



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(6): 2244-2250
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www.thepharmajournal.com

Received: 18-04-2022

Accepted: 21-05-2022

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Development of different types of dairy and plant-based spreads: A review

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DOI: <https://doi.org/10.22271/tpi.2022.v11.i6Sab.13435>

Abstract

Spread is a type of condiment that can be used while eating bread, toast, biscuits, chapatti, and other similar foods. There are so many dairy and plant-based spreads available in the market. In dairy spreads like butter, cheese, paneer, and chhana are made. In-plant-based spread jams and jellies are included. Sweet spreads have become a mainstay in many people's diets, driving up demand. Jams, marmalades, jellies, chocolate spreads, honey, and nut-based spreads are examples of sweet spreads. This paper concerned the different combinations which are used to make different food spreads.

Keywords: Dairy spread, plant-based spread, sweet spreads

1. Introduction

As a breakfast item, the spread is an item that is generally spread on chapatti, bread, chapattis, toast, and other similar items (Verma *et al.*, 2018). In the market today, there are primarily two types of spreads: butter and cheese spread, both of which are eaten with toast for breakfast (Dwivedi *et al.*, 2014) ^[14]. Spreads like dairy spreads, plant-based spreads, and meat-based spreads are available on market. The dairy spread includes butter, cheese, paneer, and chhana. Plant-based spreads include jams and jellies. Many people's diets have become more reliant on sweet spreads, resulting in growing demand. Jams, marmalades, jellies, chocolate spreads, honey, and nut-based spreads are examples of sweet spreads (Laso *et al.*, 2019) ^[33]. In spread emulsifiers, stabilizers, and flavoring agents are used that are authorized and antioxidants at the recommended doses (FSSAI, 2011) ^[22]. Milk proteins, Milkfat, vegetable oils, salt, stabilizers, emulsifiers, salt, and color are all typical constituents in fat spreads. Proteins aid in the emulsification of fat and the absorption of water, ensuring that the final product is stable. (Yadav *et al.*, 2019) ^[51].

Nowadays consumers become health conscious. Spreads that are low in fat are produced. The rheological and sensory properties of water/oil spreads are changed due to the increase in the water phase associated with the fat phase reduction in spreads. (Abdaldeim *et al.*, 2014). Table spreads are products that adhere to the principle of excellent nutrition. Table spreads have a good flavor and spreadability at refrigerated temperatures, as well as the ability to maintain their stand-up property at room temperature. Making cooking and serving easier when spreads that are low in calories are combined with other meals. Cream, butter, or butter oil are used to make dairy spreads (Patange *et al.*, 2011). Cheddar has a strong and moderate flavor, as well as its flavor and mouthfeel, are essential in cheese spreads. During the ripening process, there is a complex chain of biochemical, chemical reactions and microbiological reactions take place, resulting in the production of flavor in cheese. Consumers consider flavor while choosing cheese (refrigerated temperature (Verma *et al.*, 2013). Recently, a spread made from chhana was developed, which has a good taste and has recently, a spread made from chhana was developed, which has a good taste and also has a nutty flavor and includes significantly fewer trans fats than some other spreads. (Amitraj *et al.*, 2016) ^[5]. Easy to combine with other foods and cooking ingredients, allowing for a wide range of applications. High-quality butter, with a hint of non-fat milk solids gives the amusing flavor. This flavour goes well with a variety of foods, giving the product a wide range of applications in the kitchen and on the table (Chapalwar *et al.*, 2010). Chhana spread, a milk product is increasing in popularity in terms of manufacturing and consumption. Chhana, frequently referred to as paneer, is really a coagulated milk product made using acid and heat that is used to make a variety of classic Indian sweets such as Sandesh, Rasmalai, and Rasogulla. A wide range of gourmet specialties also used chhana.

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It is believed to have originated in India's eastern region (Verma *et al.*, 2021)^[50]. Paneer, which has a good taste and is preferable to other spreads because of its nutty flavor, has also been made into a spread (Yadav *et al.*, 2014)^[15].

Chhanna contains a good amount of protein content and sugar level is also low, which makes chhanna a good choice for diabetics. Chhanna contains a lot of fat-soluble vitamins like A and D. Approximately 90% of chhanna is made up of fat and protein. It has half as much lactose as the normal milk (Chapalwar *et al.*, 2010). Spread texture qualities including cohesiveness, adhesiveness, and spreadability are frequently employed (Radocaj *et al.*, 2011). Rheological property that is influenced by the product's composition, solid fat concentration, and fat crystal network design is known as spreadability (Vithanage *et al.*, 2009). The spread texture and spreadability are improved by the use of polyunsaturated fatty acids (Yadav *et al.*, 2019)^[51]. Milk proteins, alginates, starch derivatives, and gelatin are the most commonly used aqueous phase stabilizers in low-fat spreads (Abdeldaiem *et al.*, 2014). Due to flavor, nutritional benefits, and desirability of eating alone or with a range of other foods, nut spread is popular and well appreciated by customers. The market for nut-based spreads grew at a growth rate of 6.2 percent (Shakerardekani *et al.*, 2013)^[45]. A primary source of high-quality protein is peanut which is also known as groundnut. They are rich in minerals, and amino acids and also have a good nutritional profile. As a result, there is potential to use peanut as a source of protein that can provide the required nutrition and texture to the resulting food spread while also being low in cost (Yadav *et al.*, 2019)^[51]. Antioxidants can be utilized to prevent the decomposition of fats and oils, as well as to reduce antioxidant losses and tocopherol during processing. Nut spreads with lower carbohydrate and fat content have recently piqued consumer interest (Shakerardekani *et al.*, 2013)^[45]. Many studies have been conducted in the past to create a spread that is high in protein and low in fat using a range of fat sources, including cream, paneer, and chhanna butter, chakka and chhanna, cheese and chakka, cheese and buttermilk, UF (ultrafiltration) retentate, and safflower milk combined with buffalo milk (Patenge *et al.*, 2011).

2. Dairy spreads

2.1 Cheese spread

In India, cheese production is growing at a rate of 10–15 percent each year, with processed cheese and processed cheese spread accounting for 90 percent of total consumption. Not only does cheese spread (processed) have pre-digested fat and protein, but it also has concentrated calcium, phosphorus, riboflavin, and other vitamins. These also contains wellness-promoting bioactive polypeptides and integrated linoleic acid, as well as a low-fat table spread with a reduced fat and greater protein content (Giri *et al.*, 2014)^[25]. As a result, cheese spreads could give a more nutritious bread spreads while also incorporating phytosterols. The influence of various quantities of sterols on the sensory, microstructure, fatty acid, and physicochemical profile of cheese spreads was examined in another study (Giri, 2013).

Both young (one and half month ripened) and elderly (six-month ripened) varieties of Cheddar cheese was employed to make PCS (Giri and Kanawjia, 2013)

Glycerol Monostearate (C17H35.COO.CH2.CHOH.CH2OH) and Sodium Citrate, as well as acidifying agents for instance lactic acid, citric acid, vinegar, phosphoric acid, and acetic acid are all approved emulsifiers and stabilisers in processed

cheese spread. The amount of anhydrous authorised emulsifiers and stabilisers in processed cheese spreads may not exceed 4.0 percent of the finished product, as long as the content of anhydrous inorganic agents does not exceed 3 percent of the finished product (Verma *et al.*, 2013).

The chemical composition of processed cheese spreads was studied, including pH, dry matter (DM), total nitrogen expressed as protein content, moisture in non-fat solid (gram water/100 g non-fat solid), fat content, and fat content in DM (gram fat/100 gram DM, Fat/DM) were estimated (Ghorbel *et al.*, 2016)^[24].

A combination of Cheddar cheeses (75 percent fresh Cheddar cheese and 25 percent old Cheddar cheeses) was used in the production of processed cheese spreads. To keep the moisture content of the control processed cheese spreads at 58 percent, salt at 2%, and tri-sodium citrate at 2.5 percent, a calculated amount of water, salt, and emulsifier was added. Each batch of 1 kilogram PCS was manufactured in this study. The Cheddar cheeses, both old and young, were cleansed, quartered, and shredded (Giri *et al.*, 2014)^[25] For preparing the processed cheese spreads, a processing vessel of cheese was utilized. To begin, a quantity of shredded cheese was placed in a cheese handling cooker, and a determined quantity of emulsifier and salt was included after it was mixed with a determined quantity of water. The leftover ground cheese was then incorporated, and the contents of the vessel were cooked by swirling constantly and abrading the surface with a wooden spoon (Verma *et al.*, 2013). Once the mass was semi-solid and uniform, sterols were included (0 percent, 2 percent, 4 percent, and 6 percent sterols inclusion to PCS) and thoroughly assorted, and sterols powder was combined separately using a small amount of lukewarm water (50 °C) for 3 minutes in a running blender. It was then combined with the cheese spread after straining. With constant agitation, the contents were heated to 85 °C for 3–5 minutes. The heating was then turned off, and also the hot substance was right away poured into a sterile sample holder. The PCS was kept at room temperature before being chilled (Giri & Kanawjia, 2019)

Different products were used for prepping the processed cheese spreads like Mozzarella, cheddar cheese, and tofu (Verma *et al.*, 2013)^[50], omega-3 fatty acids (Giri *et al.*, 2013), Incorporation of different inulin levels (Giri *et al.*, 2013), phytosterols extracted from soybean (Giri *et al.*, 2014)^[25], fresh cheese (Toro *et al.*, 2016)^[49].

Broccoli sprout powder was blended into the cheese. Intermixed cheese powders with 3% – 15% freeze-dried powder of broccoli were outstanding. On a hedonic scale, the mixture containing 10 percent freeze-dried powder of broccoli sprouts was the desirable product if the only flavor was evaluated. According to the sensory overall acceptance score, up to 20%, powder of broccoli could be mixed into the cheese. As a result, combining cheese powder having 20% freeze-dried powder with broccoli was approved for the creation of a niche product (Sharma *et al.*, 2011)^[46].

Cape gooseberry and carrot paste were used for developing the processed cheese spreads (Elshrief *et al.*, 2019)^[17]. Powder made from the grape skin was used in the form of oven-dried and free-dried in processed cheese spread. The main components, phenolic compound concentration, and antioxidant capacity of both freeze-dried powder of grape skin and oven-dried were investigated. Similarly, effects of adding powders to processed cheese spreads at the rate of 1% and 2% (w/w) levels were observed. (Frühbauerová *et al.*, 2018)^[21].

Tomato juice was incorporated into the processed cheese spreads. Tomato juice was incorporated in various proportions at 10, 20, and 30%, severely. The inclusion of tomato juice to prepare the processable spread cheese resulted in a better and satisfactory spread cheese having more nutritional and health benefits. It is also healthy for children because tomato consists of a red color compound known as lycopene, which is appealing to children, as well as the presence of antioxidants that plays an imperative role in the wellness effects observed (Mehana *et al.*, 2017).

The spread cheese was fortified utilizing flours made from by-products (white and red grape pomace, broccoli, tomato peel, artichokes, and corn bran). All the cheese samples had their physicochemical and sensory qualities examined. When compared to the control cheese, phenolic content, antioxidant activity and flavonoids of the sample including grape pomace increased notably, broccoli, artichoke, maize (bran), and tomato peel by-products follows (Lucera *et al.*, 2018)^[35].

A low-cost pepper-infused processed cheese spread was made with greater sensory quality for the local market, as well as evaluating the chemical and microbiological stability of the finished product for its long-term quality. To get the right formula for processed cheese spread, two treatments were initially established. Incorporating fresh cream (750 ml, 650 ml, 850 ml), vegetable fat (250 g, 300 g, 300 g), and black pepper powder (4 percent, 3 percent, 2 percent) in treatments 3, 4, and 5 accordingly (Rifky *et al.*, 2018)^[44].

Black rice powder was used to partially substitute dairy ingredients in functional processed cheese spreads. Processed cheese spread was evaluated for chemical composition, microbiological, rheological, total phenolic compounds, antioxidant activity, and sensory evaluation. When different ratios of black rice powder were added to processed cheese spread, the total phenolic content and Amino acids were higher than the control sample when it was fresh and during the cold storage (Khalil *et al.*, 2020)^[32].

2.2 Ghee spread

Ghee primarily based on totally low-fat spread became assessed for storage with the presence or absence of potassium sorbate. Modern growth in free fatty acids,

thiobarbituric acid, pH was found. The shelf life of the product for as much as nine weeks of storage at 5 °C (Patange *et al.*, 2011). Strawberry powder was incorporated in low fat spread (Ghee spread) (Balasaheb *et al.*, 2019)

2.3 Channa spread

Chhana, commonly known as paneer, is made from the milk, after being precipitated with citric acid, sour milk, and lactic acid. Moisture content should be less than 70% and fat of milk less than 50% of the dry matter, as determined by the FDA (FAO, 2011). Because it contains almost all of the protein contained in milk, as well as a range of minerals and vitamins, chhana has a high nutritional value. It has a nutty flavor that is slightly sour and sweet, which appeals to the Indian palate. It can help pregnant and nursing women, babies, growing children, teenagers, and adults. Because it is abundant in animal protein, it is rich in amino acids for vegetarians (Yadav *et al.*, 2019)^[51].

Because of its high protein content and low sugar level, it is suggested for diabetic individuals. Chhana is high in vitamins that are fat-soluble and also include vitamin D and A. The fat and protein content of chhana is approximately 90%. It has 50% of the lactose content of the original milk. Cow chhana has an energy content of 2866 to 3748 calories per kilogram (Chapalwar *et al.*, 2010)

Chhana is a milk product that is used for the formation of different varieties of classic Indian sweets such as Sandesh, Rasmalai, and Rasogulla. Gourmet specialties also used chhana as a base. It is believed to have originated in India's eastern region (Verma *et al.*, 2021)^[50].

Chhana was made by adding proteins of the milk fat or solids or by adding vegetable oil. Whey powder, a high-quality protein source, was also used in the dairy spread's creation. All of these helped to lower the cost of dairy spread while also lowering the risk of cholesterol (Keertana *et al.*, 2016)^[30]. A low-fat chhana spread was prepared from filled milk. Peanut milk is used for the preparation of filled milk chhana spread. Peanut milk was prepared after filtering the soaked peanut which was roasted. Filled milk could be made using calcium lactate for coagulation and the temperature for coagulation was 70 °C. (Yadav *et al.*, 2019)^[51]

Table 1: Nutritional composition of different chhana spread

Chhana spread	Nutritional composition						References	
	Fat	Protein	Moisture	Ash	Total solid	Ph	Salt	
Dairy-based	15-16%	11-15%	62-63%	2-5%	40-43%	1-5%	1-2%	Tewari <i>et al.</i> , (2014), Keertana and Narayana (2016) ^[30] , Laso <i>et al.</i> , (2019) ^[33]
Filled milk based	40-45%	4-5%	54-55%	5-6%	2-3%	1-5%	5-6%	Yadav <i>et al.</i> , (2019) ^[51] ,
Dietetic sweet spread (sucralose is added + Soy and peanut milk- based chhana is used)	6-7%	14-15%	54-55%	3-4%	20-22%	-	-	Laso <i>et al.</i> , (2019) ^[33]

The milk of the cow was cooked open-fired in a karahi (80 °C). A ladle was used to swirl the milk throughout the heating process to prevent it from burning. When the milk reached (80 °C), it was stopped heated and chilled to a temperature of 70 °C before coagulating. After this, 10% or 20% solution of herbal coagulants was progressively infused in the milk with continuous stirring until the coagulation is completely done (Yadav *et al.*, 2016). After coagulation, and with the utilization of muslin cloth all the contents were poured for whey straining, and the whey was drained for roughly an hour or two without applying any outside pressure. Chhana was collected and weighed after the whey was drained. After

being weighed, the chhana is separated into smaller pieces and put inside a household mixer to make a paste with the addition of common salt at a level of 1.5% whereas the water includes 10-20ml/100gram chhana. Eventually, the spread made with the help of chhana is prepared (Verma *et al.*, 2014)^[50]

The basic ingredient for the manufacturing of dietetic sweet spread was vegetable-based chhana with two degrees of sweetener sucralose (500 ppm and 700 ppm). To make chhana, a 60:40 blend of soy and peanut milk was utilized, which was then completely combined with sucralose at two different levels (500 ppm and 700 ppm) to create the desired

dietetic spread (Laso *et al.*, 2019)^[33].

40 percent cream, 7.5 percent oil, and 0.75 percent salt were added to a high standard of chhana spread made by mixing chhana with 20 percent water at a temperature of 80 °C for 3 minutes and incorporating 40 percent cream, 0.75 percent salt, and 7.5 percent oil with water substituted by buttermilk or whey (Chappal war *et al.*, 2010). Filled milk channa might be produced at 70 °C with a coagulant of 0.8 percent calcium lactate (Yadav *et al.*, 2019)^[51].

The essential ingredients for a chhana-based low-fat dairy spread might be chhana, maltodextrin, whey powder, and SMP. The technology of response surface used in the CCRD (central composite rotatable design) was appropriate for sensory modeling and textural framework as well as ingredient optimization. The optimized combination might be used to make chhana-based low-fat dairy spread in production on a small scale based on the highest attractiveness result (0.889) (Amitraj *et al.*, 2016)^[5].

Vegan milk-based chhana could be utilized to make a high-quality diabetic sweet spread without compromising the sweetness criteria (Laso *et al.*, 2019)^[33]. According to EU rules, fat products (spreadable) with lesser than the 39 percent milk fat are designated as a dairy spread with low-fat (Amitraj *et al.*, 2016)^[5].

A panel of five judges used a "9-point scoring card" to assess the sensory quality of the chhana spread (Hedonic Scale). For each parameter, a score was assigned. To avoid positioning or order bias, the samples were placed in front of the judges with sample codes generated by a random number table. The product's coded samples were rated by a team of judges (Chappal war *et al.*, 2010, Amitraj *et al.*, 2016, Verma *et al.*, 2019, Yadav *et al.*, 2019)^[10,50,51,5].

2.4 Paneer spread

The Paneer was first prepared to utilize standardized milk of buffalo with 6 percent fat and 9% SNF, with 1% citric acid as a coagulant, and a coagulation temperature of 80 °C. Paneer spread was made by blending such paneer with 10% whey, varied salt levels (1, 1.5, and 2.0 percent), and preservatives (0.2 percent sodium benzoate or potassium met bisulfite) into a smooth paste consistency (Dwivedi *et al.*, 2014)^[14].

The Paneer spread was made using 10% whey, different concentrations of salt (1.0, 1.5, and 2.0%), and preservatives (0.2% sodium benzoate or pot. met bisulphite) made from standardized milk of buffalo (6 percent fat and 9% MSNF) employing 1 percent citric acid at 80 °C coagulation temperature. The chemical properties of the product were evaluated when it was fresh for 0 Days, 5, 10, and 20 days afterward. The total solids (TS) content increased as the amount of salt added to the fresh product increased (0 days). TS content was unaffected by the preservatives. The TS content in the product grew as the storage period progressed (Dwivedi *et al.*, 2014)^[14].

3. Plant-Based spreads

3.1 Nut spread

Peanuts, also known as groundnuts in various regions of the globe, are the consumable seeds of legume. India is the second-largest producer of peanuts, with an annual production

of 7.131 million metric tonnes around the world (Arya *et al.*, 2016).

Peanut seeds are high in protein, lipids, and fatty acids, making them a good source of nutrition for humans. Except for lysine, peanut proteins are comparatively high in amino acids required for school-aged children's growth. Furthermore, roasted peanut kernels are high in folate, niacin, and vitamin E, but low in vitamins A and C, as well as the minerals calcium and iron (Tehrani *et al.*, 2009). Due to flavour, higher nutritive benefits, and worthiness for eating alone or together with a range of other food commodities, nut spread is popular and well appreciated by customers. Spreadability is the most significant feature of nut spread; it is critical to have a soft texture of the product and is easy to spread out to prevent breaking the bread and/or crumbling. (Shakerdekani *et al.*, 2012).

A cashew nuts used in chocolate spread alternative CNS (Cashew nut slurry) and cocoa powder were used to make the spread (CP). The CNS content of the development varied from 75 percent to 95 percent, with a 5% - 25 percent CP content. The samples were put through a sensory examination. Two of the most desired samples were selected, E (75 percent CNS: 25% CP), and B (90 percent CNS: 10% CP) and as well as a control sample, for microbial load, pH, proximal and distant proximate compositions of minerals, and total soluble solids (TSS), (Amevor *et al.*, 2018)^[4]

3.1.1 Preparation of peanut spread

Peanuts are usually prepared by roasting (160 °C for 40–60 minutes) to develop tastes prior to processing into commercial peanut butter. To end the roasting process and ensure the quality of roasted peanuts, with the help of conveyors they are air-blasted. After this, the peanuts are blanched (dry) at a temperature of 138 °C for at least 25 minutes and cleaned to take out the dust, molds, skin, kernel, and other unwanted material on the outer part. At 48 °C, peanuts (processed) are mashed and bagged (Ronholt *et al.*, 2012).

Peanut butter is a paste formed from ground roasted peanuts that can be produced with or without oil. It is popular all around the world, and certain emerging markets produce it. It's used as a spread for sandwiches. Other nuts, besides peanuts, can be used to make nut spreads. Nut spreads are occasionally served in bottles with layers of jam or jelly. These layered spreads are typically eaten as sandwiches with bread (Shakerdekani *et al.*, 2013)

A mixed design was used in the creation and production of a peanut spread using chocolate with various quantities of chocolate, sugar, and peanut. Roast, a variable used in processing, was also incorporated as a part of preparation. Predictive models for spreadability, overall acceptability, look, colour, flavour, sweetness, and texture/mouthfeel were established after a consumer acceptance test. To find the best places, predictive algorithms were employed to create contour maps. Overlapping areas aided in the development of the best chocolate-based peanut spread compositions. Combinations of 29% to 65% peanut, 9% to 41% chocolate, and/or 17% to 36% sugar, total 100 percent at a medium roast level, were shown to be the best for chocolate peanut spread. (Chu *et al.*, 2004)^[12].

Table 2: Different stages of nut spread production

Phases	Purpose	Description	Reference
Roasting of nuts	It reduces the amount of moisture in the product and enhances the flavor.	Peanuts must be cooked at 160 °C for 40–50 minutes, depending on the beginning moisture content.	Ghazzawi <i>et al.</i> , (2017) [23]
Blanching	separating the hulls	A white coloured nut can be found in most nuts.	Anuradha, P. (2012) [6]
Inspection and selection	It Remove any damaged nuts or strange objects	It is able to source high-quality raw materials.	Baudin, M. (2020) [8].
Ingredients to be added	to create a finished product	Prior to mixing, add the additional components to the hot slurry.	Shakerdekani <i>et al.</i> , (2013)
De aeration	to take out the air	Formation of streaks/bubbles in the packaging goods due to air Removes moisture From the air (improves quality) Done at a pressure of 15 to 20 mm Hg	Chinnan, MS. (2011) [11].
Cooling	to make a reliable product	The cooling process is used to reduce the heated temperature that exists during the drying process.	Dhanushkodi <i>et al.</i> , (2016) [13]
Packaging and filling	To get ready for dispatch	Before distribution, the product is allowed to be set at 20 °C for 35–40 hours.	Shakerdekani <i>et al.</i> , (2013), Chinnan M. S. (2011) [11]

Aside from the components (sugar, nuts, emulsifier, and vegetable oil), the conditions for roasting the nuts, the kind and amount of stabilizer, and the particle size distribution had an impact on consumer acceptance, oxidative stability, and rheological behavior of nut spreads. Antioxidants can be used to limit the oxidation of oils and fats, as well as processing processes that minimize the losses of organic antioxidants and tocopherol. Nut spreads with lower carbohydrate and fat content have lately piqued consumer attention (Shakerdekani *et al.*, 2013).

3.2 Fruit spreads

The jam was prepared from red dragon fruit. The pineapple was added, which contains pectin, which aids in the development of gels, and was used to make red dragon fruit jam. Sugar was used as both a sweetener and a preservative. Sugar, on the other hand, has a function in the creation of pectin gels. When creating jam, commercial pectin was added to help the gel form (Nurani *et al.*, 2021) [39].

A fruit spread was prepared from avocado (*Persia Americana*). Formulated the spread made from fruits as 50 grams of avocado pulp, 0.5 grams of xanthan gum, 5g of sugar, and 9g of miscellaneous (Ofosu *et al.*, 2011).

Strawberry jams and spreads were made with high, low esterified commercial and amidated pectin under minimized pressure at different temperatures (70 °C, 75 °C, and 90 °C, individually). Ash content, dry matter, and quantities of chosen metal ions were determined to complete their characterization. Over the course of 24 weeks, the gel strength was measured and the goods were stored in the dark and under light exposure (Holzwarth *et al.*, 2013) [27].

The phenolics were determined in strawberry spreads prepared using various industrial techniques and stored for up to 19 weeks under various storage conditions. Spectrophotometry was used to quantify total phenolics, and coupled liquid chromatography and mass spectrometry were used to evaluate individual phenolics: anthocyanins (6), phenolic acids (4), flavonols (4), flavanol (1), and flavone (1). The phenolic was altered during storage (Kadivec *et al.*, 2013) [28]. The antioxidant activity of a local tomato cultivar (Heemsohna) grown in India with lower °brix and higher acidity was investigated. Its suitability for making 'spread,' a value-added innovative product, was determined by combining tomato juice with sugar in 1:1, 2:1, and 3:1 ratio, then concentrating the pulp to 65 °brix. Physicochemical characteristics and sensory acceptability of the spread were assessed during storage for six months (Fernandez *et al.*,

2008) [19].

Spread samples were prepared from African pear (*Dacryodes edulis*) pulp treated with varying degrees of food-grade additives and labelled as such. They assess the compositional attributes of the treated spread and pulp samples, as well as the spreadability and usability of the spread sample. They revealed that perhaps the table spreads high in protein and other critical elements could be made from the African pear (*Dacryodes edulis*) pulp with acceptable colour, taste, and spreadability (Akusu *et al.*, 2018) [3].

4. Conclusion

In today's world, most people are concerned about their health and are unwilling to ingest fat. Eating and food selection habits vary widely due to variances in history and culture, consumer purchasing power, and lifestyle requirements. Many research has been undertaken in the past to generate a high-protein, low-fat spread employing a range of fat sources, for instance, cheese, ghee, chhana, paneer, peanut, and fruit spreads. The majority of studies have focused on chhana peanut and processed cheese spread. It is suggested that more studies be conducted in order to develop different forms of spreads that are rich in nutrients and good for all ages people.

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