

## Overview

Maple and chocolate maple hazelnut spread recipes were developed using maple sugar and hazelnuts as the primary ingredients. The recipes were designed with ingredients known for their antioxidant, mineral, vitamin, and protein contents. With a market for nut-based spreads expected to grow at a compound annual growth rate of 7% between 2024 and 2029 (Market Data Forecast, 2024), this sweet treat is ideal for maple and chocolate



consumers. Nut spreads have various uses, including spread on fresh fruit, pancakes, crepes, toast, pretzels, or other snack products. An overview of ingredients, recipes, regulation requirements for commercial production, packaging information, and pricing information are presented below.

## The Science of Maple Hazelnut Spreads

Multiple ingredients are necessary to produce shelf-stable maple hazelnut spreads. Each ingredient presented below was selected and balanced for flavor, texture, mouthfeel, and shelf-stability. The ingredients are multi-functional and thus categorized by their lipid, carbohydrate, and protein content for simplicity.

### Roasted Hazelnuts

Roasted hazelnuts are the second most common ingredient in the hazelnut spread recipes. In raw form, they contain antioxidants, vitamins, and minerals (Steutz et al., 2017) and an average of 56% fat, 15% protein, 16% dietary fiber, and 4% moisture (Müller et al., 2020). Roasted hazelnuts maintain a similar nutritional profile (Schlörmann et al., 2015), with approximately 2% moisture (Hartel et al., 2018a). Roasted hazelnuts are used in these recipes due to the flavor profile developed during roasting. According to consumer testing, an acceptable roasted hazelnut profile develops when unshelled, raw hazelnuts are roasted at 300 °F for 20 to 28 minutes (Saklar et al., 2001).

### Lipids (Fats)

A combination of solid and liquid fats aid in the appearance, spreadability, stability, and texture of hazelnut spreads. Palm oil is commonly used in commercial hazelnut spreads as it contains liquid and solid fats at room temperature. Due to health and environmental

concerns with palm oil, multiple studies have explored alternative fats. The recipes presented below contain fat from cacao butter, hazelnuts, hazelnut oil, sunflower oil, and ghee. The fats contain vitamins, minerals, and fatty acids, such as linoleic acid, with multiple reported health benefits (Kim et al., 2016).

### **Carbohydrates (Sugars)**

In general, sugars increase sweetness and viscosity or thickness, and act as a preservative by reducing water activity, the water available for microbial growth (Vaclavik et al., 2021). Maple sugar, whole milk powder, and whey protein concentrate are the primary sugar sources in this product, and each provide a distinct flavor and sweetness.

### **Proteins**

Proteins have multiple functions in food products. Whey protein, the primary protein source in these recipes, can aid in emulsifying or stabilizing, thickening, and water-binding. While whole milk powder and cocoa powder increase viscosity and contribute to flavor (Liang and Hartel, 2004).

### **Stabilizer**

**Lecithin** is a phospholipid, a type of lipid commonly used as a stabilizer or emulsifier. It can help to stabilize and reduce spoilage of fats (Judde et al., 2003) and reduce product stickiness (Hartel et al., 2018b). An addition of 0.25 to 0.5% lecithin is common in confectionary products (Hartel et al., 2018b). The recipes below use 0.5% lecithin.

### **Equipment**

When making a nut spread, a food processor or a stone grinder, also called a melanger, can be used. A food processor uses metal blades to chop and mix ingredients quickly, resulting in a coarse textured product. A melanger uses granite stones to grind ingredients into a smooth, homogenous paste.



## Recipes

### Maple Hazelnut Spread<sup>1</sup>

#### *Ingredients*

200 g Roasted hazelnuts  
85 g Ghee  
50 g Hazelnut oil  
40 g Sunflower oil  
20 g Cacao butter  
5 g Granule lecithin  
435 g Maple sugar  
120 g Whole milk powder  
45 g Whey protein concentrate

### Chocolate Maple Hazelnut Spread

#### *Ingredients*

163 g Roasted hazelnuts  
85 g Ghee  
110 g Hazelnut oil  
15 g Cacao butter  
5 g Granule lecithin  
437 g Maple sugar  
55 g Whole milk powder  
65 g Whey protein concentrate  
65 g Cocoa powder

<sup>1</sup>To increase maple flavor, the maple hazelnut spread recipe can be adapted to contain 475 g maple sugar, 75 g whole milk powder, and 50 g whey protein concentrate. No other changes in ingredients or preparation directions. For more information, please see the Consumer Evaluation section below.

#### *Directions*

1. Roast hazelnuts at 300 °F for 20 to 28 minutes or reheat roasted hazelnuts for 10 to 15 minutes at 300 °F.
2. Add hazelnuts to a food processor or melanger. If a melanger is used, roughly chop the hazelnuts prior to grinding using a mortar and pestle. Blend or grind hazelnuts to a paste (3 to 5 minutes).
3. Add ghee, hazelnut oil, sunflower oil, cacao butter, and granule lecithin to the hazelnut paste. Continue to process in the food processor or melanger.
4. Add the maple sugar, whole milk powder, whey protein, and cocoa powder.
5. Continue to blend or grind to a desired consistency. If grinding with a melanger, a smooth texture is formed after approximately 4 hours.
6. Transfer the spread into food grade containers. Store the finished product at ambient temperature. Refrigerating or freezing containers result in a temporarily thicker product that is difficult to spread. Ideal packaging options include glass, polypropylene (PP) lined with polyvinylidene chloride, and polyethylene terephthalate (PET).

*Recipe yield is approximately 1000 g (35.3 oz).*

## Regulations

### Regulation Requirements

Commercial production of a hazelnut spread requires a scheduled process from a Process Authority. Scheduled processes are required for any food or beverage product manufactured for sale in which refrigeration or additional steps are necessary to ensure a safe product. The Cornell Food Venture Center offers scheduled process services which provide information on procedures to produce a safe product, record keeping requirements, and information on licenses and registrations required to produce said product. The guidelines presented below are for informational purposes only; it is the responsibility of each maple producer or food facility to ensure compliance and adhere to regulatory requirements.

Maple hazelnut spreads are considered low water activity foods, meaning the free water available in the product is low enough that microbial growth is not a concern, and the product is not subject to additional regulatory requirements required for acidified foods (Part 114, 2000) or thermally processed, low-acid foods (Part 113, 2011). However, the hazelnuts, whole milk powder, and whey protein concentrate ingredients are susceptible to pathogens and, if required in the Scheduled Process, must be verified as pathogen free or be evaluated for *Salmonella*, *Listeria monocytogenes*, and pathogenic *E. coli*. In New York State, hazelnut spreads must be produced in a kitchen with a 20-C Food Processing Establishment License from New York State Department of Agriculture and Markets. Food facilities located outside of NYS, should check with their state department or state regulatory agency prior to commercial production.

### Food Additives

A food additive is any substance that becomes a component of or otherwise affects the characteristics of any food. Food additives must be “generally recognized as safe” (GRAS) or approved for use by the FDA; these include preservatives, stabilizers, anti-caking agents, among others. The food additive, lecithin, is recommended to maintain quality and stability. Please refer to “The Science of Maple Hazelnut Spreads” section for information on the functionality of lecithin.

**Lecithin** is an emulsifier that stabilizes food products. It is a common ingredient in caramels, fudge, chocolates, salad dressings, soups, among many others (USDA-ARS, 2023). It helps maintain texture, prevent separation, and improve the shelf-life of foods. It is a GRAS substance with no limitations for use in food products (Lecithin, 2023).

## Packaging and Labeling

Nut spreads require packaging that prevents moisture migration and is suitable for products with high fat content. Common packaging options include glass, polypropylene (PP) lined with polyvinylidene chloride, and polyethylene terephthalate (PET). Each is a strong material with an excellent moisture, gas, oil, and chemical barrier.

Packaging must contain a tamper evident seal that is approved for food use. These are closures that provide visual evidence if the package has been opened or tampered with. Multiple tamper evident seals are available in the food industry, an example of seals appropriate for hazelnut spread include induction liners or seals that adhere to the product container with heat and must be peeled off for consumers to access the product. Induction seals are common in peanut butter containers and protect the product from quality spoilage from oxidation. Other tamper evident seals can be used on this product, unless specified by the Process Authority.

## Cost and Pricing

Determining the cost of a product involves calculating all production expenses, including but not limited to ingredients, packaging, equipment, labor, and energy use. Additional costs may include marketing, advertising, and shipping. Due to the variation in costs from business to business, only ingredient costs are presented (Table 1). The ingredient price can be reduced by sourcing for competitively priced or bulk ingredients.

Table 1. Estimated costs of hazelnut spread ingredients per 1000 g batch.

Ingredient	Maple Hazelnut Spread <sup>1</sup>	Chocolate Maple Hazelnut Spread <sup>1</sup>
Roasted Hazelnuts	\$4.00	\$3.26
Ghee	\$0.68	\$0.68
Hazelnut oil	\$0.50	\$0.59
Sunflower oil	\$0.20	N/A <sup>2</sup>
Cacao butter, odorized	\$0.24	\$0.26
Powdered lecithin	\$0.23	\$0.23
Maple sugar <sup>2</sup>	\$1.74	\$1.75
Whole milk powder	\$1.92	\$0.88
Whey protein concentrate	\$0.18	\$0.26
Cocoa powder	N/A <sup>3</sup>	\$0.59
Total cost per 1000 g batch:	\$9.79	\$9.00
Total cost per 6 oz (200g):	\$1.96	\$1.80

<sup>1</sup> Values calculated using the maple hazelnut and chocolate maple hazelnut spread recipes in the Recipe section. <sup>2</sup> Includes sugar with a bulk price of \$2.50 per pound. Does not include the cost of converting syrup to sugar. <sup>3</sup> Not applicable = N/A

At the time of this publication, hazelnut spreads containing maple were not found in the online marketplace. The premium chocolate hazelnut spreads were sold for \$5.71 to 8.80 per 200 g.

## Consumer Evaluations

To understand consumer insights, a consumer preference test was conducted with 200 maple consumers during Maple Weekend events in western and eastern New York. At each event, consumers evaluated a sample of either maple hazelnut spread or chocolate maple hazelnut spread, with 100 evaluations completed per spread type.

Overall, maple hazelnut spread was liked by 90% of consumers, with 53% liking the product extremely. Similarly, chocolate maple hazelnut spread was liked by 95% of consumers, with 52% liking the product extremely (Figure 1). Consumers were also asked to rate characteristics of the spreads, including maple or chocolate flavor, hazelnut flavor, sweetness, creaminess, and viscosity (Figure 2). In the maple hazelnut spread, maple flavor was rated as “just about right” by 50% of panelists, while 44% of consumers reported not quite enough or not nearly enough maple flavor. The recipe presented in the Recipe section contains 43.5% maple sugar.

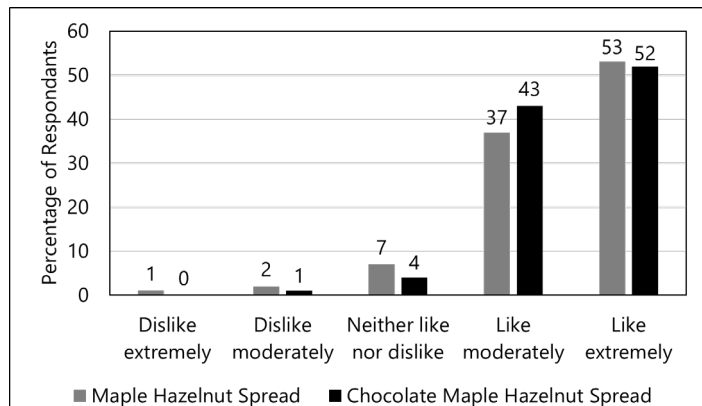


Figure 1. Overall liking of maple hazelnut spread (n=100) and chocolate maple hazelnut spread (n=100) on a 5-point scale. All participants were consumers of maple products.

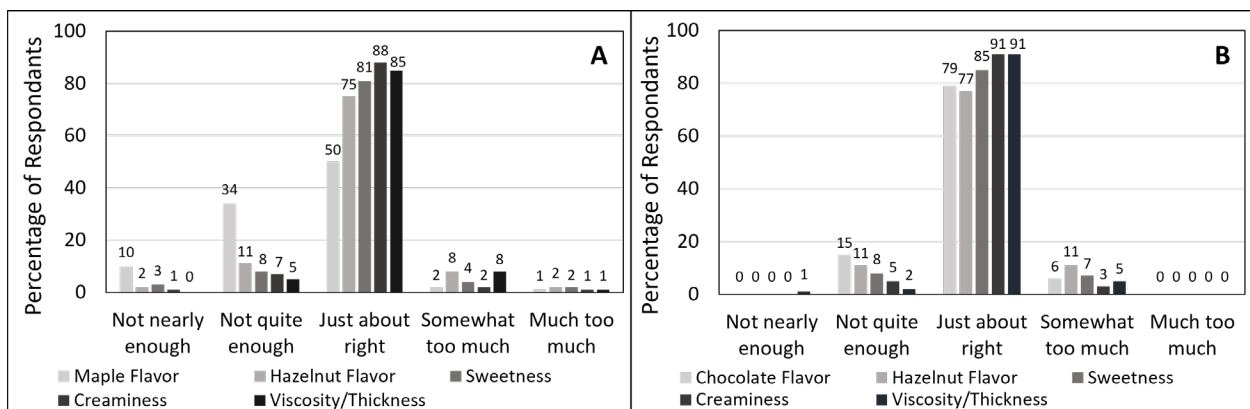


Figure 2. Acceptance of flavor and texture attributes of maple hazelnut spread (a; n=100) and chocolate maple hazelnut spread (b; n=100) on a “just about right” scale. All participants were consumers of maple products.

To increase the maple flavor in maple hazelnut spread, a post hoc test was conducted. The alternative recipe has increased maple sugar (43.5% to 47.5%) and whey protein concentrate (4.5% to 5%) and reduced whole milk powder (12% to 7.5%). No other alterations were explored, as consumer's rated maple hazelnut spread as "just about right" for hazelnut flavor (75%), sweetness (81%), creaminess (88%), and viscosity or thickness (85%).

In the chocolate maple hazelnut spread, consumers rated "just about right" for chocolate flavor (79%), hazelnut flavor (77%), sweetness (85%), creaminess (91%), and viscosity or thickness (91%). No post hoc tests were performed to adapt the chocolate maple hazelnut spread recipe.

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