The Pharma Innovation Journal 2021; 10(1): 356-359

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2021; 10(1): 356-359

www.thepharmajournal.com
Received: 19-10-2020
Accepted: 21-12-2020

VB Khomane
MSc Agri Dairy Science, Rajarshee Chhatrapati Shahu Maharaj, College of Agriculture, Kolhapur, Maharashtra, India

DK Kamble
Professor, Mahatma Phule Krishi Vidyapeeth Rahuri, Maharashtra, India

KB Kamble
Ph.D. Dairy Science, Mahatma Phule Krishi Vidyapeeth Rahuri, Maharashtra, India

KB Kubade
MSc Agri Dairy Science, Rajarshee Chhatrapati Shahu Maharaj, College of Agriculture, Kolhapur, Maharashtra, India

SH Shinde
MSc Agri Dairy Science, Rajarshee Chhatrapati Shahu Maharaj, College of Agriculture, Kolhapur, Maharashtra, India

Corresponding Author:
VB Khomane
MSc Agri Dairy Science, Rajarshee Chhatrapati Shahu Maharaj, College of Agriculture, Kolhapur, Maharashtra, India

Selection of garden cress seeds form for preparation of garden cress seeds *Burfi*

VB Khomane, DK Kamble, KB Kamble, KB Kubade and SH Shinde

Abstract
Burfi is one of the highly nutritious *khoa* based indigenous milk products. A number of ingredients incorporated in *Burfi* to enhance acceptability of *Burfi.* Considering the nutritional importance and health benefits of garden cress. The present investigation was aimed to incorporate garden cress (*Lepidium sativum* L.) in *Burfi*. It is a rich source of Iron. and it used in curing many health problems such as hypertension, Kidney diseases, prevention of cancer and mild glycemia. Therefore here an attempt was made to develop protocol for utilization of Garden cress for preparation of *Burfi*. Garden cress was added in seven different forms *viz*., Whole garden cress seeds power (A), Roasted garden cress seeds powder (B), Microwave processed garden cress seeds powder (C), Garden cress seeds in paste form (D), Boiling with tray drying garden cress seeds powder (E), Whole garden cress (F) and Sprouted garden cress seeds powder (G). Initially the form and level was optimized on the basis of sensory evaluation. It was found that the *Burfi* prepared by addition of microwave processed garden cress seeds powder had obtained maximum scored among other six forms under study and this selected form had scored 7.95, 8.10, 8.00 and 8.01 for colour and appearance, Body and texture, Flavour and overall acceptability respectively. Consumers as a whole liked the product liked 'very much' with an average score of 8.01.

Keywords: *Burfi*, garden cress, sensory evaluation

Introduction
Importance of milk in human nutrition has been universally recognized. Nutrition scientist and dieticians have recommended minimum level of milk and milk product to be included in the items of daily consumption. As per the ICMR every person should consume at- least 283 g milk/day. Milk is one of the important foods with high nutritive value. It supplies body building proteins, bone forming minerals and energy giving lactose and milk fat. India has emerged as the highest milk producing country in the world. Milk has unique position in the diet of almost people in the world. The milk production of India is 176.35 MT during 2017-18, out of the total milk produced in India 46.00% consumed as liquid milk and 54.00% is converted into products.

Khoa is one of the most important heat desiccated product, it is used as the base material for a large variety of sweet delicacies. The *khoa* and *khoa* based sweets have high commercial significance because of their popularity throughout the country and longer shelf life. *Khoa* retain more vitamin A (581.721 U/100g) along with B_2 (622.85 µg/100g) B_6 (85 µg/100g), folic acid (0.68 µg/100g) and vitamin C (5.42 µg/100g). *Khoa* prepared from whole buffalo milk on an average contains total solid as 78.4 per cent, fat as 30.5 per cent, protein as 17.70 per cent, lactose as 30.90 per cent and ash 5.90 per cent (Aneja *et al*., 2002) [3].

Burfi is popular milk based confection in India and likely to attain global status. *Burfi* is one of the highly nutritious *khoa* based indigenous milk products, prepared from cow or buffalo milk, as it contains a considerable amount of milk solid. Several varieties of *Burfi* are sold in market depending on the additives present *viz*., Plain, Mava, Pista, Nut, Chocolate, Coconut and Rava *Burfi* etc. A lot of variation can be observed in physical attributes of market samples. However, good quality *Burfi* is characterized by moderately sweet taste, soft and slightly greasy body and smooth texture with fine grains (Kamble *et al*. 2010).

Garden cress (*Lepidium sativum*) belonging to Cruciferae family. It is a fast growing annual herb that is native to Egypt and west Asia and presently it is cultivated in all over the world. In local language Garden cress is called *Ahaliw*. It has been used as an important medicinal plant since Vedic era. Garden cress seed possesses several of pharmacological properties like anti-anemic, antioxidant, galactogogues, etc. and has tremendous potential for the development of functional food by fortification with it.

Generally it is used as cooking material and with salad. Its seed, oil and powder contain significant amount of protein, fats, minerals, fiber and phytochemicals, which are incorporated in many functional beverages and food. Garden cress seed is rich source of iron which is easily absorbed in intestine and helps to increase haemoglobin level in blood (Singh *et al*. 2017) [11].

Garden cress seed has been used in curing many health related such as hypertension, Kidney diseases, prevention of cancer and mild glycemia. It is widely used to heal fractures and to increase milk secretion during lactation. Garden cress seed oil helps in preventing coronary heart diseases. Garden cress seed can be divided into two major fractions i.e. endosperm (72%) and bran (28%). Chemical composition of endosperm, bran and whole meal of Garden cress seed (in %) is given in following table.

Table 1: Chemical composition of endosperm, bran and whole meal of Garden cress seeds

Nutrients/Chemicals	Whole meal	Endosperm	Bran
Moisture	4.14	2.58	4.27
Protein	22.47	27.74	12.58
Fat	27.48	33.06	6.34
Ash	4.65	4.06	6.19
Crude fiber	7.01	4.00	14.29
Insoluble fiber	28.49	13.10	74.07
Soluble fiber	1.51	0.50	0.93
Iron (mg/100g)	7.62	8.31	6.61

Seed is high in fiber content, which suggests its usefulness in the treatment of constipation and diabetes (Prajapati *et al*.2018) [10]. The Garden cress seeds consist of 6.5 to 15 per cent of mucilage, which contains cellulose 18.3 per cent and uronic acid containing polysaccharides. Plant mucilage is also used for thickening, binding, disintegrating, emulsifying, suspending, stabilizing and as gelling agent. (Behrouzian *et al*. 2014) [4]. Considering the nutritional importance of garden cress, the effort has been made to utilized it in the preparation of *Burfi*.

Materials and Methods

The present investigation was carried out at the Division of Animal Husbandry and Dairy Science, Rajarshee Chhatrapati Shahu Maharaj College of Agriculture, Kolhapur. The whole fresh clean buffalo milk was obtained from dairy farm RCSM College of Agriculture, Kolhapur. Good quality of cane sugar was procured in single lot from local market of Kolhapur city. Garden cress was procured in single lot from local market of Kolhapur city and stored under room temperature.

Methodology

Preparation of forms of Garden cress

Whole garden cress seeds power

Garden cress were sundried and hand sorted to remove wrinkled, moldy seeds and foreign materials. Then they were ground in mixer equipped with stainless steel blade and stored in air tight container.

Roasted garden cress seeds powder

Garden cress seeds were roasted in a griddle and ground in a mixer equipped with stainless steel blade.

Microwave processed garden cress seeds powder

Garden cress was procured in single lot from local market of Kolhapur city and hand sorted to remove wrinkled, moldy seeds and foreign material. Then Garden cress seeds were kept in a Hot air oven at 130 ℃ for 18 minutes. They were cooled and processed through grinder equipped with stainless steel blade.

Garden cress seeds in paste form

Garden cress were sundried and hand sorted to remove wrinkled, moldy seeds and foreign materials. Then they were ground in mixer equipped with stainless steel blade also water was added during grinding.

Boiling with tray drying garden cress seeds powder

Garden cress seeds washed with potable water then seeds were boiled in excess potable water for 15min at 95 ℃. These were then cooled to room temperature and then excess water was drained off. The boiled seeds were again washed with excess potable water. Finally washed seeds dried in tray drier at 40 ℃ for 10-14 h. The dried seeds were ground to powder were stored in glass bottle.

Whole garden cress

Garden cress was procured in single lot from local market of Kolhapur city and hand sorted to remove wrinkled, moldy seeds and foreign material. Then stored at room temperature and directly used for preparation of *Burfi.*

Sprouted garden cress seeds powder

Garden cress seeds were pour in potable water for 2 h then water was removed and seeds were wrapped in cotton cloth for 8-9 h for sprouting. Then it removed from cloth and dried in oven at 65-70 ℃ for 2h. for powder preparation. Then stored in air tight container.

Preparation of garden cress *Burfi*

The Garden cress *Burfi* was prepared as per the method suggested by Aneja *et al*. (2002) [3] for preparation of plain *Burfi* with certain modification. Initially buffalo milk was taken and filtered through muslin cloth, then the milk was standardized to 6 per cent fat.

The standardized milk was then transferred in open pan/karahi over a brisk fire. The milk was stirred continuously and side of karahi was also scrapped to avoid any scorching or charring of milk solids at the bottom of karahi. Vigorous stirring with the help of stirrer was accomplished by scrapping process till the product reached pasty consistency, then temperature was lowered. As the product reached pat formation stage (i.e. leaving the sides of karahi), Various forms of garden cress seeds was added @ 1 per cent and sugar @ 8 per cent of milk, respectively. The contents were properly mixed and worked on gentle heat for about 5 to 8 minutes to get desired consistency. The product was taken off the flame, transferred into a tray (30x30x1.5 cm) and was

allowed to cool and set at room temperature in hygienic condition till it became slightly hard.

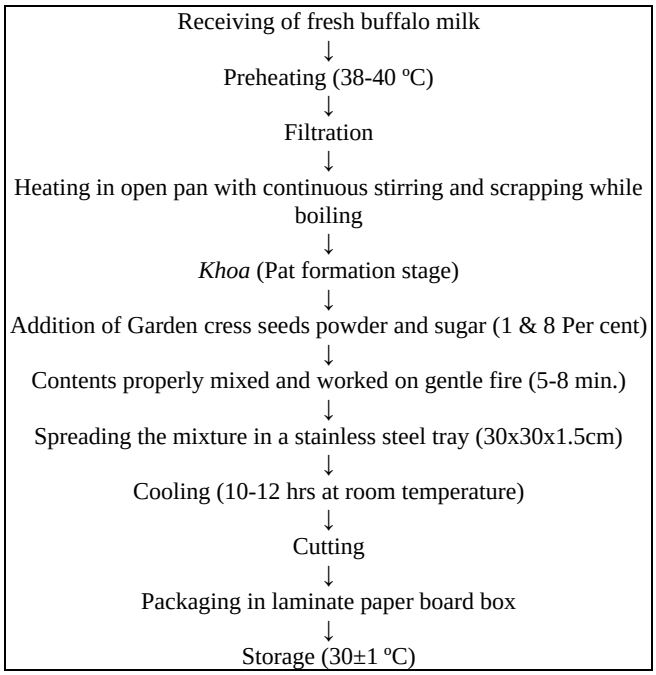

Fig 1: Flow diagram for preparation of Garden cress *Burfi*.

All these seven treatment combinations were analysed for sensory qualities and one best was selected.

Sensory Evaluation of garden cress *Burfi*

Sensory evaluation of fresh and stored garden cress *Burfi* samples was carried out by a semi trained panel of five judges from the Division of Animal Husbandry and Dairy Science and Division of Horticulture. The flavour, colour and appearance, body and texture and overall acceptability was assessed by using 9-point Hedonic scale (Amerine *et al*. 1965) [2].

Statistical Analysis

To generate meaningful inferences, the data of storage samples were analysed using (CRD) Completely Randomized Design and (FCRD) Factorial Completely Randomized Design (Snedecor and Cochran, 1994) [12].

Results and Discussion

Effect on colour and appearance score

Colour and appearance gives first impression about any food product and thus plays an important role in deciding the consumer's acceptability of the same. From the Table 2 it is clear that the colour and appearance score of *Burfi* spread was significantly (P<0.05) affected by the forms of garden cress. The colour and appearance score for various forms of garden cress was ranged from 6.78 to 7.95 respectively. The maximum score (7.95±0.03) was obtained to *Burfi* containing microwave processed garden cress seeds powder form. The panel of judged comments that there is dark brown colour to roasted form of *Burfi*, whole garden cress *Burfi* also liked very much but it rejected due to uneven distribution of seeds it created problem during analysis while microwave processed (C) was better in colour and appearance as compared to other. Yadav *et al*. (2018) [13] reported that there was colour and appearance score of *Burfi* decreased with increased level of peanut powder. However treatment C and E are non-significant to each other and both were equally accepted according to colour and appearance score. Agrwal N. and Sharma S. (2013) [1] also studied the sensory attributes of microwave processed garden cress in *mathri* product.

Effect on body and texture score

Body and texture are the second most important characteristics that determine the consumer's acceptability of any food product. The body and texture score of garden cress *Burfi* as affected by the forms of garden cress was indicated that there was more or less significantly different. The body and texture score was ranges from 6.69±0.11 to 8.10±0.09. The maximum score recorded for treatment C and minimum score recorded for treatment D. The comments of judge on *Burfi* prepared in the form of paste(D), boiling with try drying(E), sprouting (G) had sticky and moist. It may also because of more percentage moisture in the product. Agrwal N. and Sharma S. (2013) [1] investigated that *mathri* product prepared by using microwave processed garden cress seed powder had highest body and texture score as compared to other form. Chaudhary *et al*. (2019) [5] studied on the aloe vera juice incorporated *Burfi* at 0 to 100ml on khoa weight basis and concluded that increase the score by addition of aloe vera juice up to 50ml then scores was decreased.

Effect on flavour score

Flavour of any food product is perhaps the most important and basic sensory perception that appeals to the consumer and affects its acceptability. The flavour score of garden cress *Burfi* was also affected due to the various forms of garden cress and it was significant (P<0.05). Panel member liked the taste of version C they were followed by version B, F, E, A, G and D The maximum score (8.00±0.07) for flavour recorded for *Burfi* prepared by using microwave processed powder, whereas minimum score (6.91±0.09) *Burfi* prepared with paste form of garden cress. The lowest score for D may be because of bitter flavour which is not expected in *Burfi*. Kamble *et al*. (2019) [6] investigated that increased level of paste form of green chickpea above 4 percent there was decreased the flavour score. Mohite *et al*. (2012) [8] prepared health drink by using garden cress seed powder and reported that flavour score was reduced with increase in level of garden cress seed powder.

Effect on overall acceptability score

The data pertaining to forms of strawberry on overall acceptability are depicted in Table 2 and fig 2. It was observed that overall acceptability score was significantly (p<0.05) affected by the forms of garden cress. Form C was most liked by panel member while form E got a place after C. They were followed by F, B, A, G and D. Significant difference was found between all forms of garden cress. From the above results it clearly seen that the prepared by the addition of the microwave processed garden cress seed powder had maximum score for the all the sensory parameters over all other forms under study. Mohite *et al*. (2012) [8] reported that the health drink prepared by adding 3% garden cress seed powder had overall acceptability score was highest. From the above discussion of table no.2 it is concluded that, use of garden cress in microwave processed garden cress seed powder form result in the maximum sensory perception. Hence this form was added in further trial.

Table 2: Effect of garden cress Form on sensory qualities (score*) of *Burfi*

Treatments	Sensory attributes			
	Colour and appearance	Body and Texture	Flavour	Overall acceptability
A	$7.60^{d}\pm0.12$	$7.31^{c}\pm0.07$	$7.51^{c}\pm0.13$	$7.47^{c}\pm0.12$
B	$7.40^{c}\pm0.07$	$7.50^{d}\pm0.10$	$7.99^{f}\pm0.06$	$7.63^{d}\pm0.09$
C	$7.95^{f}\pm0.03$	$8.10^{g}\pm0.09$	$8.00^{g}\pm0.07$	$8.01^{g}\pm0.07$
D	$6.78^{a}\pm0.05$	$6.69^{a}\pm0.11$	$6.91^{a}\pm0.09$	$6.79^{a}\pm0.10$
E	$7.93^{f}\pm0.09$	$7.98^{f}\pm0.06$	$7.75^{d}\pm0.03$	$7.88^{f}\pm0.06$
F	$7.71^{e}\pm0.04$	$7.81^{e}\pm0.04$	$7.83^{e}\pm0.11$	$7.78^{e}\pm0.02$
G	$7.12^{b}\pm0.08$	$6.90^{b}\pm0.05$	$7.31^{b}\pm0.09$	$7.11^{b}\pm0.08$
SE(m)	0.04	0.038	0.048	0.034
CD	0.12	0.11	0.14	0.10

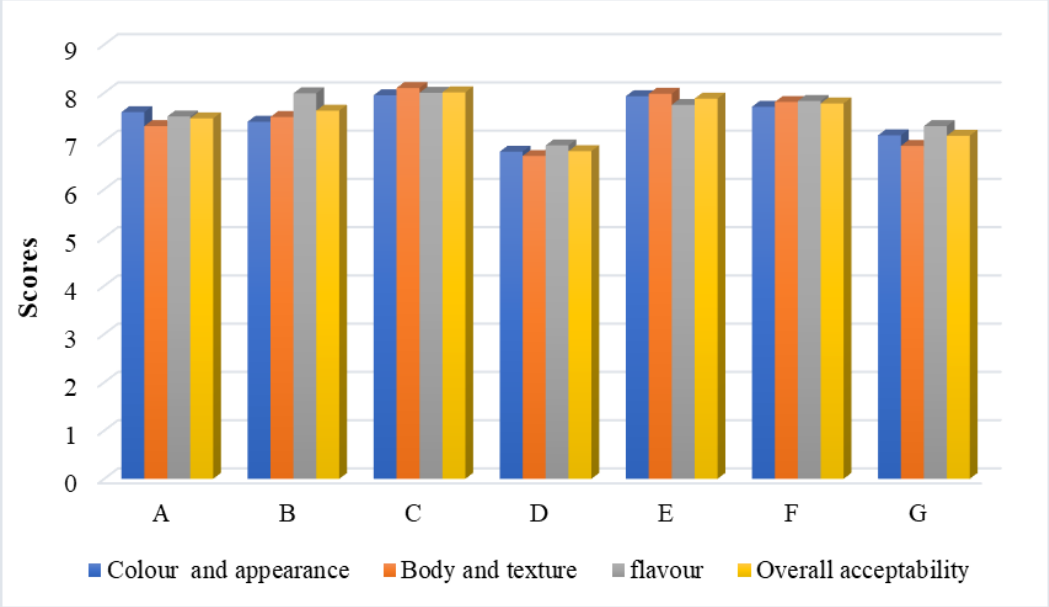

Fig 2: Effect of garden cress form on sensory qualities of *Burfi*

Conclusions

Result of the present study indicated that the resultant product was analysed for sensory parameters of colour and appearance, Body and texture, Flavour and overall acceptability. From this study it was summarized that *Burfi* prepared by addition of microwave processed garden cress seeds form was most acceptable. The selected form had score 7.95, 8.10, 8.00 and 8.01 for colour and appearance, Body and texture, Flavour and overall acceptability respectively.

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