DEVELOPMENT OF MINT MARSHMALLOW

A project submitted to University of Calicut in partial requirement
For the award of the degree Bachelor of Science program

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Undertaken at

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DECLARATION

I hereby declare that the project entitled **"DEVELOPMENT OF MINT MARSHMALLOW"** submitted to **B.VOC FOOD PROCESSING & SAFETY MANAGEMENT** is my original work and has not formed the basis for the award of any degree, fellowship or any other similar titles.

Name & Signature of student:

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CERTIFICATE

This is to certify that the project report entitled "**DEVELOPMENT OF MINT MARSHMALLOW**" is work carried out by **NASEEF K,** Student of **B.Voc FOOD PROCESSING & SAFETY MANAGEMENT, DGM MES MAMPAD** COLLEGE during the year 2021-2024 in partial fulfilment of the requirement for the award of degree of **B.VOC FOOD TECHNOLOGY** and that project has not formed the basis for the award previously of any other similar title.

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Me **NASEEF K , (MPAVBVX007)** hereby declare that I am the sole author of the project report entitled" **DEVELOPMENT OF MINT MARSHMALLOW**& that neither any part of the report or not the whole of the report has been submitted to any university or institution for obtaining any degree/diploma/ academic award

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1.ABSTRACT

The current work in the field of food technology deals with preparation of mint marshmallows using gelatine, sugar syrup, and some flavourings(mint). While marshmallows are made up of sugar and gelatine, with a dusty powdered sugar surface, and they squish like a sponge when you squeeze or bite down on them. It is known for light and airy texture. They are often soft and chewy with a slightly sticky exterior. The primary flavour of marshmallows is sweet. The purpose of the study was to enhance the nutritional profile of marshmallow by incorporating the mint juice in the into the batter. Here mint juice is used as a flavouring agent. It includes various species such as peppermint and spearmint known for there pleasant fragrance and culinary users. Mint can be beneficial, individual responses may vary, and excessive consumption may have side effects. Moreover, it has potential health benefits including digestive aid, nausea relief, skin care, weight management and improved mental focus. Here by we made three varieties of marshmallows by varying the composition of sugar syrup and gelatine. Proximate analysis of the prepared mint marshmallow including moisture , ash , sugar content were recorded. After the shelf-life study , we found that product have shelf life of three month in a condition of room temperature. Following the study we discovered that mint marshmallow offers far more health advantages than normal marshmallows.

2.INTRODUCTION

2.1 MARSHMALLOW

A sugar combination including gelatine is combined with air and moisture to form marshmallows, an aerated confectionery delicacy with a distinctive foamy texture. is a kind of candy that is usually produced using gelatin, water, and sugar that has been whipped to a soft yet solid consistency. It is typically formed into forms and covered in corn starch, or it can be used as a filling in baked goods. The marshmallow is a foam made up of a gaseous dispersed phase and an aqueous continuous phase. This makes marshmallows an aerated confectionary product made when air and moisture are added to a sugar mixture that contains gelatin, in addition to being foam. The fluffy texture of the marshmallow is caused by air trapped in its matrix. One of the main quality issues that renders the product unpalatable is the marshmallows' absorption or loss of moisture during storage and transit (Kirtil et al., 2015). All marshmallows are made up of are tiny air bubbles encased in sugar syrup. Made of sucrose, corn syrup, and water, the sugar syrup is heated to the right temperature to achieve the required water content, allowing for mechanical agitation to whip air into the matrix.

The sugar confection is modelled after a traditional therapeutic delicacy prepared from the marsh-mallow plant, Althaea officinalis. The plant species known as "marshmallow" (Althaea officinalis) is a herb that grows in marshes and other moist places and is endemic to portions of Europe, North Africa, and Asia.

2.2 MINT: -

The Lamiaceae family, which includes peppermint and spearmint, comprises about 15–20 plant species, of which mint, or mentha, is a member. This well-liked herb can be used in a

variety of recipes and infusions, either fresh or dried. Mint oil is frequently used by producers of gum, candies, toothpaste, and cosmetic items.One can add flavor to food while consuming less sodium and sugar by cooking with fresh mint and other herbs and spices.

Several species of mint plants have been used medicinally by humans throughout history. A variety of antioxidant properties and potential health benefits are provided by different types of mint plants, particularly for those with irritable bowel syndrome (IBS).

One of the two varieties of mint—peppermint and spearmint—was used in this investigation. Spearmint is often found in toothpastes, mouthwashes, health food products, and cosmetics.

Because of its purported therapeutic benefits, it is a frequently used ingredient in medicine. Vital nutrients, antioxidants, and vitamins can all be found in spearmint. Its scent is strikingly similar to peppermint. It has a lower menthol content than peppermint, but it has higher cineol, dihydrocarvone, and limonene content. In comparison to peppermint, it tastes sweeter. Spearmint is sometimes used to treat symptoms of headache, sore throat, cramps, nausea, indigestion, and gas.

Mint is used in traditional medicine to treat a range of conditions. Regretfully, there aren't many human studies that describe the effects of mint on the body other than helping with digestion and relieving symptoms of irritable bowel syndrome. Research may eventually support the idea that mint can be used to treat a larger range of ailments.The most common use of mint is probably as a digestive aid. According to a small body of research, taking peppermint oil supplements may help reduce irritable bowel syndrome-related stomach pain.

2.3 SUGAR SYRUP: -

The term "sugar" refers to soluble carbohydrates with a sweet taste that are commonly found in food. Glucose, fructose, and galactose are examples of simple sugars, also referred to as monosaccharides. Common examples of compound sugars are sucrose (glucose + fructose), lactose (glucose + galactose), and maltose (two molecules of glucose). Compound sugars are also referred to as disaccharides or double sugars. Sucrose is refined into white sugar.

Compound sugars hydrolyze into simple sugars inside the body.the appropriate. Sucrose is used in prepared foods (such as cakes and cookies), occasionally added to ultra-processed food and beverages sold in stores, and used by consumers as a sweetener for cereal and toast, among other foods and drinks.

Sugar syrup is a versatile ingredient in food production due to a number of its attributes. The main use of sugar syrup is to add a steady sweetness to a variety of foods, including drinks and desserts. The ratio of sugar to water determines the viscosity or thickness of sugar syrup. Whereas thicker syrups are used to preserve fruits, thinner ones work well for moistening cakes. Heavy sugar syrups function as preservatives by preventing the growth of bacteria in the environment, especially when used in canning and preservation.

2.4 Gelatine Powder:-

Since it acts as the scaffolding that holds all the sugar and flavoring ingredients in place and gives marshmallows their stretchy, gooey texture, gelatin powder is most likely the component of a marshmallow that matters the most. Collagen, the primary connective tissue found in animal tissues, is partially broken down into smaller protein molecules to create gelatin.

Gelatin is a naturally occurring polymer derived from the hydrolytic breakdown of collagen protein. Its unique amino acid composition confers various health advantages [1]. Gelatin is typically found as tablets, granules, or powders, though it occasionally needs to be dissolved in water before use.In some nutritionally balanced foods, gelatin has a high protein content and can be used in place of fat and carbohydrates [4]. Collagen is the most abundant naturally occurring protein in both humans and animals and is a source of the gelatin protein matrix. Although collagen can be found throughout the body, it is most prevalent in the skin, bones, tendons, and ligaments [5].The extraction of gelatin from collagen, which frequently occurs during consumption [6], calls for a boiling state or a hydrolysis reaction (occasionally with enzymatic assistance) in order to yield a flavorless and colorless substance that is well-known as a gelling agent in the food industry.In addition to being low in energy and high in protein, gelatin has no fat or cholesterol and offers protective collagens that are beneficial [8].

3. AIM & OBJECTIVE

3.1 Aim:-

To create and formulate a mint-flavored functional marshmallow

3.2 Objective: -

The objectives of the present study entitled “DEVELOPMENT OF MINT MARSHMALLOW” are: -

- To study sensory attributes of newly developed product
- To introduce an innovative product using mint.
- To evaluate moisture, ash, sugar content the developed product
- To invent and standardise the marshmallow with mint .

4.REVIEW OF LITERATURE

4.1 Marshmallow: -

Marshmallows is a type of confectionery that is typically made from sugar, water and gelatin whipped to a solid-but-soft consistency. It is used as a filling in baking or normally molded into shapes and coated with corn starch. The sugar confection is inspired by a historical medicinal confection made from Althaea officinalis, the marsh-mallow plant. (Petkewich , Rachel, et al,. 2006)

Modern marshmallow manufacturing is highly automated and has been since the early 1950s when the extrusion process was first developed. Numerous improvements and advancements allow for the production of thousands of pounds of marshmallow a day. (Hartel, Richard et al.,2014) Today, the marshmallow typically consists of four ingredients: sugar, water, air, and a whipping agent.
The type of sugar and whipping agent varies depending on desired characteristics. Each ingredient plays a specific role in the final product.

The marshmallow is a foam, consisting of an aqueous continuous phase and a gaseous dispersed phase (in other words, a liquid with gas bubbles spread throughout). In addition to being a foam, this also makes marshmallows an "aerated" confection because it is made up of 50% air. The goal of an aerated confection like a marshmallow is to incorporate gas into a sugar mixture, and stabilize the aerated product before the gas can escape. When the gas is introduced into the system, tiny air bubbles are created. This is what contributes to the unique textural properties and mouth-feel of this product.(Christine, Elizebeth et al., 1996).
In marshmallows, proteins are the main surface-active agents responsible for the formation, and stabilization of the dispersed air. Due to their structure, surface-active molecules gather at the surface area of a portion of (water-based) liquid. A portion of each protein molecule is hydrophilic, with a polar charge, and another portion is hydrophobic and non-polar. The non-polar section has little or no affinity for water, and so this section orients as far away from the water as possible. However, the polar section is attracted to the water and has little or no affinity for the air. Therefore, the molecule orients with the polar section in the water, with the non-

polar section in the air. Two primary proteins that are commonly used as aerators in marshmallows are albumen (egg whites) and gelatin. (Liu, Eunice el at., 2015).

The traditional marshmallow recipe uses powdered marshmallow root, but most commercially manufactured marshmallows instead use gelatin in their manufacture. Vegans and vegetarians avoid gelatin, but there are versions which use a substitute non-animal gelling agent such as agar. In addition, marshmallows are generally not considered to be kosher or halal unless either their gelatin is derived from kosher or halal animals or they are vegan. (Kosher spirit el at., 2019). Marshmallow creme and other less firm marshmallow products generally contain little or no gelatin, which mainly serves to allow the familiar marshmallow confection to retain its shape. They generally use egg whites instead. Non-gelatin, egg-containing versions of this product may be consumed by ovo vegetarians. Several brands of vegetarian and vegan marshmallows and marshmallow fluff exist. (Vegen S'mores el at.,2017).

4.2 MINT:-

Mint (Mentha) is a medicinal herb, which possesses a lot of bioactive components. Globally, it has been used as a flavor enhancer in foods. Due to the presence of phenolic acids and flavonoids, it is considered to have a greater number of antioxidants. Mint has been linked to physiological benefits to humans that include protection against microbes; anticancer and antiallergenic properties; positive effects in reducing blood sugar; analgesic property; cures loose motion, indigestion, gas, and irritation bowel syndrome; gives relief from respiratory problems; has wound healing activity; , and is good for breastfeeding. The present paper reviews the evidence-based research regarding the bioactive components and health benefits of the mint plant. The genus Mentha L. (Lamiaceae) can be found globally and also in many environments. Mentha commonly called Mint (Figure 1) is a collection of about 15–25 plant species. Because of its medicinal value, there is a huge demand in both the food and pharmaceutical industries. In our day-to-day life, mint is used for its flavoring and health beneficial properties. Presently, it is one of the most economically significant medicinal and aromatic crops. Mint is the richest source of antioxidants, as quantified by various antioxidant activity tests. Extract of mint possesses good total phenolic and flavonoid contents (Anwar et al., 2019; Kanatt et al., 2007).

The various chemical constituents of mint have a lot of economic importance. For example, various derivatives and constituents of mint oil have been used as an agent of flavor in the flavoring industry and in many types of foods, herbal products, medicine, and different perfumes. Mint oil is both water and alcohol soluble. The oil contains liquid and solid fractions, as they have hydrocarbon, which stops the crystallization of menthol. Research has investigated the chemical constituents present in mint (Brahmi et al., 2017). The other important constituents of the mint plant are minerals (Potassium, Iron, Sodium, Magnesium, Manganese, Zinc, Calcium, Chromium, Copper, Iodine, and Selenium) and vitamins (Vitamin A, C, and carotene activity were found to be higher, while B12, thiamine, folic acid, and riboflavin were also reported).

4.2.1 HEALTH BENEFITS: -

4.2.1.1 Digestive Aid :-

Traditionally, mint has been used to treat digestive problems such as gas and indigestion. Particularly peppermint oil has the potential to ease gastrointestinal tract muscle tension.

4.2.1.2 Relief from Nausea:-

Mint, especially peppermint, is known for its anti-nausea properties. It can be helpful in alleviating symptoms of nausea and motion sickness

4.2.1.3 Respiratory Health:-

Mint contains a compound called menthol, which soothes the respiratory system. Mint is frequently used to ease congestion and encourage easier breathing.

4.2.1.4 Headache Relief:-

Mint, especially peppermint, has a cooling effect that may help relieve tension headaches. One possible method of relief is to apply peppermint oil topically or inhale its aroma.

4.2.1.5 Anti-inflammatory properties:-

Antioxidants and anti-inflammatory substances found in mint may aid in lowering bodily inflammation. This may help with ailments like arthritis.

4.2.1.6 Skin Care

The antibacterial qualities of mint may be advantageous to skin health. When applied topically, it might aid in reducing acne and relieving skin irritations.

4.2.1.7 Weight Management

According to certain research, the aroma of mint may lessen cravings and appetite, which could support attempts to control weight.

4.2.1.8 Provide Essential Nutrients

Mint contain minerals like:

- calcium
- Magnesium
- Potassium

Vitamins in mint:

- Vitamin A
- Vitamin C
- Vitamin K

Nutrients in mint:

- Essential oil
- Fibre
- Phytonutrients (menthol , carotenoids)

[James A Duke (1983). "Anacardium occidentale L." Handbook of Energy Crops. (unpublished); In: NewCROP, New Crop Resource Online Program, Center for New Crops and Plant Products, Purdue University. Retrieved 10 December 2019.]

4.3 Gelatin:-

Gelatin is a natural polymer which is made of hydrolytic degradation of protein from collagen and its distinctive structure of amino acids gives it several medical benefits Generally, gelatin is in the form of tablets, granules or powders and sometimes it can be dissolved in water before use. Gelatin is widely explored by researchers as a matrix for three-dimensional cell culture and as a component of tissue-engineering scaffolds.Gelatin has a high protein content in certain. Hydrocolloids have been popularly used as a gelling agent in food industries. Most hydrocolloids are extracted from plants and in general, only gelatin is extracted from animals. Pig, cow, and fish collagens are the primary sources of gelatin. Hydrocolloids and gelatin have often been confused due to the fact that some scholars support the other family of hydrocolloids, particularly plants labeled as 'veggie gelatin.'

4.3.1Extraction of gelatin

Typical industrial gelatin production process [46] from natural sources (porcine and bovine by-products) is shown in Fig. 1(a). In the industry, porcine skins and bones or beef hides were considered to be type A gelatin and type B were commonly extracted from beef-based raw materials, sometimes also from pig bones. Common acids and alkaline agents used to extract minerals and bacteria from these raw materials in the industry were caustic lime or sodium carbonate. Fig. 1(a) shows that, at the

4.3.2 Commercialisation of gelatin

Gelatin is the most widely used among other types of hydrocolloids on the market. By far, gelatin is actually a multivariate, functional substance in today's life. On the

consumption perspectives in today's market, according to the report of Grand View Research [80], the estimation for market size of gelatine will reach 5.0 billion USD in year of 2025. By the end of 2027 the gelatin market size is predicted to be USD 6.7 billion, with a CAGR of 9.29 per cent. Fig. 3 showed the market expansions

(J.R. Rapin et al., 2010 K. Deshmukh et al., 2014 Z. Yang et al., 2016 L.S. Kumosa et al.,)

4.4 Sugar Syrup:-

Sugar is the generic name for sweet-tasting, soluble carbohydrates, many of which are used in food. Simple sugars, also called monosaccharides, include glucose, fructose, and galactose. Compound sugars, also called disaccharides or double sugars, are molecules made of two bonded monosaccharides; common examples are sucrose (glucose + fructose), lactose (glucose + galactose), and maltose (two molecules of glucose). White sugar is a refined form of sucrose. In the body, compound sugars are hydrolysed into simple sugars. Sugars are found in the tissues of most plants. Honey and fruits are abundant natural sources of simple sugars. Sucrose is especially concentrated in sugarcane and sugar beet, making them ideal for efficient commercial extraction to make refined sugar. In 2016, the combined world production of those two crops was about two billion tonnes. Maltose may be produced by malting grain. Lactose is the only sugar that cannot be extracted from plants. It can only be found in milk, including human breast milk, and in some dairy products. A cheap source of sugar is corn syrup, industrially produced by converting corn starch into sugars, such as maltose, fructose and glucose. ("OECD-FAO Agricultural Outlook 2020–2029 - Sugar" (PDF). Food and Agriculture Organization. 2019. Archived (PDF) from the original on 17 April 2021. Retrieved 15 February 2021.)

4.4.1 There are two types of sugar contain:-

4.4.1.1 Monosacchrides:-

Fructose, galactose, and glucose are all simple sugars, monosaccharides, with the general formula $C_6H_{12}O_6$. They have five hydroxyl groups (−OH) and a carbonyl group (C=O) and are cyclic when dissolved in water. They each exist as several isomers with dextro- and laevo-rotatory forms that cause polarized light to diverge to the right or the left. (Robertson et al., 1976)

4.4.1.2 Disacchrides:-

Lactose, maltose, and sucrose are all compound sugars, disaccharides, with the general formula $C_{12}H_{22}O_{11}$. They are formed by the combination of two monosaccharide molecules with the exclusion of a molecule of water. (Robertson et al., 1976)

5.MATERIALS & EQUIPMENTS

The following are the components needed for product development that were used in the study "DEVELOPMENT OF MINT MARSHMALLOWS":-

- Sugar
- Gelatin
- Mint
- Water

5.1 Equipment need: -

- Spoon
- Mixing Bowl
- Measuring cups
- Grinder
- Weighing machine
- Sauce Pan
- Stove
- Beater
- Refrigerator
- Pan box

6.METHODOLOGY

6.1 Preparation of products

6.1.1 Method: -

• Weigh and thoroughly wash 250 grams of mint leaves. Grind the mint leaves and store them until needed.

•Mix one cup (100 ml) of gently heated water with two table spoons of gelatin powder. and stir continuously until all the ingredients are mixed.

• Put one cup (200g) sugar and ½ cup water in a sauce pan and set over medium heat. Next, keep stirring until all of the sugar is mixed.

• Take the pan off of the burner and stir in the gelatine mixture.

• Beat the mixture until a batter forms.

• Transfer to a pan box and refrigerate for three hours.

6.2 FLOWCHART

Take mint and grind it ,keep it until used

Take two table spoon gelatin powder into mild hot water and stir for 5 mints

Take water and sugar and place to heat

Mix the gelatin mixed water with sugar solution

Then beat the mixed solution with beater to form a batter

Place the batter to a pan and kept for refrigeration up to 3 hours

6.3 INGREDIENTS:

Gelatin powder

Sugar

Mint leaves

Water

7. LABORATORY EQUIPMENTS AND ANALYTICAL INSTRUMENTS

7.1Bunsen burner:-

A Bunsen burner, named after Robert Bunsen, is a kind of ambient air gas burner used as laboratory equipment; it produces a single open gas flame, and is used for heating, sterilization, and combustion. The gas can be natural gas or a liquefied petroleum gas, such as propane, butane, or a mixture.

7.2 Weighimg Balance:-

A tool used to measure the mass of samples is a weighing balance. Depending on the level of precision needed, several concepts are used to measure the samples. Laboratory instruments called analytical balances are capable of precisely measuring items down to the sub-milligram level. Rather than measuring items directly, these devices measure the force required to counter the mass being measured. The force needed to oppose the samples is produced by electromagnets. These balances are protected from outside elements like dust, air currents, humidity, etc. by being housed in a chamber hood.

7.3 Muffle furnace

A jacketed enclosure known as a "muffler furnace" is used to heat materials to extremely high temperatures while completely enclosing them and preventing them from coming into contact with outside pollutants, chemicals, or materials. Since stainless steel is typically used for lining, muffle furnaces are largely resistant to corrosion.

Muffle furnaces were created to counteract the negative effects of combustion-based heating. These results include a range of undesirable byproducts that are frequently introduced as contaminants to the substance that is being heated. To counter this, it became imperative to create a housing medium.

7.4 Hot Air Oven

A hot air oven is a laboratory instrument that uses dry heat to sterilize laboratory equipment and other materials. The equipment cannot be wet or material that will not melt, catch fire, or change form when exposed to high temperatures are sterilized by using the dry heat sterilization method. Hot air oven also known as forced air circulating oven. Some examples of material which cannot be sterilized by employing a hot air oven such as surgical dressings, rubber items, or plastic material.

8. SENSORY EVALUATION

According to Stone and Sidel (1993), sensory assessment is the scientific field that is used to elicit, measure, analyze, and evaluate items that are first perceived by the senses of smell, touch, sight, taste, and hearing. To determine the degree of consumer acceptability of the products, sensory evaluation is carried out. It is a tool for assessing, figuring out, or raising the caliber of the goods. The cashew spread that was designed was assessed sensory using the 9-point hedonic scale.

The 9-piont hedonic scale is also called as the degree of liking scale and is commonly utilised to check the acceptability of the products among the consumers. The scale has equal intervals and ranges from like extremely to dis-like extremely. It has a central point- neither like nor dislike. The minimum acceptability belongs to 1 (dislike extremely) and the maximum acceptability belongs to 9 (like extremely).

8.1 SELECTION OF PANEL OF JUDGES: -

The accuracy of the result is influenced by the sensitivity and expertise of the panelist or evaluator. The assessor need to function like a calibrated tool and generate results that are repeatable. For the purpose of conducting sensory analyses of food products in an effective manner, it is imperative that the most stable and sensitive panel members be selected and trained. Sensitivity threshold tests are used to gauge a person's capacity to detect particular flavors, aromas, or textures in food or drink. It can be used to assess the deterioration of primary taste and screen for basic flavor identification. Those with ordinary to good sensory acuity for the key attributes like taste, smell, texture, etc,were chosen to serve on the panel. Thus, a sensitivity threshold test was used to determine the panel members' perception of taste before they were chosen.

8.2 SCORE CARD OF SENSORY EVALUATION: -

Three individuals are randomly selected to participate in a sensory evaluation, with charades generated as a result. The parameters that are assessed include color, taste, scent, external quality, and uniformity. Nine-point hedonic scale is easy for the panellist to understand and use. Hence, the score card for sensory evaluation was prepared based on 9-point hedonic rating scale and the scores were given in such a way that

GRADE	SCORE VALUE
Like Extremely	09
Like very much	08
Like moderately	07
Like slightly	06
Neither like nor Dislike	05
Dislike slightly	04
Dislike moderately	03
Dislike very much	02
Dislike Extremely	01

8.3 Samples:-

8.4 SensorEvaluation

9. CHEMIAL ANALYSIS

9.1 ESTIMATION OF MOISTURE CONTENT

9.1.1 Aim:-

To calculate the sample's moisture content as a percentage.

9.1.2 Materials required: -

- Petridish
- Desiccator
- Hot air oven, equipped with a temperature control system and electrical heating
- Weighing Balance

9.1.3 Principle: -

Moisture content of the sample is estimated by calculating the weight loss after evaporating the moisture present in sample by heating in hot air oven.

9.1.4 Procedure: -

Accurately weigh 3 grams of the prepared material into a petridish that has already been dried, cooled, and measured.

Place the dish in the 100±20°C hot air oven for one hour. Take the dish out of the oven, let it cool to room temperature in the desiccator, then weigh it. At 30-minute intervals, repeat the drying, cooling, and weighing processes. until there is a weight differential of less than 1 mm between two consecutive weights. Note the weight that is the lowest.

9.1.5 Calculation: -

$$\textbf{Moisture content \%} = \left[\frac{(w2-w3)}{(w2-w1)}\right] 100$$

Were, w1 – weight of empty petridish =34.2

W2- weight of the petridish with sample before drying =37.2

W3 – weight of petridish with sample after drying = 36.22

9.1.6 Result: -

The percentage of moisture content in given sample = 33.3%

9.2 ESTMATION OF TOTAL ASH CONTENT: -

9.2.1 Aim:-

To calculate the sample's ash concentration as a percentage.

9.2.2 Apparatus: -

Silica crucible. Tongs, Desiccator, Weighing balance

9.2.3 Principle: -

When a sample of known weight is ignited, a residue of non-carbonaceous materials is left behind that may be calculated through gravimetric analysis.

9.2.4 Procedure

- Ignite a silica crucible to a dull redness, cool to room temperature in a desiccator and weigh.
- After thorough mixing, weigh accurately 3 gm sample into the tarred crucible.
- Set the crucible atop a triangle made of clay pipes over a Bunsen burner, and carefully light it until it is completely charred. Make sure the sample doesn't ignite and, in the event that it does, put out the fire by replacing the crucible's cover. For two hours, ignite the carbonized bulk until the ash turns totally white.
- Cool the crucible to room temperature in a desiccator.
- Check the presence of carbon by wetting the sample carefully with a few drops of distilled water.
- If black particles are present, dry the dish and ignite until no specks of carbon are visible.
- Cool in a desiccator and weigh.

9.2.5 Calculation: -

$$percentage\ of\ ash\ = \left[\frac{(m3-m1)}{(m2-m1)}\right] \times 100$$

Where, Weight of empty crucible-m1= 24.24

Weight of crucible and sample-m2 = 27.52

Weight of crucible and ash- m3 =24.26

9.2.6 Result : -

The percentage of ash content in given sample = 0.60%

10.RESULT AND DISCUSSION

10.1Sensory evaluation of Mint Marshmallows

A nine-point hedonic rating system was used to create the score card for the sensory evaluation. The prepared mint marshmallows was given to the judges for sensory assessment after being labeled with the appropriate codes. We computed and compared the average score for every food product. Finally, "sample B" was chosen as the finished item. The table shows example B's score.

Sample B – score sheet:-

	Colour	Flavour	Texture/ consistency	Appearance	Total acceptability
Person 1	8	9	9	8	9
Person 2	7	9	8	8	8
Person 3	8	9	9	7	8

10.2 Chemical Analysis

10.2.1 Estimation of moisture content: -

Weight of empty dish (W1) = 34.2
Weight of the dish with material before drying (W2) = 37.2
Weight of the dish with material after drying (W3) = 36.22

$$moisture\ content\ \% = \left[\frac{(w2-w3)}{(w2-w1)}\right] \times 100$$

$$= \left[\frac{(37.2-36.2)}{(37.2-34.2)}\right] \times 100$$

= 33.3%

10.2.2 Estimation of Ash content:-

Weight of empty crucible (m1) = 24.24g

Weight of crucible and sample-(m2) = 27.52g

Weight of crucible and ash - (m3) = 24.26g

$$\%\ of\ ash\ = \left[\frac{(m3-m1)}{m2-m1}\right] \times 100$$

$$= \left[\frac{(24.26-24.24)}{(27.52-24.24)}\right] \times 100$$

= 0.60%

11. CONCLUSION

The current work in the field of food technology deals with preparation of Mint Marshmallow using gelatin, sugar, mint, water.

To sum up, our new Mint Marshmallow is a delightful blend of the refreshing essence of mint and the traditional marshmallow sweetness. With each soft, pillowy bite, this inventive product infuses a cool mint flavor, giving a beloved treat a refreshing twist. Our Mint Marshmallow is sure to enhance your snacking experience, making it ideal for individuals seeking a refreshing and distinctive treat. A must-try for all candy lovers, this product combines the classic appeal of marshmallows with the crisp and refreshing notes of mint. It can be enjoyed on its own, used in inventive desserts, or added whimsically to hot beverages.

In this work, we assessed the product's shelf life and nutritional value. After a few trials, the sensory evaluation was performed to finish the preparation. Following more testing on a carefully selected sample, the other samples were thrown out because of their inadequate flavor, texture, color, and appearance. After that, a chemical analysis was performed to determine the sample's shelf life. After conducting the shelflife investigation, we found that products have an approximate three-month shelf life when stored at room temperature in an airtight container. After further investigation, we found that mint marshmallows were substantially more nutritious than regular marshmallows.

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