

A Study of the Preparation of Quinoa Based Chocolate Muffins (Gluten Free)

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ABSTRACT

The study of preparation of chocolate muffins with quinoa seeds (gluten free) was carried out at the Parul Institute of Applied Sciences, Parul University, Vadodara. Compared to conventional cereals, Chenopodium quinoa seeds have a higher nutritional value and are a great source of bioactive ingredients. As cases of food instability, malnutrition, and celiac disease have increased, so has consumer demand for strong, high-nutrition, gluten-free crops and products. Quinoa can be viewed as a healthy and secure substitute because to its rusticity, broad adaptability, high nutritional profile, and gluten-free nature. The seeds also contain small granule-sized starch, which necessitates more commercial investigation. The purpose of the present research is to standardize the method used to make muffins using quinoa seeds flour. Additionally, cabinet tray drying (60°C) was chosen for commercial viability based on chemical composition and organoleptic evaluation. Increasingly people are getting celiac disease diagnoses or other illnesses where wheat products should be avoided. It is crucial to broaden the selection of gluten-free goods offered because of this. In this study, it was determined to use the response surface methodology to optimize the technology for making muffins gluten free and chocolate while establishing water share (WT). The major goal of this study was to increase the level of dietary fibre and bioactive substances with antioxidant properties in gluten-free muffins in order to increase their nutritional value. To the best of our knowledge, no publication in the recent literature has yet attempted to simultaneously raise both components. This is crucial for food producers as well as other researchers who might use it to build a matrix for nutritional or microbiological studies.

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KEYWORDS: muffins, quinoa, gluten free value, nutritional value

1. INTRODUCTION

A muffin is a baked good that is served in individual portions. Because they are made using common components such refined flour, oil, and table sugar, they are seen to be unhealthy and lack adequate nutrition.

Consequently, composite flour, such as quinoa flour, can be utilized to make it nutritionally viable.

Chenopodium quinoa is a member of the amaranth family of plants.

It is an herbaceous annual plant that is primarily farmed as a crop for its edible seeds. Seeds are more nutritious than many grains in terms of protein, dietary fibre, B vitamins, and dietary minerals.



Fig: Quinoa Seeds

2. REVIEW OF LITERATURE

The pseudo cereal quinoa is a native of South America and has been grown there for many years. Due to its lack of gluten, quinoa is non-allergenic and can therefore be advantageous for those with celiac disease. The Incas referred to it as "chisaya mama" because it was a mother wholesome diet (Van Etten et al., 1963). Quinoa is not a true cereal and does not belong to the grass family, but it may be harvested and eaten like grains of cereal, and its leaves can also be used as a herb. Quinoa seeds differ greatly from cereal seeds in that the circular germ, which surrounds the perisperm, which is rich in starch, and the seed coat, which is comparatively high in fat and protein, make up the bran component (Alvarez-Jubete et al., 2010).

The pericarp contains saponins that must be removed before consumption. (Prego et al., 1998) depicts the quinoa seed's anatomy and the correct placement of each part. Because of its great nutritional value, which includes a high protein content with a balanced amino acid profile, good quality edible oil, and minerals like iron and calcium, quinoa is regarded as a complete food. Quinoa grain is tiny and can be kept for years if dried (Abugoch, 2009; Valencia-Chamorro, 2003). The Incas adopted quinoa as a replacement for scarce animal proteins, and it still serves as their main source of protein today (Tapia, 1997).

3. OBJECTIVES OF THE STUDY

Despite all the advantages of this superfood chocolate based muffins, there is relatively little scientific understanding of how to use it. In order to make quinoa available for processing on a large scale, a methodical approach to research is needed. The following goals have been set for the current study in light of the information in the literature and the aforementioned research gaps:

1. To study the preparation of gluten free chocolate muffins specially from quinoa seeds.
2. To understand the nutritional aspects and botanical composition of quinoa seeds.
3. To analyze the costing ,break even analysis of the product chocolate muffins.
4. To evaluate the different ingredients used for preparation of this product.
5. To characterise quinoa starch and standardise the procedure for extracting it.

Nutritional Composition of Quinoa Muffins

- Energy 327.42 Kcal/100g
- Protein 9.97 g/100g
- Carbohydrates 38.36 g/100g
- Fat 14.90 g/100g
- Moisture 34.79 g/100g
- Total Ash 1.98 g/100g
- Sugar BDL [DL=0] g/100g

4. MATERIALS & METHODS

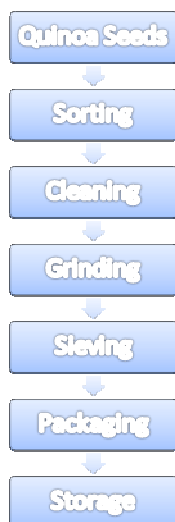


Fig. Flowchart for Production of Quinoa Flour

Ingredients required for preparing Muffins:

- 45 g Quinoa grains
- 40 g Dates, chopped
- 15 g Unsweetened cocoa powder
- Thick unsweetened evaporated milk
- Baking powder
- Baking soda
- Vanilla essence
- Unsalted butter
- Water
- Cashews
- Pumpkin seed

Procedure to prepare Chocolate Muffins with Quinoa seeds (gluten free)

Step 1 - In a mixer grinder add chopped dates and add 1 cup water.

Grind dates to fine paste. Later on keep it aside for further use.

This makes around 2 cups of date paste.

Step 2 Grind quinoa grain in a mixer grinder to a fine powder consistency and keep it aside for further use.

Step 3 Sieve the mix of quinoa flour, cocoa powder, baking powder and baking soda powder 3-4 times. Later keep it aside for further use.

Step 4 In a mixing bowl add evaporated milk, date paste and butter. Mix everything with an eggbeater.

Step 5 Next add half of dry sieved mix into the wet mix and mix with light hand.

Step 6 Next add ¼ cup water, remaining half of dry mix and vanilla essence. Blend everything together lightly and then later use electric beater to blend the ingredients properly

Step 7 Then add chopped cashews and walnuts and lightly mix with muffins batter.

Step 8 Later pour the batter in a greased and flour dusted muffin mould container.

Step 9 Then tap the muffin mould container to release any trapped air in the batter.

Step 10 Next bake the muffin for 50-55 minutes at 350-degree Fahrenheit or 175-degree Celsius in a preheated oven.

Step 11 Later remove the muffin from the oven and let it cool.

Step 12 Serve it plain

5. RESULTS & DISCUSSION

Business Plan of Chocolate Muffins

The mood-altering food that is primarily consumed by children, but today is enjoyed by individuals of all ages, is chocolate muffins. There is no set time, location, agenda, or place where one must consume chocolate; one may do it whenever or wherever they like. They are the most popular foods since they are healthy to eat, have numerous advantages, and taste fantastic. They are therefore still in demand today and in the future. Thus starting a chocolate muffins manufacturing or production business is a wonderful concept with the potential for profit.

Financial Expenditures

Manufacturing unit

Raw materials & products

Chocolate muffins moulds, trays, blenders, whiskers

Equipment for producing

Laborers

Electricity supply

Packing items

Transportation options

Projected Profitability Statement

Particulars	1 st year	2 nd year	3 rd year	4 th year	5 th year
Capacity Utilisation %	50	60	70	75	90
Sales					
Gross Sale					
Cakes, Bread, Buns	22.50	39.00	43.20	48.00	54.00
Total	22.50	39.00	43.20	48.00	54.00
Cost of Sales					
Raw Material Consumed	7.13	14.96	15.71	16.50	17.32
Electricity Expenses	1.42	1.95	2.16	2.40	2.70
Depreciation	1.95	2.34	2.10	1.90	1.71
Wages & labour	5.53	6.79	7.52	8.35	9.40
Repair & maintenance	1.95	1.95	2.16	2.40	2.70
Packaging	1.95	1.95	2.16	2.40	2.70
Cost of Production	19.93	29.94	31.81	33.95	36.53
Add: Opening Stock /WIP	0.00	5.99	10.37	12.77	13.05
Less: Closing Stock /WIP	5.99	10.37	12.77	13.05	14.36
Cost of Sales	13.94	25.56	29.41	33.67	35.22
Gross Profit	8.56	13.44	13.79	14.33	18.78
Salary to Staff	1.08	2.44	2.42	2.43	2.34
Interest on Term Loan	0.66	1.13	0.71	0.29	0.01
Rent	1.13	1.95	2.16	2.40	2.70
Selling & Admin Exp	1.13	1.95	2.16	2.40	2.70
Total	4.00	7.47	7.45	7.52	7.75
Net profit	4.56	5.97	6.34	6.81	11.03
Taxation	0.00	0.00	0.12	0.15	0.20
PROFIT (After Tax)	4.56	5.97	6.22	6.66	10.83

6. SCOPE FOR FURTHER STUDY

Since C. quinoa is gluten-free, it may be farmed economically on a bigger scale, especially in India. It also has a huge nutritional potential. The physical qualities can be used to develop the right machinery for properly DE hulling C. quinoa seeds to remove the antinutritional components. Due to its greater protein content, quinoa seeds can be studied for the isolation, characterization, and use of proteins. It might be possible to scale up the development of C. quinoa cookies, which would be advantageous for celiac disease patients. The study can be expanded to include the use of quinoa flour in the creation of additional ready-to-eat snacks in addition to cookies. The quinoa starches discovered in the current experiment, both natural and modified, can be used in a wide variety of culinary products. In addition to the alterations utilised in this study, quinoa starch can also be altered through other processes like irradiation, acetylation, and cross-linking to see how these changes affect the functional characteristics of the starch and final product.

7. CONCLUSION

In the current work, Chenopodium quinoa seeds were examined for their physical characteristics and ground to provide flour with the ideal particle size and

enhanced functional characteristics. The flour was then examined for its physical-chemical features, colour, functional qualities, pasting qualities, morphological and structural traits, minerals, fatty acid profile, phenolic and flavonoid content, and antinutritional elements. The procedure for isolating starch was standardized since seeds have a large amount of starch, and the starch that was extracted using the standard process was examined for its physical-chemical, morphological, thermal, structural, and rheological properties. Chocolate Muffins were made using flour made from Chenopodium quinoa.

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