar can be easily formulated using oats, cornflakes and honey by simple processing techniques which is packed with essential nutrients.

Introduction:

The recent outbreak of corona virus caused by SARS –CoV 2 (severe acute respiratory syndrome) is rapidly increasing the number of infected patients worldwide. The SARS –CoV 2 induced immune abnormalities may lead to infections by microorganisms, septic shock, and severe multiple organ dysfunction. It has been shown that SARS-CoV-2 disrupts normal immune responses,

leading to an impaired immune system and uncontrolled inflammatory responses in severe and critical patients with COVID-19.^[10] The risk of malnutrition of COVID-19 patients is related to chronic pathologies and the reduction of food intake caused by nausea, diarrhea, and the loss of appetite. The most common chronic conditions observed in COVID-19 patients are diabetes, chronic obstructive pulmonary disease, renal insufficiency, cardiovascular diseases, and dementia.^[3] In individuals infected with SARS-CoV-2, nutritional status is a crucial factor for optimal prognosis and can determine the clinical severity of COVID-19. Dietary supplementation with selected vitamins (e.g., A, B, C, and D), minerals (e.g., selenium, zinc, and iron), and omega-3 fatty acids was suggested by Zhang and Liu, as a treatment option for COVID-19 patients and as preventive therapy against lung infection.^[9] The present study aims at development of NutriBar for the post recovery of immune-deficient Covid affected patients. A nutri bar is a product containing one or more vitamins. Food bars may also contain wide variety of carbohydrates like monosaccharide, disaccharides, their hydrolytic products, among proteins; cereal proteins, vegetable proteins, animal proteins, whey proteins, egg proteins. A nutri bar consist of oats, cornflakes, milk powder, edible gum, ghee, flax seed, almonds, black raisins and honey.

Oats provide 389 calories and are an excellent source (20% or more of the Daily Value, DV) of protein (34% DV), dietary fiber (44% DV), several B vitamins and numerous dietary minerals, especially manganese (233% DV). Flaxseeds are Richest source of ω -3 fatty acid and also rich in antioxidant lignans^[9]. Gum Arabic is a water-soluble dietary fiber, rich in calcium, magnesium & potassium which help to treat kidney related disorders^[8]. It is a branched chain complex polysaccharide, either neutral or slightly acidic found as Mixed calcium, magnesium and Potassium salt of a polysaccharidic acid (Arabic acid) Milk powder provides bioactive constituents such as antioxidants, peptides, proteins, conjugated acids, linoleic acids, vitamins, oligosaccharides & organic calcium can be derived. These components provide health benefits such as hemodynamic, probiotic growth, GIT modulation and immune-regulation^[6].

Keeping in view, the nutritive and health promoting aspect of plant derivatives; present investigation is aimed to improve the nutritive as well as medicinal value of nutri bars that can be used as a nutritive food for post recovery Covid patients.

Objectives:

1. To develop healthy and nutritious trendy food for all age group people especially for pregnant and lactating women.
2. To provide a product with high biological value protein.

Materials and Methodology:

Materials:

Oats, cornflakes, milk powder, edible gum, ghee, flax seed, almonds, black raisins, jaggery, honey, glucose and maple syrup were purchased from the local market. Analytical grade chemicals were used for the chemical analysis and were purchased from the local suppliers

Methodology:

Formulation of Nutribar: 3 different formulations of varied composition of the ingredients were prepared. They are as per the

Ingredients	Control (g)	S1 (g)	S2 (g)	S3 (g)
Oats	60	60		40
Corn flakes	20	10	20	30
Milk powder	10	10	10	10
Edible gum	7	5	5	5
Ghee	5	4	3	5
Flax seed	5	5	5	5
Almonds	5	5	5	5
Black raisins	55	5	5	5
Honey	30	30	50	40

Table 1: Formulation of Nutribar:

3.1.2 Flowchart of preparation of control

Dry roast of oats, corn flakes, almonds

↓
Cool for 5 mins

↓
Grind coarsely

↓
Frying of edible gum in ghee

↓
Cool 5 mins

↓
Mixing of all dry ingredients

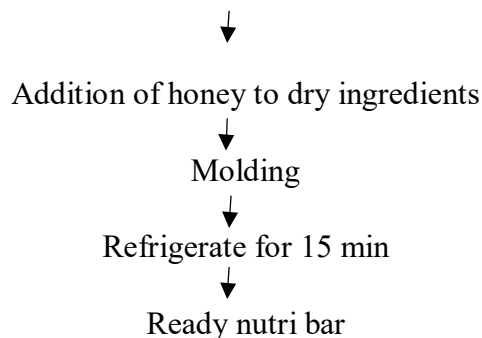


Fig 1: Flowsheet of control sample.

3.2.2 Flowchart of preparation of Nutribar:



Fig 2: Formulation of Nutribar

Sr. No	Constituents	Control	S 1	S 2	S 3
1	Moisture (%)	8	7.70	7.81	7.42
2	Protein (%)	12.3	14.5	15.61	14.78
3	Fat (%)	14.7	9.46	10	12.15
4	Ash (%)	2	1.63	1.8	1.88
5	Carbohydrate (%)	63.9	62.12	64.38	61.54
6	Crude fiber (%)	3.2	3.2	3.33	3.1
7	Calcium (mg)	-	220.03	228.69	223.52
8	Iron (mg)	-	2.8	3.9	2.5
9	Potassium (mg)	-	82.37	87.5	84.39
10	Energy (Kcal/100g)	413.1	437.1	409.3	414.63

Table no 2: Proximate Analysis of Formulated nutribar

Proximate Analysis of control and Nutribar:

Moisture, Protein, Fat, Carbohydrate, Crude fiber, Ash, Calcium, Iron and Potassium were determined by standard A.O.A.C methods.

Organoleptic Evaluation:

A semi-trained panel evaluated the samples for colour, flavour, taste, texture and over all acceptability using the nine- point hedonic scale.

Result and Discussion:

Proximate Analysis:

The data with respect to different formulation with respect to chemical composition of the Nutribar is as per table no 2.

Moisture: The data presented in table 2. reveals that moisture content of the control sample was found to be higher as compared to other samples. Whereas the moisture of S3 sample is found to be lowest. The moisture content of S1 and S2 are 7.70 and 7.81 % respectively.

Protein: The highest protein content was found in the Nutribar sample S 2. The increased content of protein in Nutribar is due to the incorporation of oats and cornflakes. Whereas lowest protein content is found to be in Control sample. The protein content in sample S1 and S3 is found to be 14.5 and 14.78 respectively.

Fat: From the mentioned table no 2, It could be revealed that fat content of control sample was found to be higher (14.7) than other samples because of the higher amount ghee added to the control. The lowest fat content can be seen in the S2 sample i.e., 10 % and the fat content in S1 and S3 sample is 9.46 and 12.15 % respectively.

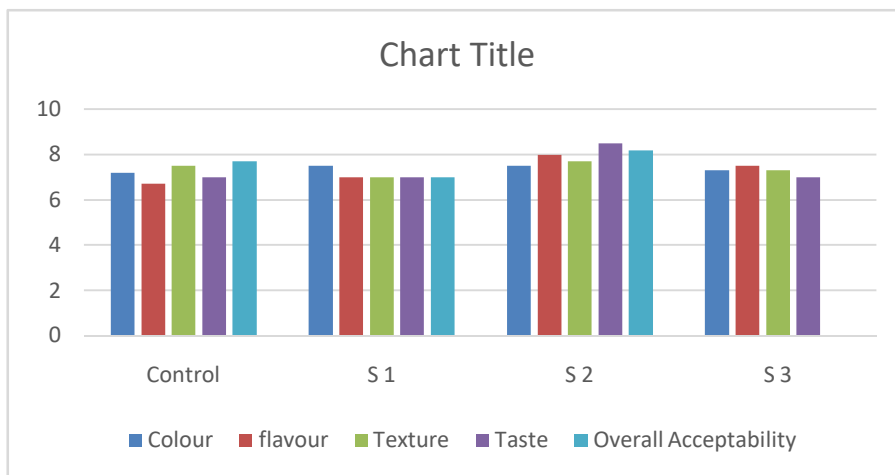
Crude fiber: Data from table no 2, It could be revealed that Crude fiber content of S 2 sample was found to be higher i.e., 3.33 than other samples. The lowest crude fiber content can be seen in the S 3 sample i.e., 3.1% and in S1 and Control sample contains 3.2 %.

Calcium: It was revealed from data of table no 2 that the calcium content of the S 2 sample is found to be highest i.e., 228.69 than the other formulated samples.

Iron: The iron content in the sample is found to be highest in the sample in the sample S2 than the other formulated samples. The S1 and S3 samples contain 2.8 and 2.5 mg respectively.

Organoleptic evaluation of Nutribar:

Sensory evaluation of prepared Nutri bar with different levels of various ingredients was carried out by panel of semi-trained judges consisting of 10 members by using 9-point hedonic scale and sensory score were summarized in the following graph1.



Graph 1. Sensory evaluation of Nutribar.



Fig 3. Pictorial representation of Formulated nutri bar.

Colour: The colour indicates the fitness of the Nutribar for the consumption and this is the preliminary parameter for acceptance of food. The highest score for colour of Nutribar was same for S1 and S2 sample (7.5) and lowest score was found in the control sample (7.2)

Flavour: Flavour is the combination of taste, smell and aroma. Graph 1 revealed that the nutri bar S2 secured the maximum score (8.0) as compared to other samples, whereas the control sample secured the least score (6.7)

Taste: It is revealed from the graph 1 that the taste of sample S2 secured the maximum score (8.5) among the panelist members whereas the control, S1 and S2 sample secured the same score (7.0)

Texture: Texture refers to those qualities of food that can be felt with the fingers, tongue, palate or teeth. The result from graph 1 shows that the texture of nutri bar S2 secured the maximum score (7.7) and the lowest score was found it sample S1 (7.0) Control sample and S3 sample secure 7.5 and 7.3 respectively.

Overall acceptability:

Overall acceptability is acceptance of panelist regarding the overall sensorial attributes. The nutri bar sample S2 secured the maximum score (8.2) whereas the sample S1 secured the least score (7.0). The control sample and the sample S2 were graded overall acceptability as 7.7 and 7.3 respectively.

Conclusion:

The research study titled "Development and standardization of Nutribar for post recovery Covid patients" was carried out with the objectives of successfully developing the product and assesses acceptability of the product developed. It can be concluded from above results of present findings that the quality of Nutribar S2 can be prepared by using oats, corn flakes, flax seeds, honey, jaggery, almonds, ghee and gum acacia ingredients. According to the organoleptic qualities, fortified bar was excellent followed by nutritional quality particularly protein- 15.61%, fat – 10%, crude fiber 3.33%, carbohydrates- 64.38%, Iron 3.9 mg and calcium – 228.69 mg. Moreover, the process is techno economically feasible and can be explored on commercial levels.

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