International Journal of Food Science and Nutrition
www.foodsciencejournal.com
ISSN: 2455-4898
Received: 25-01-2024, Accepted: 17-02-2024, Published: 11-03-2024
Volume 9, Issue 1, 2024, Page No. 59-62

Studies on formulation and quality evaluation of Instant Nutri Kheer Mix

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Abstract
Studies on formulation of Instant Nutri kheer mix were successfully done. Ragi is rich in Calcium content and Oats rich source of dietary fibers. It is responsible for reduction of insulin and glycemic indices. All the dry ingredients are ground in fine powder and mix well for preparation of instant Nutri kheer mix. Ragi and Oats are used for preparation of various formulation of instant Nutri kheer mix. Among the prepared 3 samples, Sample T3 prepare having superior qualities as compare to sample T1 and T2. The Instant Nutri kheer mix product has chemical composition such as Ash (2.6 %), Moisture (3.6 %), Fat (7.6 %), Carbohydrate (69.85 %), Protein (17.5 %) and Energy (417.8 Kcal). It was concluded that the instant Nutri kheer mix can be stored in Aluminum pouches or HDPE pouches at room temperature for 3 months. So the Instant Nutri kheer mix can satisfy the consumer in acceptance quality.

Keywords: Ragi, oats, value addition, sensory evaluation, quality analysis, aluminum pouch, storage study

Introduction

Kheer is a delicious Indian dessert which is popular throughout the country and enjoyed by the all of the society. Conventionally it is prepared by partial whole milk powder, Sugar powder and Rice powder. Because of change in food habits and life style of people convenience food Ready to eat or Ready to serve foods and ready mixes for different food products are gaining popularly. (Kadam *et. al.,* 2011) [5].

Kheer is rice – based sweetened dairy dessert immensely popular in the Indian sub-countries and Middle-East countries. It is obtain by cooking pre-soaked rice in the boiling milk with simultaneous concentration that leads to a reasonably thick consistency ranging from a viscous fluid to a semi-solid rice pudding- like (UK, USA) and Amazake-like (Japan) milk-rice dairy dessert. It is often garnished with raisins, cashew nuts, pistachios or almonds and flavored with cardamom, saffron etc. (Borad *et al.,* 2017) [2].

Kheer is a traditional Indian dairy product. It occupies a special position in Indian Diet due to high nutritional and sensory properties, from the ancient time. The Hindu Kheer is derived from Sanskrit word 'Ksheer' for milk and 'Kshrika' for any dish prepared with milk. Kheer is popular all over the country, as a pre-eminent milk delicacy. It has been associated with festivities and celebrations from the time immemorial. Kheer is Known by different names in different parts of the country, such as 'Kheer' is North Western region, 'Payasam' Southern region, 'Payas' in Eastern region, 'Phirni' in Northen region and 'Kheech' in Mewar region of Rajastan. (Mukhekar *et. al.,* 2019).

Kheer has been known to mankind since times immemorial. It was used as sweet dish at all the ceremonial occasions and festivals and is relished by all age groups thought to be a very nutritious food. It is closely resembles "rice pudding" a popular desert in the United states and in North and Central Europe. (Mukhekar *et. al.,* 2019)

Kheer or Payasam is an extremely popular heat desiccated cereal based, sweetened indigenous milk product. In addition to the milk nutrients, Kheer also contains nutrients from rice, sugar and other additives. Sadly, as is the case with other indigenous milk products, concrete attempts have been lacking in developing a large-scale production process of manufacture. A big thrust in the research and development is evident in the last decade or so in this direction. (Sarode *et. al.,* 2007).

Ragi is one of the rich sources of nutrient compared to other cereal crop. It contain Moisture content about (12%), Dietary fiber (18%), Protein (9.8%), Carbohydrate (81.5%), Starch (65-75%), Fat (1-1.7%), Minerals (2.7%), and Crude fiber (4.3%) that equivalent to other millets and cereals. It is also rich source of Calcium (344 mg), Phosphorous (283 mg), Iron (3.9mg), Vitamin B and Vitamin E and other Micronutrient. It contains Anti-nutritional factor such as Tannins (0.04-3.47%), Phytate (0.48%), Oxalate (0.36%) and Polyphenols. Tannin protect our body against cell damage through neutralizing chemicals. Tannin have Antimicrobial and Anticancer property. Excess amount of Tannin content leads to reduce the Iron intake in diet which ultimately lower down the nutritional profile of grain. Because of regular intake as staple food Ragi has various health benefits such as regulating the proper blood glucose level, wound healing is impaired in diabetic patient. It contain Tryptophan which control our appetite, keep weight under control. Ragi contain high Calcium and Iron and because of that it can strengthen body bones (Rathore *et al.,* 2019).

Oats are unique among the cereals; one of the rich sources of dietary fibers among cereals belongs to the Poaceae family like all other grain varieties Butt *et al.,* (2008). Oats are generally considered ―healthy", being touted commercially as nutritious which has led to wider appreciation of oats as human food. Oat grout or whole grains (after removal of hull) contain all three parts of the grain – the germ, endosperm and bran, rich in all valuable nutrients. A high intake of dietary fibre is positively related to several preventive medical and nutritional effects (Spiller

2001) e.g. Dietary fibre complex with its antioxidants and other phytochemicals is most effective against cardiovascular disease and some types of cancer, lowering lipid levels (Jacobs et al. 1998a; Jacobs et al. 1998b; Jacobs et al. 1998; Slavin et al. 2000; Thompson 1994). Mineral content which is 2- 3% in oat include phosphorus, potassium, magnesium, and calcium as main components as in other cereal.

Material & Methods

Procurement of Raw Material

Raw materials required during present investigation were procured from local market of Saralgaon such as Oats, Ragi, Dairy whitener, Sugar, cashew, almond and cardamom etc. Most of the chemicals and equipments used in this investigation were of analytical grade which are obtained from College of Food Technology Saralgaon, Thane.

Physical Properties of Instant Nutri Kheer Mix

The colour of Instant Nutri Kheer Mix was determined by visual observations; the Bulk density of Instant Nutri Kheer Mix was measured by measuring cylinder. The Texture of Instant Nutri Kheer Mix was determined by Texture meter.

Chemical Properties of ingredients and Instant Nutri Kheer Mix

Proximate composition such as moisture, ash, crude fat, crude protein and crude fiber of all the Ingredients and Crackers incorporated with quinoa Seed was determined according to the procedures given in AOAC (2000). For moisture determination samples were dried in oven at 130ºC for 60 minutes. For ash determination samples were placed in muffled furnace at 550ºC to burn out all carbon compounds leaving in organic part (ash). Fat was determined by fat extraction unit by using n. Hexane. For fiber determination, samples were treated with 1.25% Sulphuric acid and Sodium Hydroxide solution. After filtration of digested material it was washed with hot water and then ignited. By calculating loss of weight after ignition, crude fiber contents were determined. Protein contents were determined by using Kjeldahls unit.

Sensory Evaluation of Instant Nutri Kheer Mix

Prepared product were evaluated for sensory characteristics in terms of appearance, color, flavor, aftertaste, texture and overall acceptability by 10 semi-trained panel members comprised of academic staff members using 9- point Hedonic scale. Judgments were made through rating the product on a 9 point Hedonic scale with corresponding descriptive terms ranging from 9 ‘like extremely’ to 1 ‘dislike extremely’. The obtained results were recorded in sensory score card.

Statistical Analysis of Instant Nutri Kheer Mix

The analysis of variance of the data obtained was done by using completely randomized design (CRD) for different treatments as per the method given by Panse and Sukhatme (1967). The analysis of variance revealed at significance of $p<0.005$ level S.E and C.D. at 5 percent level is mentioned wherever required.

Formulation of Instant Nutri Kheer Mix

Table 1

Ingredients	Treatments			
	T0	T1	T2	T3
Oats	0g	25g	20g	15g
Ragi	0g	5gm	10gm	15gm
Sugar powder	0 g	30 g	30 g	30 g
Dairy Whitener	0 g	30 g	30 g	30 g
Cashew Nut Powder	0 g	3 g	3 g	3 g
Almond Powder	0 g	3 g	3 g	3 g
Coconut Powder	0 g	3 g	3 g	3 g
Cardamom Powder	0 g	1 g	1 g	1 g

Where,

T0: Kheer prepared by conventional method. (Control sample)
T1: Oats 25g + Ragi 5g
T2: Oats 20g + Ragi 10g
T3: Oats 15g + Ragi 15g

Kheer prepared with incorporation varying in Oats and Ragi were investigated. The formulation was made by Sugar Powder, Dairy Whitener and other Oats and Ragi Powder *viz.*, 30:30:30 percent respectively and 10 percent of Almond-Cashew-Coconut Powder. Sample T3 was organoleptically acceptable and used for further study.

Process of Instant Nutri Kheer Mix

Sugar Powder, Dairy Whitener and Oats-Ragi powder
↓
Addition of other ingredients
↓
Mix all Ingredients Properly
↓
Packaging
↓
Storage

Preparation of Nutri Kheer Mix

For preparation of Kheer from Nutri Kheer Mix Powder use 300ml of water for 100gm Instant Kheer mix. Boil water on low gas flame by the addition of Instant Kheer mix and then keep boiling these mixtures for 10 to 12 min.

Results and Discussion

Physical properties of instant Nutri kheer mix

Table 2

Parameters	Instant Nutri Kheer Mix
Colour	Brownish
Texture	Soft and Fine
Bulk Density	0.6 g/L

Instant Nutri Kheer Mix was Brownish which was determined by visual observation. The texture of Instant Nutri Kheer Mix is soft and fine. Bulk Density of Instant Nutri Kheer Mix is 0.6 g/L.

Chemical properties of instant Nutri kheer mix

Table 3

Parameters	Instant Nutri Mix (T_3)
Ash	2.6 %
Moisture	3.6 %
Fat	7.6 %
Protein	17.5 %
Carbohydrate	69.85%
Energy	417.8 kcal

The data on chemical properties of Instant Nutri Kheer Mix viz. moisture, fat, protein, ash, Carbohydrate and Energy was carried out and the results obtained were Moisture content in Instant Nutri Kheer Mix was found to be (3.6%), Fat (7.6%), Ash (2.6%) Protein (17.5%), Carbohydrate (69.85%) Energy (417.8%) respectively, it concluded that Instant Nutri Kheer Mix rich in Protein.

Sensory Evaluation

Sensory Evaluation of Instant Nutri Kheer

Table 4

Sample	Colour	Flavour	Taste	Consistency	Appearance	Overall Acceptability
Control(T_0)	8	8	9	9	9	8.6
T_1	7	8	8	7	7	7.4
T_2	7	7	8	7	7	7.2
T_3	9	9	8	9	9	8.8

In the sensory evaluation of prepared 4 formulation of Instant Nutri Kheer Mix i.e T0, T1, T2 and T3.The sample T3 is more acceptable as compared to sample T1 and T2 by the panel members. The sample T3 which prepared by the Ragi and Oats have the effective colour and consistency than the sample T2 and T3 which prepared. T3 sample also get highest score than other sample. The overall acceptability of sample T3 was 8.8 points while other samples points are T0 (8.6), T1 (7.4), T2 (7.2).

Conclusion

Conclusively, it emerges that the formulation and standardization of recipe for Instant Nutri Kheer Mix was carried out successfully prepared by using Ragi and Oats powder, Sugar Powder, Dairy Whitener and other ingredients. The health benefits of Oats and Ragi products having some enrichment. As regards the organoleptic qualities of Instant Nutri Kheer prepare from Kheer Mix was excellent followed by nutritional quality particularly protein, Carbohydrate and energy content increased in Instant Nutri Kheer Mix. This type of value addition by way of nutrient/enrichment does certainly help to provide good source of carbohydrate and energy. So, the product can be satisfy the consumer in accepts and quality.

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