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Development and Formulation of Chocolate-coated Seeds Bar

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Abstract

Vitamins E, D, and B6 minerals like zinc and selenium and amino acids like glutamine all play a role in the body's immune system development. Edible seeds are a great source of protein, healthy fats, fiber, and important minerals like magnesium, potassium, calcium, iron, and zinc in addition to vitamins B1, B2, B3, and E. Examples of edible seeds include pumpkin, flax, sesame, sunflower, mustard, amaranth, oat, barley, black rice, brown rice, quinoa, nigella, and millet seeds. All cells need enough nourishment to grow their immune systems. Based on the sensory assessment 25 percent pumpkin seeds, 10 percent watermelon seeds, 10 percent sunflower seeds, 10 percent flax seeds, 5 percent sesame seeds, 20 percent dates, and 25 percent dark chocolate make up the Chocolate Coated Seeds Bar. Furthermore, including a diverse selection of seeds in your diet can offer a spectrum of nutrients vital for supporting immune function. These seeds contain ample amounts of protein, healthy fats, and fiber, in addition to supplying vital minerals such as magnesium, potassium, calcium, iron, and zinc. They also are ample in nutrients B1, B2, B3, and E, all of which make contributions to average immune gadget characteristic. Examples of seeds include pumpkin, flax, sesame, sunflower, mustard, amaranth, oat, barley, black rice, brown rice, quinoa, nigella, and millet. By ingesting a various array of seeds, people can ensure their cells receive the nourishment needed for ideal immune system improvement and characteristic.

Keywords: Dates, Dark chocolate, Sesame seeds, Sunflower seeds, Pumpkin seeds, Watermelon seeds.

INTRODUCTION

A chocolate-coated seeds bar is a combination of seeds, dates, and chocolate. Seeds are a nutrient powerhouse that can be ingested on a regular basis for a variety of health advantages. Seeds are considered to be incredibly versatile, containing an abundance of fibre, lipids, vitamins, minerals, and antioxidants, and can be used in a variety of ways in any meal [1]. These little yet powerful kernels are abundant in vitamins and minerals that the body requires to function at its best. People are choosing to include these seeds in their diets for improved health as they become more aware of their benefits. Furthermore, a number of seeds are excellent providers of omega-3 fatty acids. For example, pumpkin seeds are naturally antioxidant-rich and notably high in magnesium. In addition to being high in protein, this seed has pharmacological qualities that include anti-inflammatory, anti-bacterial, anti-fungal, and antioxidant effects. [2]. Proteins, tocopherols, minerals, diet E, niacin, pyridoxine, folic acid, calcium, copper, iron, magnesium, and phosphorus are all considerable in sunflower seeds. These seeds have pharmacological actions, including antibacterial, antifungal, and anti-inflammatory qualities as well as dermoprotective advantages [3].

Incorporating fruits into one's daily diet has been shown by research to lower the likelihood of developing cancer. As a result, anticancer activity has been documented for a variety of fruits, juices, and aqueous extracts. The fruit crop watermelon

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(Citrullus lanatus) is a herbaceous creeping plant in the Cucurbitaceous family. It is mostly reproduced by seeds and grows best in warm climates. Protein, diet B, minerals (consisting of potassium, magnesium, phosphorus, and sodium), iron, zinc, manganese, and copper, and phytochemicals are all plentiful in watermelon seeds [4]. Despite their many potential uses, watermelon seeds are frequently wasted while the fruit is consumed. The influence of diversity on the nutritional, phytochemical, and antioxidant qualities of watermelon seeds is also little documented. The proximate and antioxidant activity of three different watermelon types were investigated in this study [5].

Flaxseed is an essential oilseed crop for industrial, culinary, feed, and fibre production. Almost every portion of the flaxseed plant is commercially viable, whether raw or processed. High-great fiber with a popularity for electricity and durability is produced via the stem. In the intervening time, the seed is rich in lignans, simply digested proteins, and omega-three fatty acids. In addition to being one of the greatest sources of-linolenic acid oil and lignans, flaxseed is an important source of high-quality protein and soluble fibre, and it contains phenolic compound potential [6].

Throughout millennia, Asian societies have utilized sesame seeds as a dietary staple for promoting health and preventing illness. They considerably raise plasma g-tocopherol levels and boost vitamin E activity, both of which are thought to help people live longer and avoid diseases like cancer and heart disease. Sesame seeds are high in oil, which contains a lot of unsaturated fatty acids like oleic and linoleic acid, protein, particularly methionine, and micronutrients like minerals, lignans, tocopherol, and phytosterol [7]. Antioxidant activity is abundant in dates. Phenolic chemicals appear to have a substantial role in their anti-oxidant properties.

Consuming dates could potentially elevate antioxidant levels and offer protection against chronic diseases [8]. Numerous nutrients found in dark chocolate are beneficial to human health. It is one of the most powerful sources of antioxidants and is made from the seeds of the cacao tree. Dark chocolate has been shown in studies to boost our health and reduce the risk of heart disease. Dark chocolate contains stimulants like caffeine and theobromine, but the amount of caffeine in it is quite modest compared to coffee, so it's unlikely to keep you up at night. Zinc, iron, and magnesium are many of the minerals which might be ample in dark chocolate. It also incorporates flavonoids, that are antioxidants with various fitness blessings [9].

MATERIALS & METHODS

Raw Materials

The local grocery in Tirunelveli produces pumpkin seeds, watermelon seeds, sunflower seeds, sesame seeds, flax seeds, dates, and chocolate. The quantities of each product are listed below (Table 1)

Table 1. Quantities of the ingredients.

S.N.	Product	Quantity
1	Pumpkin seed	25
2	Sunflower seed	10
3	Watermelon seed	10
4	Flaxseed	10
5	Sesame seed	5
6	Dates	20
7	Dark Chocolate	25

Preparation of Chocolate-coated Seeds Bar

Separately, the seeds are roasted and refrigerated. After that, it's blended with dates to form a grainy mixture. After that, the coarse mixture is spread out on the parchment sheet of the tray. The dark chocolate is melted and then poured over the combined seed mixture. After tapping the tray to remove any air bubbles, refrigerate it for an hour (Figure 1).

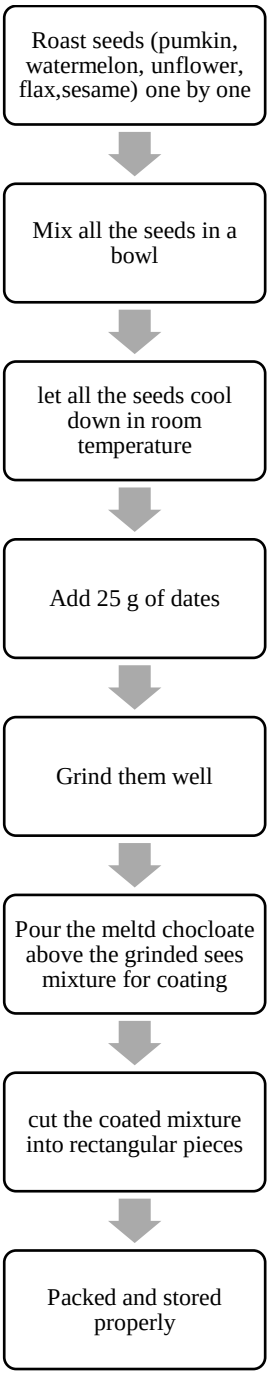

Figure 1. Flowchart of preparation of chocolate-coated seeds bar.

Macronutrient Analysis

Determination of Reducing Sugars Reagents

- Fehling A solution is prepared by dissolving 69.28 grams of copper sulfate pentahydrate ($CuSO_4.5H_2O$) in distilled water, then diluting the solution to a total volume of 1000 milliliters. After filtration, store the solution in an amber-colored bottle.
- Melt 346 grams of Rochelle salt (potassium sodium tartrate) and 100 grams of sodium hydroxide (NaOH) in distilled water to make Fehling B solution. Dilute the mixture until a total of one thousand milliliters is reached. Once the solution has been filtered, store it in a bottle with an amber hue [10].
- Prepare a 20% solution of neutral lead acetate. This reagent is utilized to clarify sugar solutions.

- Make a potassium oxalate (10% answer; $K_2C_2O_4.H_2O$). Excess lead is removed with this answer in the course of the clarifying procedure.
- Prepare a 1% solution of methylene blue in distilled water.

Procedure & Calculations

1. Weigh accurately about 5 g sample, transfer to a 200 ml volumetric flask dissolve in warm water, dilute to about 150 ml.
2. In case solution is not clear, add 5 ml of Carrez 1 solution followed by 5 ml of Carrez 2 solution.
3. Make up to 200 ml. Filter through a dry filter paper.
4. Titrate the solution obtained as such to determine % Reducing sugars.

Preliminary Titration

Pour 5 milliliters of Fehling A and B into a 250 milliliter conical flask each. After that, add around 10 mL of water to the mixture and a few glass beads or boiling chips. After dispensing the solution, bring the flask to a boil. Three drops of methylene blue indicator should be added to the mixture. Add solution dropwise over time until the blue tint fades and the mixture turns brick red. (The sample solution concentration should be between 15 and 50 ml for a titre value of between 15 and 50 ml.) Make a note of the titre value.

Final Titration

Pipet out 5 mL of both Fehling A and B respectively. Add about 2 mL less sample solution than the preliminary titration's titre result. Complete the titration by heating the flask to boiling in 3 minutes. Perform a duplicate titration and calculate the average of the results. Then, determine the percentage of reducing sugar using the following formula.

$$\text{Reducing Sugars \%} = \frac{\text{Dilution x Factor of Fehling (in gm)} \times 100}{\text{Weight of sample x Titre value}}$$

Determination of Total Fat [11]

Reagents

1. 8 M Hydrochloric acid-sp.gr. 1.16
2. Filter aid-a suitable brand (3) Petroleum ether-redistilled below 60°C
3. Sodium sulphate–anhydrous

Procedure

1. Weigh 10 to 20 grams of the prepared pattern precisely right into a 400 milliliter beaker.
2. Add 25 mL of hydrochloric acid and 30 mL of water to the beaker.
3. Heat the mixture for 30 minutes on a steam bath, ensuring to stir regularly.
4. Incorporate 5 grams of filter aid and 50 milliliters of ice-cold water, then refrigerate for 30 minutes in an ice bath.
5. Insert a robust linen piece into the Buchner funnel and moisten it with water.
6. After using a mild suction, cover it with a suspension made of 3 grams of filter aid and 30 milliliters of water.
7. After rinsing with ice-cold water three times, remove any remaining moisture with a suction device.
8. Using a tiny piece of filter out paper to accumulate any residue stuck to the funnel, go back the clear out-cake from the funnel to the unique beaker.
9. Rinse the funnel with petroleum ether, directing the solution back into the beaker, then evaporate the ether on a steam bath.
10. Using a tumbler rod, break apart the cake and location it on the steam bath till the insides are dry enough to pulverize effortlessly. After that, bake it for an hour at one hundred ± 2˚C within the oven.

11. Mix well after adding 15 g of powdered anhydrous sodium sulfate to the mixture. After that, transfer the mixture to the Soxhlet apparatus's fat extraction thimble. Pour the 50 ml of petroleum ether that you used to wash the beaker into the thimble. Petroleum ether is used to extract the fats until at least three hundred ml has been allotted. Transfer the extract to a tared dish and evaporate the petroleum ether on a steam bath.
12. Dry the fat till the difference in weight between successive weighing is not more than 1 mg.

Calculation

Total Fat % by mass (on moisture free basis) = $\frac{10000 \times w}{W \times (100 - M)}$

Where, w = weight in g of fat

W = weight in g of prepared sample taken for the test

M = moisture, percent by weight, in the prepared sample

[Ref:-I.S 1163: 1971 Specification for Chocolate/I.S.I Handbook of Food Analysis (Part IX) 1984 page 20]

Determination of Total Protein (Kjeldahl method) [12]

Reagents

a. Kjeldahl catalyst:-15 gm Pot. Sulphate + 0.5 gm Copper sulphate
b. Sulphuric Acid-Concentrated
c. NaOH solution-50% (1+1). Let stand until clear
d. Standard NaOH solution-0.1 N=0.1 M (4.00 gm/litre)
e. Standard acid solution-Prepare either HCl or H_2SO_4 solution HCl sol-0.1
f. N = 0.1 M (3.646 gm/litre)
g. H_2SO_4 sol-0.1 N = 0.05 M (4.9 gm/litre)
h. Methyl Red Indicator-0.5 gm in 100 ml ethanol

Procedure

Transfer 1-1.5 gram of prepared material to a kjeldahl digestion flask and weigh it. 15 g potassium sulphate, 0.5 g copper sulphate, and 25-40 ml sulphuric acid boil briskly for 2 hours after gently heating the flask in an inclined position until frothing stops. Allow time for cooling. Mix in approximately 200 ml water and 25 ml Sod. thiosulphate solution (80 gm/l). Pour enough Sodium Hydroxide solution (1 1) cautiously down the facet of the flask such that the contents are strongly alkaline. Add a little part of anti-bump granules or granulated zinc next (round 110 ml). After making sure the condenser and splash head are running well, attach the flask to the distillation equipment and integrate the acid and alkaline layers. A transport tube should be connected to the condenser and located slightly below the pipetted quantity's floor inside the digesting flask. Continue boiling until approximately 150 milliliters of distillate are obtained. Then, add 5 drops of methyl red indicator and titrate with 0.1 N NaOH. Carry out a blank; 1 mL of 0.1 HCl or H_2SO_4 equals 0.0014 N. N X 6.25 equals total protein[13]

Micronutrient Analysis

Micronutrients are essential dietary nutrients, such as vitamins, minerals, and trace elements that are required in very small amounts and are crucial for human growth, disease prevention, and well-being [14]

Determination of Calcium & Magnesium

Preparation of Sample

The samples were ground using a wooden pestle and mortar. In a conical flask, each sample (1 g) was weighed. The conical flask received an aliquot of 20 ml of an acid combination of HCl and HNO_3 in a 3:1 ratio. The sample was digested by slowly heating it on a hot plate until it was clear [15].

Procedure

The calcium and magnesium content of the digest was determined using Gregory's (2005) method, after which it was chilled and diluted to 250 ml with distilled water before being filtered. The metal, calcium, and magnesium concentrations in the filtrate were determined. A diluted clear digest was utilised in an atomic absorption spectrophotometer (Model 210 VGP) with specialised calcium and magnesium lamps at 422.7 nm and 285.2 nm, respectively.

Determination of Iron

In our diets, iron is a necessary nutrient. Although iron is considered a trace mineral (one that is required in small amounts), a diet deficient in it can lead to anaemia, a deficiency disorder. Iron can be found naturally in foods including raisins, liver, and spinach. Other foods are "fortified" with extra iron, such as breads and cereals[16]

Procedure

Preparing the Standards:

1. Prepare the following solutions in five test tubes. Thoroughly mix each with a stirring rod (Table 2).
2. Add 2.5 mL of 0.1 M KSCN to each test tube. Mix well. A red colour should result from the formation of the $FeSCN^{2+}$ ion.

Table 2. Concentration of the 5 test tubes given.

Test Tube	0.001 M $Fe(NO_3)_3$ (mL)	H_2O (mL)	Concentration (mM/L)
1	0	20 mL 0.1 M HCl	0.00
2	5	15	0.25
3	10	10	0.50
4	15	5	0.75
5	20	0	1.00

Preparing the Food Samples

1. Weigh out about 2.5 g of the solid food and place in a crucible.
2. Using a warm burner flame, warmness the crucible till the food pattern is converted to ash completely. Depending on the sort of food sample this is used, the period can variety from five to twenty mins.
3. Turn off the burner and let the ash cool down. Once cooled, transfer it to a small beaker
4. Add 10 mL of 2.0 M HCl and carefully stir for one minute. Add 10 mL of distilled water. Stir.
5. Filter the mixture; collect the filtrate. Add 2.5 mL of 0.1 M KSCN. Mix well.

Finding the Absorbance

6. Use a spectrophotometer at a wavelength of 458 nm or use the fixed wavelength (458 nm) on the UV-VIS.
7. Place each standard solution and food solution into a separate cuvette.
8. Measure and record the absorbance of each solution.

Determination of Potassium

Eleven dry fruits were purchased commercially from the market: almond, cashewnut, pepper, pistachios, dry dates, raisin (black), raisin (common), amla, acrota, apricot, and kheerbhez. External moisture changed into removed the usage of a dry cloth once they have been rinsed with distilled water. Individual fruits were separated and dried for 1 hour in a hot air oven at 500°C. The dried samples had been in the end powdered the use of a blender and sifted through a 2 mm rubber sieve. Then, 2 g of every fruit pattern powder become weighed and subjected to dry ashing in a very well cleaned silica crucible at 550°C in a muffle furnace for approximately 5 hours. The resulting ash was dissolved in 5 mL HNO_3/HCl/H_2O 1099 and gently cooked on a hot plate until brown vapours were no longer visible.

5 mL DIW was added to the residual residue in each crucible and heated until a colourless solution was produced. After filtration through a Whatman filter paper No. 42, the mineral solution from each crucible was transferred into a 100 mL volumetric flask, and the volume was adjusted to the mark with deionized water (DIW). The potassium content of the solution was determined using a flame photometer.[17].

Proximate Composition

The ash, moisture, and dry matter content of the samples were determined using standard procedures outlined by Ger (1990). The ash concentration was evaluated by incinerating 2 g of the sample material for 3 hours in a muffle furnace set to 550°C. As a proportion of the residue that was weighed, the ash content was determined. The moisture content of a 2 g sample was evaluated by drying it for 24 hours at 105°C. The difference in weight gave the moisture content. Dry matter was determined as (100-% of Moisture).

Calculations:

$$\%\ \text{of Moisture} = \frac{(b-a)-(c-a)\times 100}{(b-a)}$$

$$\%\ \text{of Ash} = \frac{(c-a)\times 100}{(b-a)}$$

a = Empty weight of Glass Petri dish

b = Weight of Petri dish + Sample before Oven drying

c = Weight of Petri dish + Sample before After drying

According to the specs of the flame photometer, the stress at the pressure gauge was maintained at 10 lbs/squareinch (0.7 kgs/cm^2). Samples of dried fruit extracts have been analyzed for potassium using preferred potassium solutions and deionized water as a reference, in accordance with the tool manual instructions. The instrument displays the element's concentration in milli equivalents per litre. The amount of potassium found in dry fruit was determined in milligrams per 100 grams [18]

Calculation

Ppm=m.Eq of K+ ion × Atomic weight of potassium

mg of ion present in 100 g of dry fruit = ppm × 0.1

Determination of Phosphorus

Reagents

- Ammonium persulfate
- Sodium Bisulfate

Procedure

Total Phosphorus

1. Pour 50 mL of the sample into a 125 mL Erlenmeyer flask, or an aliquot diluted to 50 mL, then add 1 mL of 11 N sulfuric acid.
2. Combine 0.4 g of ammonium persulfate, mix well, and gently boil for approximately 30-40 minutes or until the volume reduces to about 10 mL.
3. Another option is to subject the solution to heat in an autoclave at 121°C (15-20 psi) for 30 minutes. Subsequently, allow the solution to cool, bring the volume to around 40 mL through dilution, and then proceed with filtration
4. For samples with extended iron or arsenic levels, upload 5 mL of sodium bisulfite, mix thoroughly, and place in a water tub at ninety five°C for half-hour (starting 20 mins after the sample reaches 95°C). Once the combination cools, dilute it to 50 milliliters.
5. Determine phosphorus as outlined in orthophosphate [19].

Sensory Analysis

The term "sensory, subjective, or organoleptic evaluation" refers to the system of comparing a food product the use of human senses. Every time a person eats meals, they pass judgment. The interaction of numerous sensory impressions worried inside the preference and consumption of meals is referred to as sensory first-rate. The acceptance of the food is determined by its appearance, flavour, and mouthfeel. The subject's response to the sensory components of food, not the food itself, is the effective characteristic.

This reaction is influenced by a number of psychological and social elements, and it plays an important part in the acceptance and liking of foods in the end [19]. The sensory evaluation of CCSB for product choice and consumer acceptance was done with untrained consumers. A five-point hedonic scale was utilised to assess appearance, taste, scent, and texture. All samples were made in disposable plastic plates and assessed in a monadic order by each panellist to maintain the identical evaluation conditions. The panellists were tasked with evaluating the product and assigning a score as well as grading it. The sensory exam took done in a relaxing setting with nice weather.

RESULT & DISCUSSION

The current study, named "DEVELOPMENT & FORMULATION OF CHOCOLATE COATED SEEDS BAR," was completed and found to produce 498.65 Kcal of energy. The nutritional values of the ingredients are listed in the table below (Figures 2 & 3) (Table 3)

All the parameters like macro-nutrients (carbohydrate, protein, fat) and micronutrients (Fe, Ca, K, P, Mg) were determined by the Nutritive value of Indian Food**.** The nutritive value of the ingredient is divided by the appropriate quantity and then is multiplied by 100. For example: Iron content of Pumpkin seeds in 25 g is

$$8.07 \div 25 \times 100 = 2.0175$$

Here 8.07 is the Iron nutritive value for 100 g. Since 25 g of pumpkin seeds are taken the nutritive value is been divided by the taken quantity 25 and then is multiplied by 100.

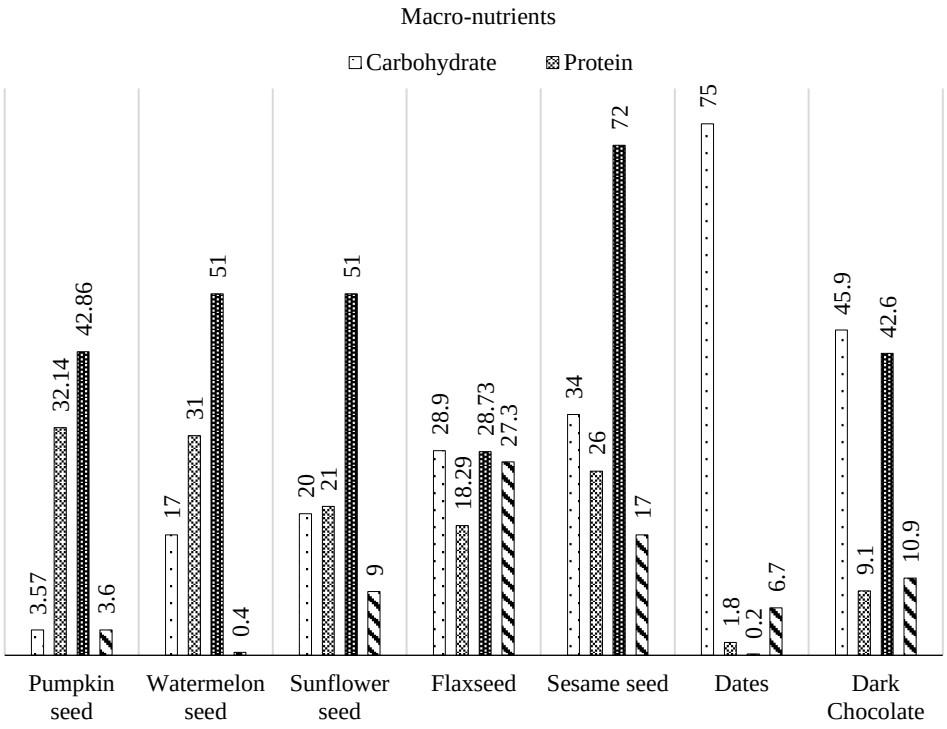

Figure 2. Macro-nutrient composition of the ingredients (g/100).

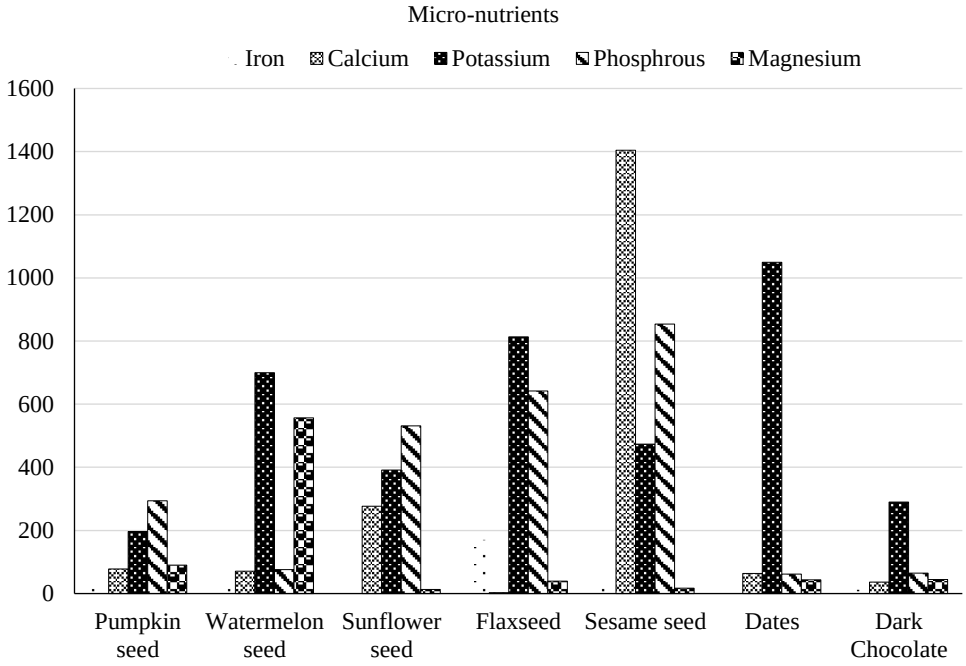

Figure 3. Micro-Nutrient Composition of the Ingredients.

Table 3. Nutritive value of chocolate coated seeds bar (100 g).

Nutrients	Value
Carbohydrates	462.73
Protein	10.49
Fat	16.13
Fiber	8.26
Minerals	
Magnesium	220.96
Calcium	134.98
Iron	113.7
Potassium	580.93
Sodium	43.36
Phosphorous	9.19
Copper	6.37
Zinc	19.57

Nutrient Analysis

Each 100 gms of chocolate-coated seeds bar contains 462.73 gm of carbohydrate, 10.49 gm of protein Proteins are the main building blocks of your body. The synthesis of enzymes, hormones, neurotransmitters, and other important chemicals, as well as the development of muscle tissue, tendons, organs, and pores and skin, all rely on proteins. It is cautioned to eat zero.36 grams of protein in keeping with pound (zero.8 grams according to kg) of body weight, consistent with the Dietary Reference Intake (DRI). Adults must eat 20% to 35% in their daily energy as fat. This corresponds to 44–77 grams of fats in line with day for a food plan of two,000 energy. Furthermore, the day by day advocated consumption of fiber (DRI) is 25 to 30 grams from nutritional assets. An intake of 78.12 grams of magnesium is advised. Age and gender-particular endorsed daily allowances (AI) for manganese are as follows: ladies 19 years of age and above have to take 1. Eight mg, pregnant ladies 14 to 50 years of age ought to take 2 mg, and nursing girls 2.6 mg. Furthermore, a consumption of 146.62 grams of calcium is cautioned, with 1200 milligrams of calcium in step with day being the Recommended Dietary

Allowance (RDA). Men and postmenopausal women have to goal for 8 mg of iron in line with day, whereas premenopausal ladies need to intention for 18 mg. Different elements, which include gender and lifestyles level, influence the Recommended Dietary Allowance (RDA), that is the recommended intake of iron. For males and girls, respectively, the typical day by day nutritional intake of iron is among sixteen to 18 mg and 12 mg, respectively. And lastly, 290 grams. The DRI of potassium for 19-51 is 2,600 mg per day.

Nutritive values obtained from the whole seeds chocolate have comparatively high nutritious value show in Figure 3. The chocolate-coated seeds bar contains 462.73 of carbohydrates, 10.49 of Proteins, 16.13 of Fat, 8.26 of Fiber, 220.96 of Magnesium, 134.98 of Calcium, 113.7 of Iron, 580.93 of Potassium, 43.36 of Sodium, 9.19 Phosphrous, 6.37 of Copper, 19.57 of Zinc. As the chocolate coated seeds bar contains 113.7 mg it can be given to anemic patients.25 mg of magnesium is needed to absorb calium to our body. Thus the chocolate coated seeds bar can be given to the people, who have low bone density to increase their calcium absorption(Figure 4).

Storage Study

Finally, the product was tested to see how long it will last in storage. The product can be kept for 10 days at ambient temperature and 20 days in the refrigerator, according to the shelf life. The dark chocolate begins to melt at room temperature due to the increase in ambient temperature, whereas the product stored in the refrigerator does not melt and retains its shape and appearance. However, due to the reduction in temperature, the seeds bar becomes hard and the aroma differs from the fresh one while refrigerated (Table 4).

Sensory Evaluation

The most appropriate method for evaluating selected recipes was sensory evaluation. The finished products underwent nutritional analysis and sensory evaluation. The product's and standards pleasant features were assessed by a 10-member panel. The panel was asked to rate the goods on a 5-point hedonic scale for look, taste, scent, texture, and overall acceptabilit**.** The chocolate coated seeds bars were judged on their general acceptability (appearance, taste, scent, and texture) using a 5-point scale. This evaluation is used to decide whether or not or no longer clients are happy with a product's features. For product like, a 5-point hedonic scale is employed (1 = dislike strongly, 2 = dislike mildly, 3 = neither like nor dislike, 4 = like slightly, 5 = like strongly). The score as well as a nutritional analysis are included in the report (Figure 5)

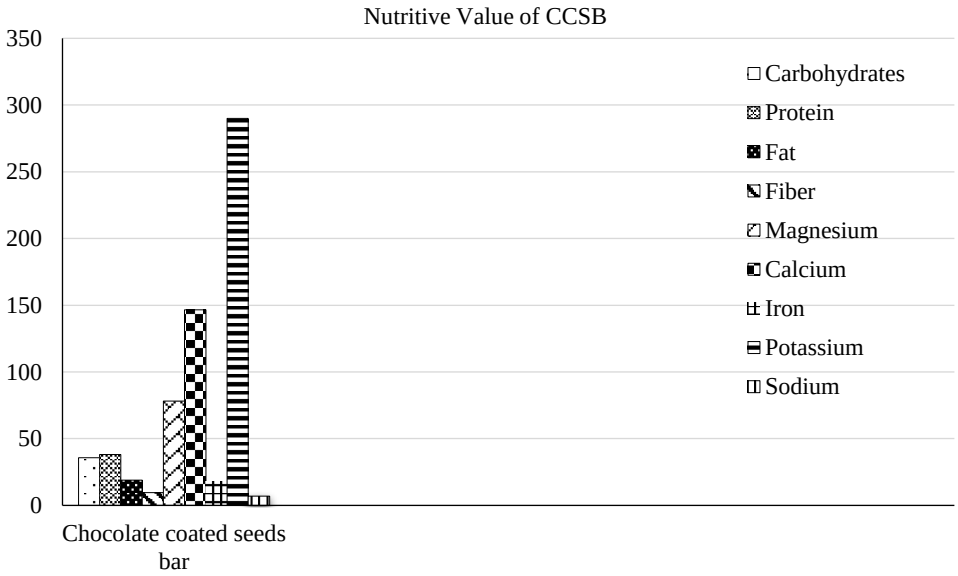

Figure 4. Nutritive value of chocolate coated seeds bar (100 g).

Table 4. Storage study.

S.N.	Samples	No. of days	Range of temperature		Results
1	Chocolate coated seeds bar	10	Room temperature	Cold temperature	No changes
2	Chocolate coated seeds bar	10	Room temperature	Cold temperature	Hardened product
3	Chocolate coated seeds bar	10	Room temperature	Cold temperature	Hardened product

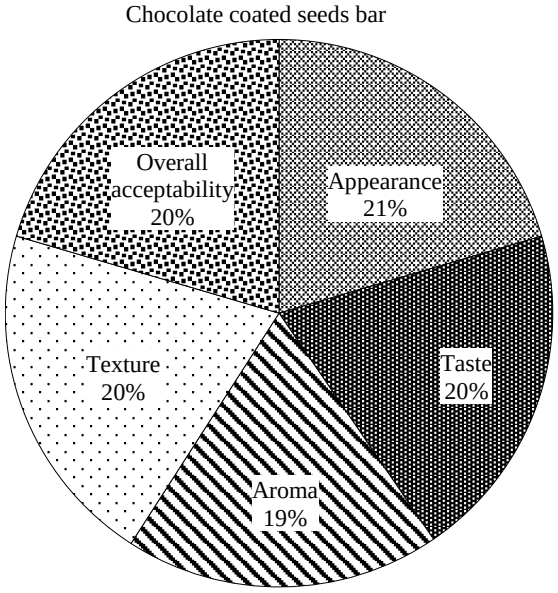

Figure 5. Sensory Evaluation by 5-Point Hedonic scale.

CONCLUSION

Women aged 35 and above are at a higher risk of bone deterioration due to childbirth and a decreased capacity to absorb calcium from their dietary intake. Calcium is made up of magnesium and zinc as precursors. Because the substance we made is high in magnesium and zinc, it can be used by people of all ages to improve skeletal strength, particularly in women. Antioxidants, anti-inflammatory, omega-3 fatty acids, low LDL, high PUFA, and Vitamin-E are also present in the product, which aids in weight management. As a result, the researcher will employ this nutrient-dense seeds bar in future experiments. As the magnesium and zinc is the precursor of calcium, it is the main component in the absorption of calcium. Since the product chocolate coated seeds bar contains 220.96 of Mg and 19.57 of Zn, It can be given to the low bone density people.

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