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**Sona Anna Sibi**  
Department of Food Technology  
and Nutrition, Lovely  
Professional University,  
Phagwara, Punjab, India

## A review on preparation of various fruit based spread

**Sona Anna Sibi**

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### Abstract

India is a developing country where wheat and rice are essential foods that offer calories and protein to a substantial population. Throughout history, grain has been a significant contribution to human nourishment. The majority of people are currently employed and have busy lives. As a result, they seek out convenient and time-saving products. Instant food is in high demand these days. Bread spread is an immediate meal item that fits people's busy lifestyles and is a simple way to provide nutrition. In this, various spread like peanut butter, Butter diary fat spread, Moringa leaves based spread, Jackfruit seed-based spread and the like. This paper analyses various such spreads for their nutritional benefits and easy usage.

**Keywords:** Spread, instant food, a substantial portion, time-saving, immediate meal

### 1. Introduction

India could be a developing country wherever wheat and rice are essential foods that provide calories and super molecule to a considerable population. Throughout history, grain has contributed to human nourishment (Kamaljit *et al.*, 2011). A ramification could be a reasonably food that's superimposed onto things like bread and insane, sometimes with a knife, enhancing the flavour and texture of food. Spreads are wont to improve the flavour or texture of foods. Typical spreads embody butter and gentle cheeses. Spreads are sometimes seen within the kind of a paste, sweetener or liquid that's ready from fruits, nuts, cheese, yeast extract (Beeren *et al.*, 2019). These types of foods are convenient to use on busy mornings. Breakfast spreads are thought-about foods that are applied to another sorts of food sort of a surface breakfast-type work product like bread, biscuits, pancakes, and waffles. Typical spreads embody fruit jams and jellies, chutney, dairy farm spreads (e.g. cheese and spreadable cheese), edible oils (e.g. butter and margarine), nut sorts of butter (e.g. peanut, hazelnut, and almond), and yeast extract spreads. Spreads are foods that are in line with a healthy eating philosophy. At the same time, they have a pleasant taste and flavour, as well as excellent spread ability in the refrigerator and the ability to stand up to high ambient temperatures (Dostalova., 2003) Spreads are lower in calories than butter and combine well with other dishes for ease of cooking and serving. Table spreads have to meet the consumer's nutritional and convenience needs. There are currently commercial table spreads with fat levels ranging from 80% to 0%. Spreads are similar to margarine but contain less than 80% fat. Only items with less than 80% but more than 40% fat, 40-70% fat, 62-80% fat, or less than 75% fat are branded as spreads in various countries. Spreads having a very low fat content are sometimes referred to as "ultra low-fat" spreads. Low-fat spreads typically comprise 30-50 percent moisture, 30-50 percent fat, and 8-12 percent fat-free solids (Dostalova. 2003) Breakfast spreads are breads, biscuits, pancakes, and waffles that are put on top of other foods. Fruit jams and jellies, chutney, dairy spreads (such as cream cheese and spreadable cheese), edible oils (such as butter and margarine), nut butters (such as peanut, hazelnut, and almond), and yeast extract spreads are examples of common spreads. Some breakfast spreads are low in salt when compared to other baked goods.

Some breakfast spreads don't contain a lot of Na compared to alternative workplace merchandise. However, they're consumed often throughout the day throughout meals and snacks, creating spreads a big contributor to Na within the diet (Johnson, 2019). Individuals from outside Asian country use an outsized quantity of unfold in their diet. Once comparison geographies, we are able to see that folks within the USA consume a lot of unfold than alternative countries. The foremost well-liked and wide used merchandise for spreads area unit

**Corresponding Author**  
**Sona Anna Sibi**  
Department of Food Technology  
and Nutrition, Lovely  
Professional University,  
Phagwara, Punjab, India

batty, particularly almond, Brazil batty, cashew, hazelnut, nut tree nut, pecan, pine nut, pistachio, walnut *et al.* Considering the assembly of world's most well liked tree batty, cashew batty ranks on a world bases with a production two,760,000 MT, followed by almond (2,560,000 MT) walnut (2,550,000 MT) Brazil nut (1,000,000MT) pistachio (940,000, MT) and hazelnut (860,000 MT) in 2010. (FAO, 2012). Customers may now get a range of dairy and non-dairy spreads delivered to their house. These spreads may contain more unsaturated fatty acids in order to improve spread ability at low temperatures. (Lee *et al.* 2018)

## 2. Review of Literature

### 2.1 Global production of breakfast spread

Breakfast spreads (defined as margarine and spreads, butter, spreadable processed cheese, nut and seed spreads, and yeast extracts) had a global market volume of 46.6 million tonnes and a value of US\$56 billion in 2016 (Euro monitor International, 2017). Margarine is the most popular product

(5.2 million tonnes), followed by butter (3.2 million tonnes), spreadable process cheese (2.1 million tonnes), nut and seed spreads (688 million tonnes), and yeast extracts (16.2 K tonnes). However, the butter category has the highest retail value (US\$17.5 billion), followed by processed cheese (US\$15.2 billion), margarine and spreads (US\$14.3 billion), nut and seed spreads (US\$3.4 billion), and yeast extracts (US\$0.2 billion). Since 2011, the overall volume and retail value have decreased by 8.9% and 9.7%, respectively, throughout the entire category. (Johnson, 2019) The drop in total volume is attributable to the margarine and spreads (4.5 per cent) and yeast extract (6.6 per cent) categories. All categories are on the decline in retail value, except for nut and seed spreads (4.1 per cent). The US (642.9 million tonnes), Brazil (581.6 million tonnes), Germany (364.7 million tonnes), and the United Kingdom (364.7 million tonnes) have the most significant overall quantities of margarine and spreads. (Beeren *et al.*, 2019).

**Table 1:** Volume of spread used by different countries (Beeren *et al.*, 2019)

Sl.no	Country	Volume of spread found in different countries
1.	United States	642.9 Million tonnes
2.	Brazil	581. 6 Million tonnes
3.	Germany	364.7 Million tonnes
4.	United kingdom	303. 3 Million tonnes

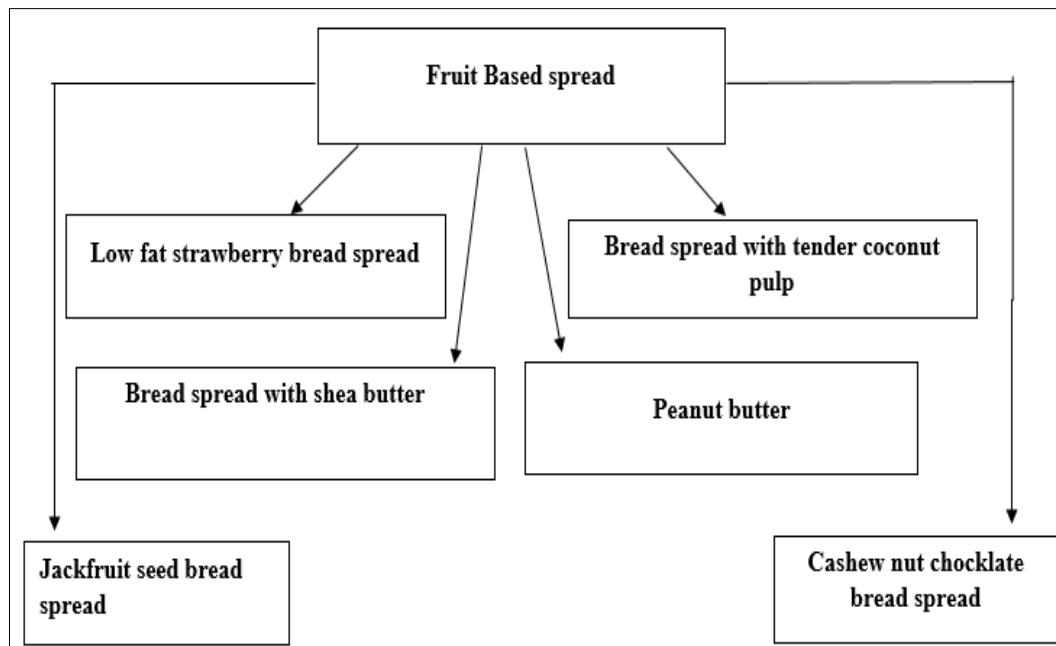
Breakfast spreads cover a wide range of products, including sweet fruit-based, savory, and sweet fruit-based spreads. Nut-based, dairy-based, and savory yeast extract-based alternatives are also available. Natural sodium is present in many ingredients (for example, fruit, vegetables, nuts, and milk), but its contribution to the sodium concentration of the product as a whole is quite little. Take salt, for instance. Each 100 g of strawberry, peanuts, and milk has 1, 18, and 49 mg of salt, respectively (United States Department of Agriculture, 2016). There may be changes across crop years, as well as between species and types, because they are agricultural crops. Feeding methods, This may have a slight impact on the finished product's salt content. The other substances would

provide the majority of the sodium, with salt being the most prevalent. Salt makes up the majority of the sodium components in the fruit-based and yeast groups. Other additives, such as stabilisers, can be used to keep the fat, fats, ground nuts, and water in an emulsion form in nut and dairy spreads and cream cheeses. All but butter can be found in the dairy-based kind (e.g. cream cheese). Components with sodium (e.g. sodium sorbate, orthophosphates) that aren't specified above Salt is used to help create texture, as a preservative to extend shelf life, and to aid in food security preparation. Because of the broad scope of this topic, this discussion will focus on sodium-containing substances rather than specific food categories or unprocessed raw materials.

**Table 2:** Sodium content of various breakfast spreads in different parts of the world (Webster *et al.* (2010). Arcand *et al.* (2016). Arcand *et al.* (2016).Ni Mhurchu *et al.* (2011) Monro *et al.* (2015).

Geography	Breakfast spread	No: of products	Mean (mg/100g)	Range (mg/100g)	Data Collection (year)
Australia	Regular butter	33	535	147-976	2008
	Margarine	57	427	5-1300	
	Salt reduced butter	9	294	200-350	
Canada	Margarine	49	653	-	2003
	Salted butter	19	664	-	
United kingdom	Margarine	168	597	0 – 1000	2013
Newzeland	Butter				
	Margarine				
	diary Spread				
	Branded	52	414(136)	1 – 700	
	private label	6	486(157)	39 - 680	

### 2.1.1 Different types of fruit based spread



**Fig 1:** Different type of spread (Timbabadiya *et al.*, 2017), (Khedkar, 2016) (Thilakaratne *et al.*, 2014), (Supit *et al.*, 2018) [22, 26]

### 2.2 Low fat strawberry spread

Strawberry is a popular fruit of the Rosaceae family. It is planted all across the world and holds a prominent position among little fruit plants. The very perishable fruit has a good flavor and is deep crimson in color with a distinctive form. It's high in vitamin C, sugar, organic acids like anthocyanin, phosphorus, iron, and other minerals and vitamins, and it has a fruity, sweet, and tangy flavor. Purees, juice concentrate, juice, jams, preserves, and rose red wine are all made using it. (Sharma *et al.*, 2009) Strawberries (*Fragaria ananassa*) are one of the most popular fruits in the world, having a distinct and appealing flavor. The texture and presence of volatile chemicals are the two most important properties of ripe strawberries. (2019, Jiawei *et al.*) Strawberry's high fiber, potassium, vitamin C, and folate levels are well known for their potential health advantages. Strawberries are also high in blood sugar-regulating dietary fibers (pectins, celluloses, etc.) as well as thyroid-supporting iodine. Strawberry fruits are high in sugars (mostly glucose and fructose, with little sucrose) and acids. Strawberry is an excellent source of vitamin C. Vitamin C and phenolic compounds have been shown to contribute to the antioxidant capacity of fruits by acting as oxygen radical scavengers and may have health benefits (Yildiz *et al.*, 2014) Potassium (the most prevalent mineral), calcium, and magnesium are all abundant in strawberries. They're also high in folate, omega-3 fatty acids, vitamin B6, vitamin K, and the energy-boosting vitamins B2 and B5 (Milivojevic *et al.*, 2010) Ripe strawberries, on the other hand, are very perishable due to their smooth texture, rapid softening and respiration, and resistance to fungal infections and off-flavor development (Lara *et al.* 2004) For pulp processing, uniform red-colored, medium-sized, healthy fruits were chosen. The fruit sepals were manually removed and crushed using a Pulp-Homogenizer combination. After that, the pulp was put into sterilized glass bottles and pasteurized for 15 minutes at 100 °C. The homogenized pulp was then sieved at 1 mm in stainless steel. According to the approach described by, the pulp was treated and held for a longer amount of time (Bishnoi *et al.* 2016)

### 2.2.1 Powder preparation

Strawberry were purchased at a local market in Kolhapur and transported to the Department of Animal Sciences' laboratory. RSCM College of Agriculture, Kolhapur, Department of Animal Husbandry and Dairy Science the strawberries were cleaned under running water from a tap. The fruits were then blanched for 3 to 5 minutes in hot water. After blanching, the fruits were sliced into four pieces and dried for 18 hours at 55 degrees Celsius (Olubunmi *et al.* 2013) Using a kitchen mixer blender, the dried strawberry fruit pieces were ground into powder. A 1mm stainless steel sieve was used to filter the powder. For later usage, the sieved strawberry powder was wrapped in plastic bags and stored at room temperature. Except for boiling into the water for 3-5 minutes, the same procedure was followed for strawberries that had not been blanched.

### 2.2.2 Making a low-fat spread with cow milk ghee and strawberry jam

In a planetary mixer, low-fat spread made from cow milk ghee was made according to a procedure described by Patange (2006). Before combining and emulsifying the fat and serum stages, they must be separately prepared and tempered. Ghee was heated to 50 °C before being combined with the emulsifier to make the fat phase. It was then rapidly cooled to 20 °C (rate of cooling, 12 °C/min) with continuous agitation in a cold water-bath (2.5 °C 1 °C) and finally to 5 °C by quiescent holding in a refrigerator for an overnight duration. The chilled fat phase was then tempered at room temperature for 6 hours before usage to the blending temperature of 25 °C 1 °C.

The final product was tested for sensory factors such as colour and appearance, flavour, body and texture, spread ability, and general acceptability, according to the findings. It was concluded from this investigation that a reduced fat spread made with blanched powdered strawberry was the most acceptable.

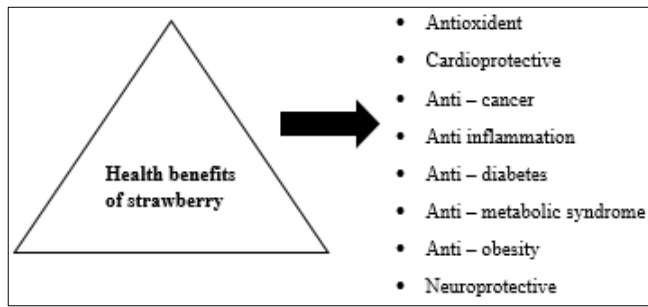


Fig 2: Health benefits of strawberry (Sharma *et al.*, 2009)

Table 3: Nutritional composition of strawberry (Yildiz *et al.*, 2014)

Carbohydrate	Protein	Fat	Calories	Fibre
11.7g	1 g	0.5g	49 kcal	3 g

### 2.3 Bread spread with tender coconut pulp

The coconut palm (*Cocos nucifera* L), a palmaceae family member, is one of the world's most economically important trees. The various possible uses of this multi-purpose tree crop have earned it the nickname "tree of life." Coconut holds a unique place among the different horticulture crops grown throughout the universe due to its contributions to both the food and edible oil economies. Only about 50-55 percent of India's matured nuts are used for domestic culinary purposes as well as social and religious occasions, leaving the rest for processing into oil and various food products. Around 15% of the collected nuts are used at the tender nut stage for direct consumption as well as conversion into bottled beverages (GOI, 2008). The raw materials that needed for this is Tender coconuts aged 7-8 months were purchased from local stores, while fully ripened fruits were obtained from Thrissur, Kerala neighbourhoods. The flesh of the young coconut is a white albuminous endosperm that was chosen for the study because it is edible and tender. Tender coconut pulp was used as the substrate for the spread, which was then combined with fruit extracts in three different quantities. Guava extracts in 75:25, 50:50, and 25:75 ratios from tender coconut pulp (TCP). Tender coconut pulp (TCP): 75:25, 50:50, and 25:75 extracts of jackfruit rind. Plantain extracts in 75:25, 50:50, and 25:75 ratios from tender coconut pulp (TCP). Three replications of the experiment were carried out in CRD. In an open pan, delicate coconut pulp and fruit extracts were combined in the desired ratio and heated continuously with the other ingredients. When the TSS reached 68-690 Brix, the heating was turned off and the liquid was poured into clean, sterilized, and dry glass bottles with a volume of 200 mL and sealed airtight. The bottles were then kept at room temperature for storage testing. For a period of six months, quality evaluations of the products were conducted at monthly intervals. A panel of ten judges conducted an organoleptic examination of the spread using a score card, and quality criteria such as appearance, color, flavor, texture, taste, and overall acceptability were scored using a nine-point hedonic scale. The findings of this study demonstrate that various fruit extracts such as guava, plantain, and completely wasted jackfruit rind, as well as residual coconut pulp left in tender coconuts after intake of coconut water, can be used to make spread. The spread's physicochemical and organoleptic examination revealed that the items had a six-month shelf life when stored at ambient temperatures. When different textural characteristics such gel strength, adhesiveness, brittleness, and rupture strength were investigated, the generated spread was shown to have good textural features. At the conclusion

of six months of storage, microorganisms were found, although they were within acceptable limits. The goods were ranked based on the scores they received for several organoleptic qualities. ST8 (50 percent TCP + 50 percent PE) received the greatest ranking in terms of spread, followed by ST3 (25 percent TCP+ 75 percent GE).

Spread's production costs ranged from Rs. 14.63 to Rs. 18.13/200g. The spread made from jack fruit rind extract was determined to have the lowest production cost. Because the items are calorie-dense, they will appeal to people of all ages, with the exception of those on calorie-restricted diets. The spread's nutritional and organoleptic appeal was improved by blending it with soft coconut pulp and fruit essence.

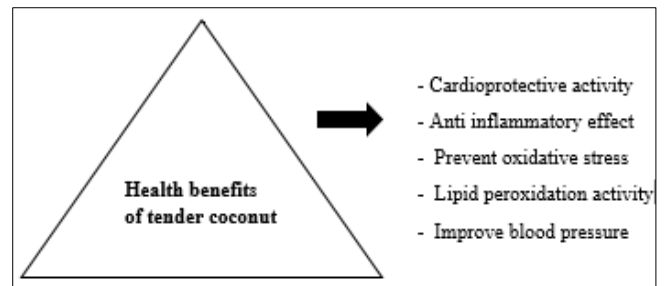


Fig 3: Health benefits of tender coconut (Zulaikhah, 2019) [28]

Table 4: Nutritional composition of tender coconut (Shahanas *et al.*, 2015) [23]

Carbohydrate	Protein	Fat	Calorie	Fibre
6.8g	1.5 g	15g	160 kcal	4g

### 2.4 Bread spread with shea butter

Shea tree fruit is green in color and contains a fleshy edible pulp that is high in vitamins and minerals. It is highly sweet and includes 0.7-1.3 g of protein and 41.2 g of carbs. In comparison to oranges, which have 50mg/100g of ascorbic acid, the fruit pulp has 196.1mg/100g. The iron and calcium content is comparable to that of raspberries (FAO, 1998). Sugar concentration ranges from 3-6 percent, with glucose, fructose, and sucrose being divided evenly. Shea butter is made in one of two ways. Traditional and chemical processes include hexane extraction, clay filtering, and refined shea butter as the final product (Davrieux *et al.*, 2010) [8]. Shea butter is used as a foundation for therapeutic ointments, and its anti-inflammatory, emollient, and humectant effects have been reported. Shea butter is also used as a water proofing wax, in hair styling, and in candle production. It's also used to treat colds and the flu. It's also used by traditional African percussion instrument makers to help wood and leather ties last longer (Alander, 2004). Shea butter is used as a cooking oil in West Africa, particularly Ghana, Nigeria, and Togo (Olajide *et al.*, 2000). It is edible and can be used in cooking, and the chocolate industry occasionally substitutes shea butter for cocoa butter, but the taste is different. Shea butter has found a market in Europe and Asia as a baking fat, margarine and other fatty spreads, confectionery and chocolate sector due to its high nutritional value (Akhter *et al.*, 2008) [3]. Shea butter could be a creamy solid at room temperature, easily spreading on bread like dairy butter. It is extremely high in vitamins A and E, and it offers the skin with all of the necessary nutrients for balance and flexibility. Spices such as ginger, garlic, and fragrance leaves are widely used in Nigeria. They are a collection of esoteric food additives that have been used to improve the sensory quality of foods for

thousands of years. These spice ingredients provide dishes a distinct flavor, aroma, or piquancy, as well as color. JMBFS / Ifesan *et al.* 2012: 1 (6) 1406-1423 1408 Several studies have shown that plant extracts or essential oils can be used as food additives and have antioxidant qualities (Banon *et al.*, 2007; Capenter *et al.*, 2007; Ifesan *et al.*, 2009a,b; Ifesan *et al.*, 2010).

A local factory in Ilorin, Kwara State, provided processed shea butter. Suaya spice was obtained in Wuse, Abuja, Nigeria, while ginger, garlic, and fragrance leaf were purchased at a local market in Akure, Ondo State. Sorted ginger, garlic, and fragrance leaves were rinsed in water. They were dried in an air oven at temperatures ranging from 50 to 550 degrees Celsius. The spices were processed into powder form after drying. Shea butter and spice blends were made in two ratios: 70:30 (shea butter: spice) and 85:15 (shea butter: spice) (shea butter: spice). Shea butter and spice were weighed into a blender and properly combined to achieve a homogeneous product, which was then packaged in a transparent rubber plastic and stored at room temperature for 4 weeks. The following labels were applied to the samples: SGG (70:30) SGG Shea butter + Ginger (85:15) SSS Shea butter + Ginger (70:30) - Suaya spice + shea butter, SSS (85:15) -SGL, Shea butter + Suaya spice (70:30) -SGL Shea butter + Garlic (85:15) SSL -Shea butter + garlic (70:30) -.The saponification value in shea butter-spice samples was reduced when the quality of the butter was improved by adding different spices to make bread spread. The addition of spices to shea butter improved the blends' ability to scavenge free radicals, potentially extending the shelf life of the items. In addition, sensory evaluation scores suggested that the shea butter + sua ya spice blend was the most preferred in terms of taste and color.

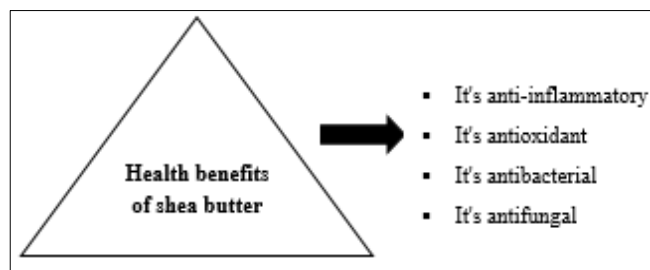


Fig 4: Health benefits of shea butter (Honfo. *et al.* 2014) [12]

Table 5: Nutritional composition of shea butter (Akhter *et al.*, 2008) [3].

Carbohydrate	Protein	Fat	Calorie	Fibre
0g	0g	14g	120 kcal	0g

## 2.5 Peanut butter

The peanut (*Arachis hypogaea*) is officially a pea and belongs to the bean/legume family (Fabaceae). Despite being a legume, it is usually classified as an oilseed due to its high oil content. Peanuts are a good source of protein, oil, and fibre (Lukaniuk *et al.*, 2011). Sometimes known as “groundnuts” in some world areas, Peanuts are the edible seeds of a legume. India is the world’s second-largest producer of peanuts, with an annual production of 7.131 million metric tons. Peanuts are used to make peanut butter, confections, roasted peanuts, snack items, extenders in meat product formulations, soups, and desserts, in addition to oil. Peanuts are eaten in several ways worldwide, most of which are traditional dishes.

People on excursions to places like Antarctica, space, and hiking use peanuts as their sole source of nutrition. In recent

years, it has notably been the source of eradicating malnutrition among the populace of several African countries (Guimon and Guimon, 2012). According to a recent study, cooking peanuts increases their antioxidant content. Boiling peanuts increases the amount of the isoflavone antioxidants biochanin A and genistein by two and four times, respectively (Craft *et al.* 2010) [7]. Peanuts and peanut butter are popular as a snack, meal items, and ingredients in various commercial products, and their consumption is linked to a lower incidence of cardiovascular disease, and they offer little harm to positive energy balance. However, concerns have been raised about whether product shape (e.g. whole nut vs butter) and processing characteristics (e.g. roasting and flavouring) may impair their beneficial health benefits. The effects of peanut shape and processing on two CVD risk factors: fasting plasma lipids and body weight, were studied in this study. One hundred and eighteen persons (47 men and 71 females; age 292 (SD 84) years; BMI 300 (SD 45) kg/m<sup>2</sup>) were studied. For four weeks, participants from Brazil, Ghana, and the United States were randomly assigned to eat 56 g of raw unsalted (n 23), roasted unsalted (n 24), roasted salted (n 23), or honey-roasted (n 24) peanuts, or peanut butter (n 24). Peanut shape and processing did not affect body weight or fasting plasma lipid responses in the whole sample. However, when comparing high fasting plasma lipids candidates to those with normal fasting plasma lipids, HDL-cholesterol rose considerably at the group level, while total cholesterol, LDL-cholesterol, and TAG concentrations fell significantly. These findings show that the processing characteristics investigated in this study do not impair the lipid-lowering benefits of peanuts or have a detrimental influence on body weight. In order to evaluate the impact of peanut shape and processing on additional health risk factors, more research is needed (Kiernan *et al.*, 2010) [15].

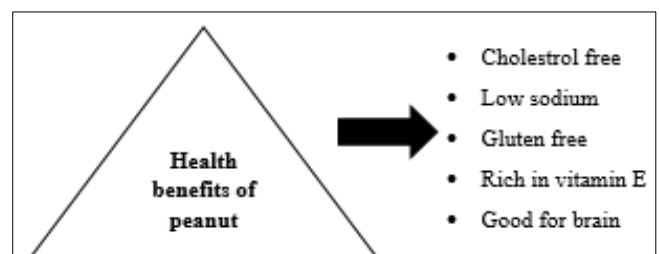


Fig 5: Health benefits of peanut (Kiernan *et al.*, 2010) [15].

Table 6: Nutritional composition of peanut (Craft *et al.* 2010) [7].

Carbohydrate	Protein	Fat	Calorie	Fibre
4.6 g	7.3 g	14 g	161 kcal	2.4g

## 2.6 Jackfruit seed bread spread

The largest tree-borne tropical fruit globally, the jackfruit (*Artocarpus heterophyllus* Lam), belongs to the Moraceae family. It is a monoecious evergreen tree that’s thought to be native to the Western Ghats rain forests in India’s southwest (Baliga *et al.*, 2011) [6]. Jackfruit is the national fruit of Bangladesh and Indonesia (Matin, 2015). The name jackfruit is taken from the Portuguese word *jaca*, which originates from the Malayalam word *chakka*. Jackfruit is a significant underutilised tropical fruit, frequently referred to as the poor man’s fruit that has been used to add value to dishes in India since ancient times (Arora and Parley 2016) [4]. This section of the jackfruit is a good source of vital food components like carbohydrates, protein, and minerals (Ocloo *et al.*, 2010) [16].

However, they are not used to their full potential due to the lack of knowledge about the seeds' nutritional and food production potential.

Jackfruit seeds are valuable by-products that account for more than 15% of the total weight of the fruit (Akter and Huque 2018) [2]. As a result, the goal of this study was to explore if the jackfruit seed could be used to make a bread spread that was healthy, inexpensive, and acceptable in terms of consistency, texture, scent, and flavour. After three experimental formulations, the standardised recipe for jackfruit seed spread was discovered. Clean jackfruit seeds were cooked for 30 minutes before being blended with jackfruit rags, raw sugar, olive oil, lemon juice, lemon rind, turmeric powder, and salt until a paste-like consistency and smooth texture were reached. In order to eliminate the excess moisture, enhance shelf life, and achieve a spreadable consistency, the mixed ingredients were simmered for 15 minutes on low heat. The finished product was sealed in sterilised jars. The qualities of jackfruit seed spread include a canary yellow hue, a silky texture, a lemony scent, and a sweet acidulous flavour. Potassium (59mg), phosphorus (8mg), calcium (26mg), magnesium (4mg), thiamin (0.02mg), riboflavin (0.02mg), niacin (0.2mg), and vitamin C are all included in one meal (21g) (2mg). On a nine-point hedonic scale, 30 evaluators of both genders assessed the product as very highly liked. The jackfruit seed spread is inexpensive, with a jar of 200g net weight retailing for 58.00. In the refrigerator, the shelf life is 30 days. It was suggested that more research be done on manufacturing jackfruit seed dispersed on a big scale in areas where the fruit is commonly grown (Supit *et al.*, 2018) [22].

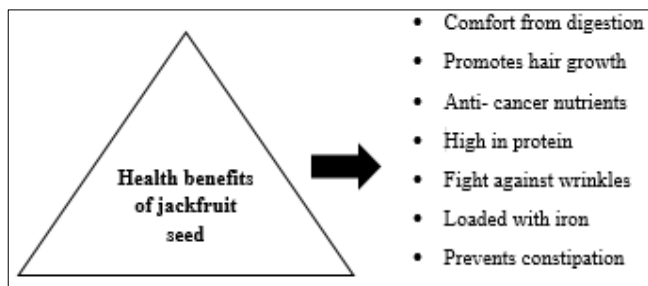


Fig 6: Health benefits of jackfruit seed (Supit *et al.*, 2018) [22].

Table 7: Nutritional composition of jackfruit seeds (Supit *et al.*, 2018) [22].

Carbohydrate	Protein	Fat	Calorie	Fibre
22.2g	1.45g	0.33g	93.7	1.5g

### 2.7 Cashew nut chocolate – bread spread

Consumers nowadays seek products with more tremendous health advantages, which has resulted in significant growth in consumer knowledge and interest in the health-enhancing properties of certain foods or dietary components (Jnawali, Kumar, & Tanwar, 2016). Many families use margarine as a spread, although it is discouraged owing to concerns voiced

by health providers about the trans-fats in margarine. On the other hand, cashew nuts are high in macro- and micronutrients, phytochemicals, tocopherols, and phenolic compounds. Furthermore, the nutritional profile of nuts revealed that they are high in unsaturated fatty acids, fibre, minerals, and proteins, making them healthful meals (Chen, Lapsley, & Blumberg, 2006). They include essential fatty acids, which are required for the body's healthy functioning and play a vital role in controlling various metabolic, transport, and excretion activities (Soares *et al.*, 2013). The creation of a nut spread can expand the culinary applications of cashew nuts & introduce customers to a healthier breakfast or snack option (Shakerardekani & Karim, 2012). As obesity, diabetes, and other lifestyle-related disorders threaten the world, health concerns take precedence in people's eating choices. As a result, manufacturing a plant-based spread will provide individuals with a healthier spread option (Kulkurani & Soni, 2014). A spread is a type of food applied over bread, crackers, or other pastries. Cheese, butter/margarine, jam/jellies, and chocolate spread are frequently prepared from fruits, nuts, milk, fat, and chocolate. Nut spreads are spreadable nuts mashed into a paste (Shakerardekani, Karim, Ghazali, & Chin, 2013). The preparation method is that all other additional components (sugar, milk, vegetable oil, and flavour) were acquired at the Madina market in Accra, Ghana, and roasted cashew nuts from CRIG's (Cocoa Research Institute) Ghana, Tafo) substation in Koforidua. The roasted cashew nuts were ground into a slurry in a household blender. Cashew nut slurry (CNS) was substituted for cocoa powder (CP) in the preparation of chocolate spread at a rate of 95 per cent, 90 per cent, 85 per cent, 80 per cent, and 75 per cent, for a total of five samples. Thirty-five per cent cashew nut-CP composite, 29.4 per cent sugar, 20 per cent milk, 15 per cent vegetable oil, 0.1 per cent vanilla, and 0.5 per cent lecithin were found in the prepared spreads. A melanger was used to weigh and grind the components. A market-purchased chocolate spread was utilised as a control (Olaleye *et al.*, 2021) [17]. In microbial analysis, microorganisms such as bacteria, mould, and yeast proliferate with high water activity, but because most confectionery goods have a low water activity (less than 0.75), they are resistant to microbial deterioration and can be considered ambient-stable (Subramaniam, 2000). The mineral content of the cashew nut-chocolate spreads was more significant than the control sample (Mg, Na, and K) (Olaleye *et al.*, 2021) [17].

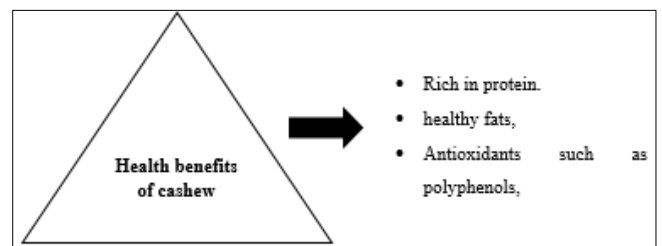
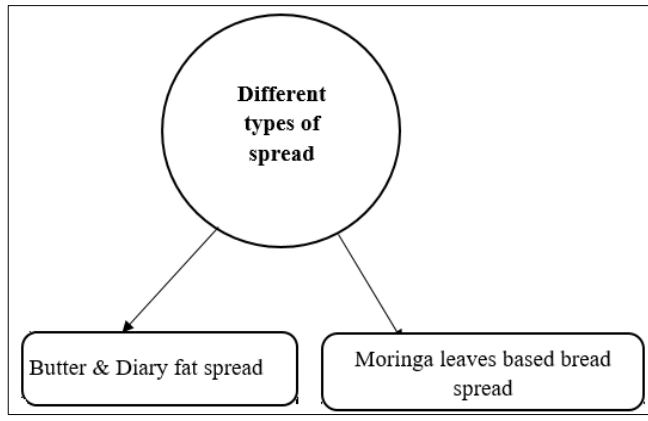


Fig 7: Health benefits of cashew (Olaleye *et al.*, 2021) [17].

Table 8: Nutritional composition of cashew (Kulkurani & Soni, 2014).

Carbohydrate	Protein	Fat	Calorie	Fibre
8.6g	5.2g	12g	157 kcals	0.9g

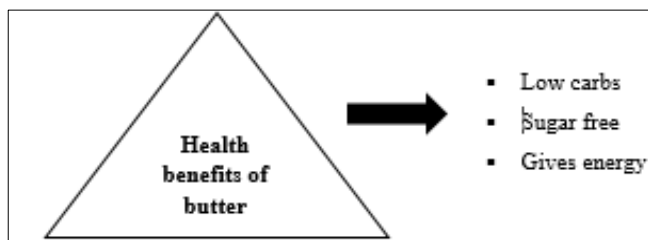
### 3. Different bread spread



**Fig 8:** Different type of spread (Timbabadiya *et al.*, 2017), (Khedkar, 2016) (Thilakaratne *et al.*, 2014), (Supit *et al.*, 2018) [22, 26]

#### 3.1 Butter and dairy fat spread

Butter can be prepared by churning fresh or fermented cream or milk. Using milk fat to make butter is an ancient method of conserving milk fat. Butter is responsible for the majority of milk’s nutritional value. Butter is commonly used as a spread and a condiment in baking, sauce making, and pan-frying (Khedkar, 2016). Oils and fats are standard components in a wide range of produced meals, and they play a crucial role in many culinary recipes (Sato & Ueno, 2014). Spreadable fats are one of them, as they are ‘plastic’ in nature and may be spread thinly over food items like bread slices. Butter, margarine, and other fat blends and spreads are examples of spreadable goods typically made from milk fat, other fats (vegetable, animal, or marine origin), or a combination of milk fat and other fats. Butter, for example, has been known to be manufactured since ancient times as a means of keeping milk fat to be utilised in cooking and for medicinal and aesthetic uses (Early, 1998). Even after commercial manufacture, butter remained a relatively costly commodity among fat-based goods (Varnam & Sutherland, 1994). As a result, in 1869, french scientist ‘Hippolyte Mege-Mouries’ invented ‘margarine’ as a low-cost alternative for butter. Margarine was formerly widely accepted as a spread, but its vegetable fat source is not regarded as tasting, feeling, or looking like butter in taste, texture, or mouthfeel (Ahmed & Luksas 1988). Furthermore, regardless of the fat in margarine and butter, the high-fat level was a significant health problem for dietary conscientious people. As a result, various low-fat spreads have been created (Varnam & Sutherland, 1994).



**Fig 9:** Health benefits of butter (Khedkar, 2016).

**Table 9:** Nutritional composition of butter (Khedkar, 2016).

Carbohydrate	Protein	Fat	Calories	Fibre
0g	0.1g	12g	102 kcal	0 g

#### 3.2 Moringa leaves based bread spread

Moringa leaves are abundant in protein, calcium, magnesium, potassium, iron, vitamin A, choline, thiamine, vitamin C, and valine, among other nutrients. Murunga (*Moringa oleifera*), a typical arid zone home-garden vegetable crop in Sri Lanka, belongs to the Moringaceae family. *Moringa oleifera* is a tiny, fast-growing evergreen or deciduous tree that can reach a height of 10 to 12 metres. It features a spreading, open crown with drooping, brittle branches, tripinnate leaf, and thick, corky, whitebark (Parrotta, 2014). In Sri Lanka, several types of *Moringa* are grown, including Rann murunga (a native variety), Jaffna, and Chavakachcheri murunga (Ramachandra *et al.*, 1987). The majority of women in Sri Lanka are currently employed and have busy lives. As a result, people seek items that are both handy and time-saving. Instant food is in high demand these days. Bread spread is an immediate meal item that fits people’s busy lifestyles and is a simple method to provide nutrition. Low-cost product development *Moringa* leaves-based bread spread contains many nutrients, and the *Moringa* tree is widely available in Sri Lanka. Therefore, using a bread spread made from *Moringa* leaves can save time and money while providing a high level of nutrition. In order to evaluate the physicochemical characteristics and organoleptic features of a bread spread made from dried *Moringa* Leaves powder in light of these observations, this study was conducted.

Moreover, the storability economics of the storability and economics of the generated product (Thilakaratne *et al.*, 2014) [26]. *Moringa* leaves are well-known for being a high-protein, readily digested dietary source (Fahey, 2005) [9]. They are high in protein, vitamins, calcium, iron, ascorbic acid, antioxidants, and other nutrients such as carotenoids, flavonoids, and phenol. Youngsters consume *Moringa* in various poor and impoverished nations worldwide (Kasolo *et al.*, 2010). Preparation of *Moringa* leaves bread spread is According to the trial and error method, water was added to the dehydrated *Moringa* leaves powder, carrot powder, and pepper powder in a 4:1 ratio to rehydrate the *Moringa* leaves powder, carrot powder, and pepper powder, and this was mixed according to the recipe using a spoon for the preparation of the *Moringa* mixture. The prepared *Moringa* mixture was cooked to 80 °C for three minutes in an open pan. Then, a margarine mix was created by combining mustard powder and vinegar. Finally, an electric beater was used to combine the *moringa* and margarine combination.

When the temperature of the *Moringa* combination dropped below 350 °C, citric acid was added to lower the PH. The prepared spread was poured into the sanitised glass container and polypropylene cups. Capping was done immediately after filling the bottles and cups. Using a sensory panel of 30 untrained panellists from the Institute of Post-Harvest Technology, a sensory evaluation was conducted to determine the best treatment from the four preliminary treatments and the best treatment from the other refined recipes. A five-point Hedonic scale assessed colour, odour, flavour, and spreadability. Two packing materials (glass packaging and propylene cups) were used for this investigation and kept under storage settings of ambient temperature and refrigerated temperatures. A storage study was conducted to establish the designed bread spread’s shelf life and find the best packing material for the product. The product stored in a polypropylene cup at room temperature was rejected after the first month of preparation. The product stored in a polypropylene cup at room temperature was rejected after two

months of preparation because it contained a higher microbial count than the Sri Lankan margarine standards. Gas and crack formation were detected, and pH was increased from 4.15 to 5.19 in a polypropylene cup at ambient temperature and from 4.15 to 4.8 in samples held in a polypropylene cup at refrigerated temperature acidity decreased from 0.087 to 0.082. As a result, only the storage of samples in glass bottles was studied, and the optimal storage conditions were both ambient and chilled. The product's shelf life could not be determined due to a time constraint. On the other hand, Moringa Leaves Powder Bread Spread was safe to eat for three months (Thilakaratne *et al.*, 2014) [26].

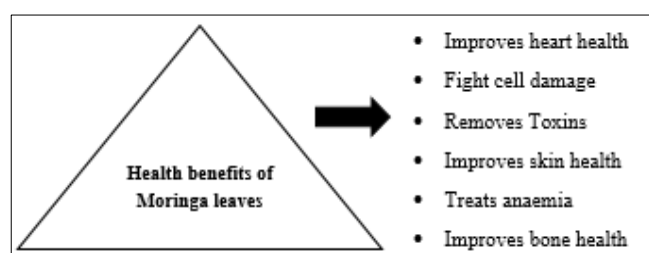


Fig 10: Health benefits of Moringa leaves (Parrotta, 2014).

Table 10: Nutritional composition of Moringa leaves (Thilakaratne *et al.*, 2014) [26].

Carbohydrate	Protein	Fat	Calories	Fibre
38.2 g	27.1 g	2.30g	205 k cal	19.2 g

#### 4. Conclusion

Various bread spread food available in the market is discussed in this. A spread is a food applied onto other foods like bread and crackers. Spreads are used to add flavour and texture to dishes that might otherwise be bland. Butter and soft cheeses are typical spreads, and there is a growing desire for ready-to-eat and ready-to-cook convenience items due to recent social and cultural developments. (Sehgal and Sehgal, 2002). Different types of spreads are available in the market, like peanut butter, butter and dairy fat spread, cashewnut chocolate bread spread, bread spread with tender coconut pulp, low fat strawberry spread, moringa based bread spread and jackfruit seed-based bread spread, bread spread with shea butter. When different textural characteristics such as gel strength, adhesiveness, brittleness, and rupture strength were investigated, the generated spread was shown to have good textural features. At the conclusion of six months of storage, microorganisms were found, although they were within acceptable limits. The saponification value in shea butter-spice samples was reduced when the quality of the butter was improved by adding different spices to make bread spread. The addition of spices to shea butter improved the blends' ability to scavenge free radicals, potentially extending the shelf life of the items. In addition, sensory evaluation scores suggested that the shea butter + suya spice blend was the most preferred in terms of taste and color. In the refrigerator, jackfruit seed spread has a shelf life of 30 days. Bread spread made from dehydrated murunga leaves powder could be developed. The cost of the ingredients is estimated to be Rs. 49/= for the preparation of 100g of the product. The recipe calls for 40% dehydrated murunga leaves powder and 10% carrot powder, 35 percent margarine, 8.4% chopped onion, 3% vinegar, 1.2 percent mustard powder, and 1.2 percent pepper powder. The optimal recipe was found to be 1.2 percent salt. The developed bread spread could be stored in

glass jars at room temperature or in the refrigerator for three months without losing its quality. The final product was tested for sensory metrics such as color and appearance, flavor, body and texture, spreadability, and overall acceptability, according to low fat strawberry. It was concluded from this investigation that a reduced fat spread made with blanched powdered strawberry was the most acceptable.

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