



**PROJECT REPORT**

**ON**

**“Study on Comparison Between Almond Flour With Market Available All Purpose Flour”**

Supervised by

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Date of Submission: 19-07-2021

## **LETTER OF TRANSMITTAL**

Date: 19-07-2021

Dr. Sheikh Mahatabuddin

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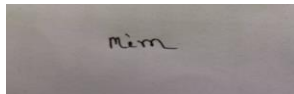
**Subject: Submission of project report**

**Dear Sir,**

With all due regard I am exceptionally happy to precise my appreciation for your direction and support during my study. It isn't conceivable for me to total my report without your support. I am very exceptionally appreciative to Daffodil International University and my instructors and my other individual people who support and help me amid my project work. I attempted to get ready the report, I collected most significant data which make my report as explanatory and dependable as conceivable. I tried to be concentrated my best effort to attain the objects of the report. I arranged the report in my practical knowledge and experience which can be offer assistance in my future proficient life. I request you to excuse my any mistake within the report and in spite of my best effort.

And once again thank you for your support and patience on me.

**Sincerely Yours,**



Khadija Kamal Mim

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## CERTIFICATE APPROVAL

This is certifying that Khadija kamal mim, bearing ID: 171-34-591, study on B.Sc. in Nutrition and Food Engineering is a sincere student of Department of Nutrition & Food Engineering, Faculty of Allied Health Sciences, Daffodil International University . She has completed her project report on “**study on comparison between Almond flour with Market available All Purpose flour**” under my supervision .

We are happy to affirm that the data presented within the report are genuine work of Khadija kamal mim and It has the extraordinary enchant working with her. We wish her achievement all through daily life.



20/07/2021

.....  
**Dr. Sheikh Mahatabuddin**

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## Abstract

The study was carried out for comparing between Almond flour with Market Available All Purpose flour. Almond flour produced from mature almond nuts. There were two sample has been taken one was (S1) almond flour, another was (S2) All Purpose flour. It was observed that (S1) contains 14% protein, 22.5% fat, 5.91% moisture, 3.83% ash, 50.65% carbohydrates and 3.11% fiber. And the other hand, (S2) contains 12% protein , 7.55% fat , 4.90 % moisture , 2.80% ash , 70.05% carbohydrates and 2.7% fiber .From this analysis we can find out that (S1) is high source of protein , fat ,moisture, ash and fiber then (S2) . And the other side (S2) is high source of carbohydrates then (S1). This study showed that (S1) contains high percentages of protein and low percentages of carbohydrates compare to (S2), which is good for our health .

**Key words:** *Almond, Almond flour, All Purpose flour.*

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# **CHAPTER 1**

## **Introduction**



## 1.1 Introduction

The scientific name (*Terminalia Catappa*) called Almond is well known tree nuts, which six vital contains of proteins , minerals, calcium , magnesium, rich source of vitamin E and dietary fiber. It is very much imperative treatment source of iron deficiency, constipation, gastroenteritis, kidney torments , diabetes and various skin diseases like eczema, pimple etc. Almond seed is local to the Mediterranean climate region of the Middle East, Eastward as far as the Industry in Pakistan. In Iran, Bangladesh, India and Pakistan, it's called as badam. It were spread by people in old times along the shores of the Mediterranean into northern Africa, Asia and southern Europe and as of late transported to other parts of the world. [1] [2]

Almond flour comes from Almond nuts. Almond flour is mainly almond nuts which is ground and sieved to a certain molecule estimate. It is utilized to create treats, cookies, cupcake, premium pastries and Almond macaroons.

Almond flour could be a great elective flour to wheat flour additionally reasonable fixing in gluten-free heating due to it's:

- ✚ Low carbohydrate content.
- ✚ Fiber and nutritional content.
- ✚ Absence of gluten-forming protein.

All Purpose flour is a common and flexible utilize wheat flour. It's too called refined or basically flour which is made from wheat grains after evacuating the brown covering. At that point it is processed, refined and whitened. It is one of the most common flour ingredients throughout the world. This sorts of flour are customarily created within the southern region of the United states. It's made either from:

- ✚ Hard wheat (for bread flour) and
- ✚ Blend of hard and soft flour ( for cake flour).[3]

## 1.2 Almond flour in Bangladesh

Bangladesh, a net merchant of nuts such as almond and very others nut . A few a long time back, years, tall esteem tree nuts was constrained supply in Bangladesh retail markets and buyers were not mindful of the wellbeing benefits of tree nuts. However, in present days , due to improved consumer socio-economic status, increased knowledge and awareness of tree nuts, so the demand has risen strongly. And now days people known the benefits of almond nuts and almond flour . So that Bangladesh retailers imports a big amount of almond flour in market . Bangladesh imports almonds and almond flours from U.S., and Hong Kong as the major supplier, directly and indirectly re-exporting via. In 2017, Bangladesh imported 753 Metric Ton of almonds and almond flour , ,which is accounting for 87 percent and 11 percent respectively, of total imports mainly from Hong Kong and the U.S.. In Bangladesh almond flour mainly found in super-shop and online base.[4]

## 1.3 Types of Almond flour

There are two types of Almond flour :

- ❖ **Blanched almond flour**: Almonds have normally brown skin color, which is consumable. If the skin is expelled the almond is called blenching. The blenched almond flour could be a white color and smoother surface and light weight. In this manner, this sort of almond utilized in confectionary for making cakes, treats, cookies and different desserts.
  
- ❖ **Unblanched almond flour** :.Unblanched almond flour is the flour made by almonds with their skin on. This flour is a red-brown color and heavier weight. Unblanched almond flour also usage in cooking. we can make all types of cake, desserts, cookies etc with this flour. [5]
  
- ❖ Bangladesh ready to discover both sorts of flour.

## 1.4 Objectives

### 1. General objective:

- To Compare Between Almond Flour With Market Available All Purpose Flour.

### 2. Specific Objectives:

- To check the proximate analysis of almond flour.
- To observe the proximate analysis of All Purpose flour .
- To aware the people that almond flour is good for health .

## Chapter 2

# MATERIALS AND METHODS

## 2.1 Collection of Almond flour :

The almond seeds or almond nuts are collected from a super shop named (Unimart ) Dhaka, Bangladesh .This study was carried out NFE food processing lab, under Daffodil International University, Asulia campus , Dhaka ,Bangladesh .

## 2.2Apparatus and Equipment :

- ✚ Stove
- ✚ Oven
- ✚ Electric balance
- ✚ Bowl
- ✚ Blender
- ✚ Spoon

All equipment were collected from the processing lab of university .

## 2.3 Table-1: Amount of Almond flour :

Ingredient (Almond seeds)	Quantity ( Almond flour)
100g	67.4g

Table 1: showed that 100g Almond seeds contains 67.4g Almond flour .

## 2.4 Flow chart of Almond flour production :

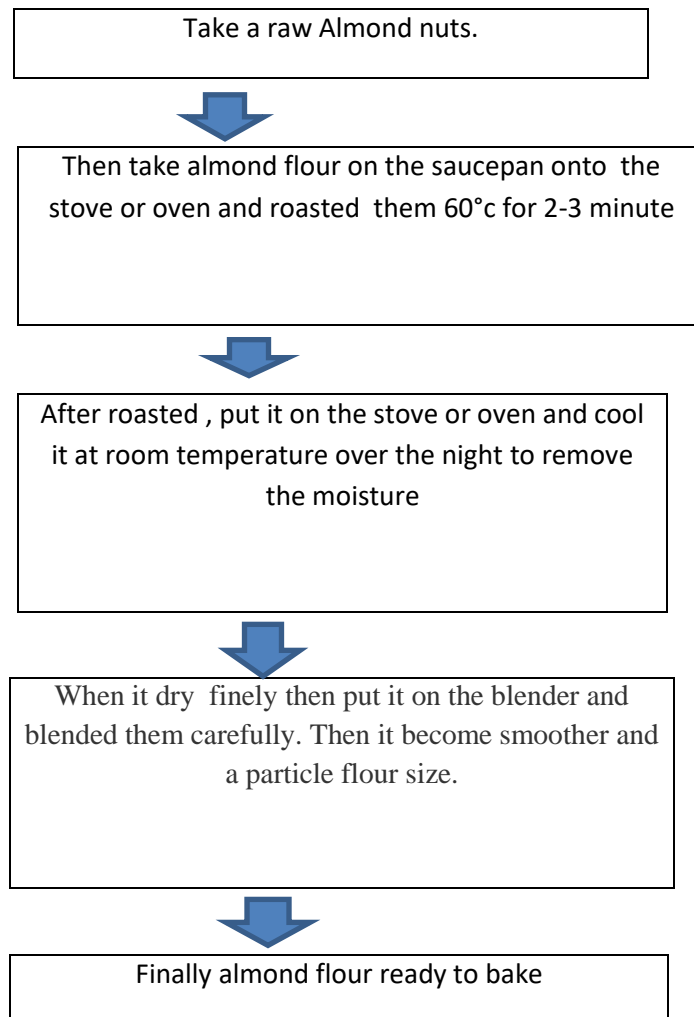


Figure 1: Roasted Almond



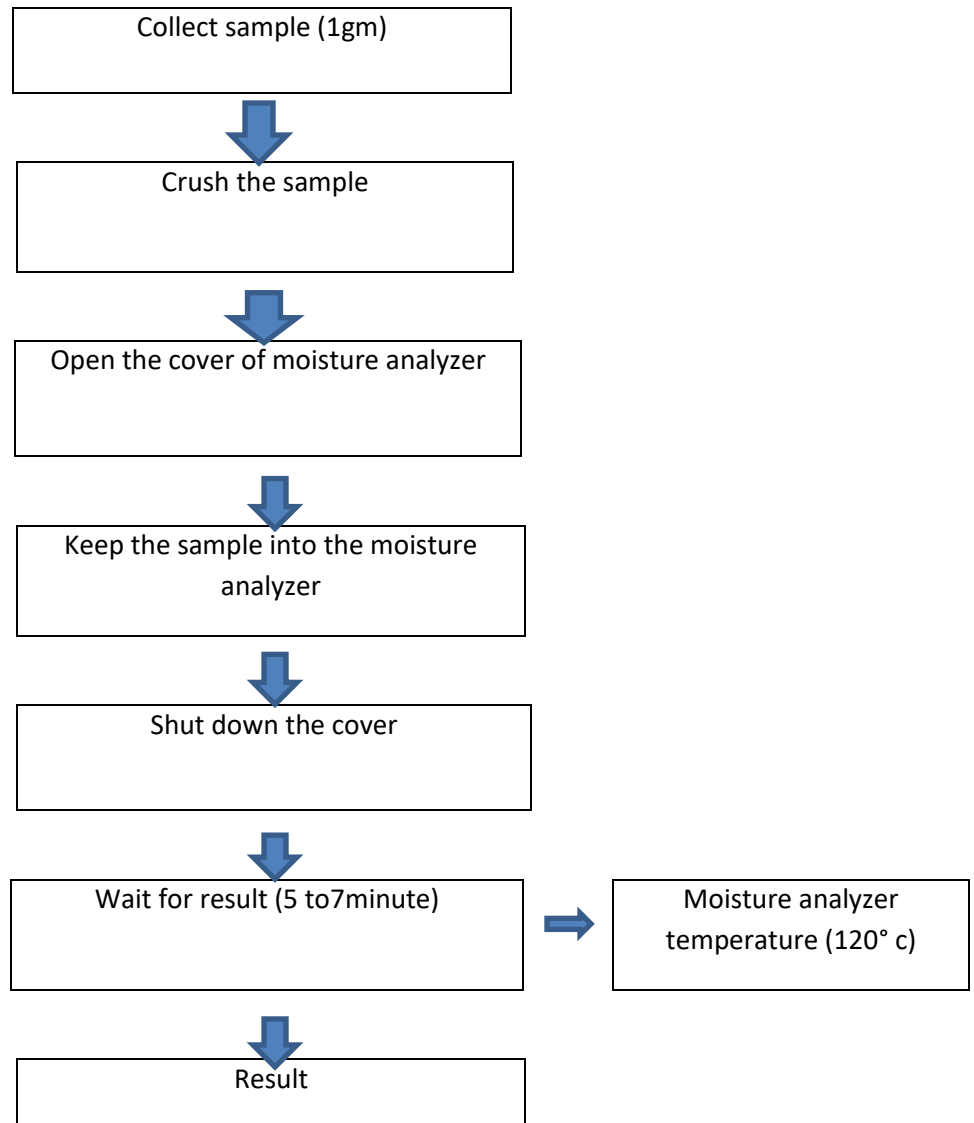
Figure 2: Almond flour

# **CHAPTER 3**

## **CHEMICAL ANALYSIS**

### 3.1 Determination of Moisture:

#### Procedure:



[6]

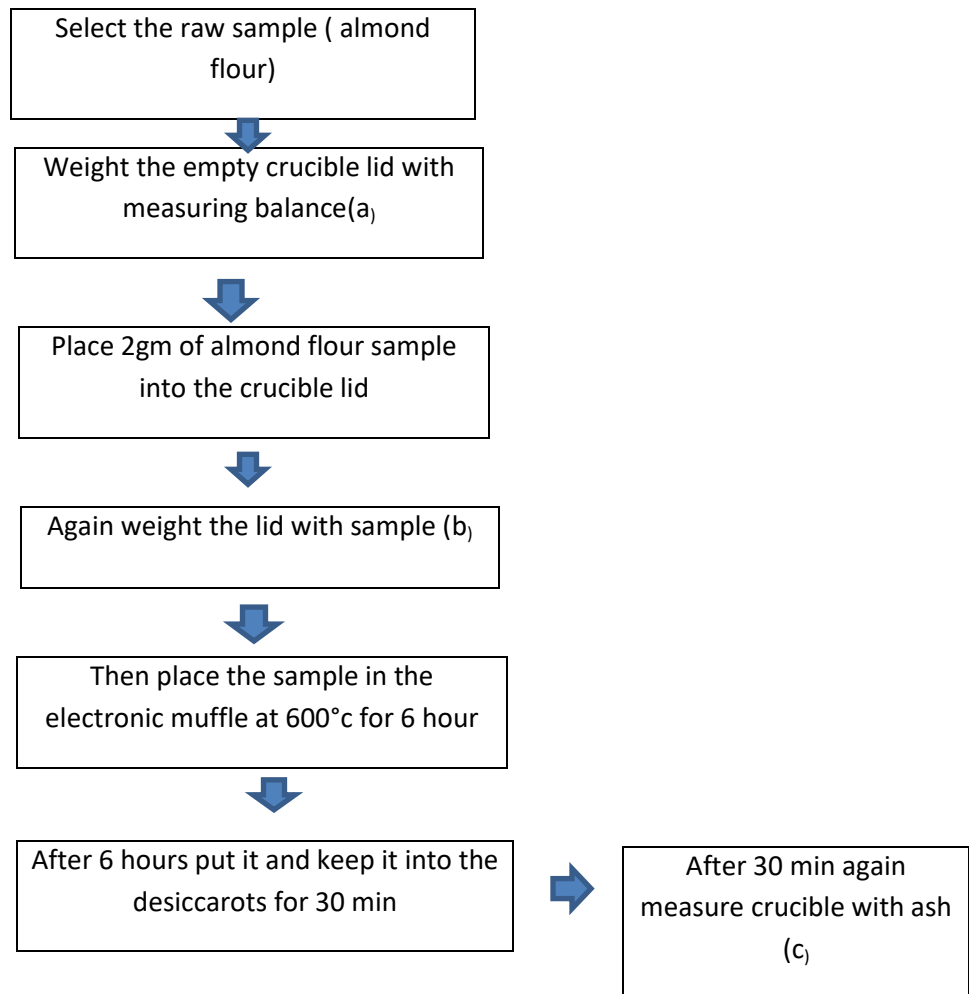


### 3.2 Determination of Ash:

#### Apparatus :

1. Crucible lid .
2. Electric muffle furnace machine
3. Weight machine
4. Spatula .
5. Desiccators .

#### Procedure:



**Calculation:**

Empty crucible lid weight - A

Crucible with sample – B

Weight of the sample – (B-A)

Crucible with ash - C

Weight of ash – (C-A)

So, the % of ash =  $\frac{c-a}{b-a} \times 100$  [7]

### 3.3 Determination of Fat:

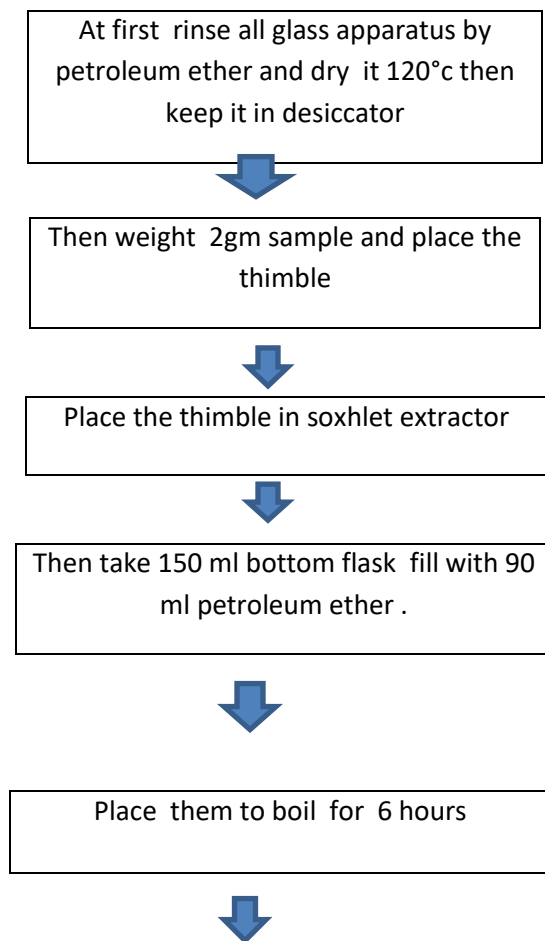
#### Apparatus:

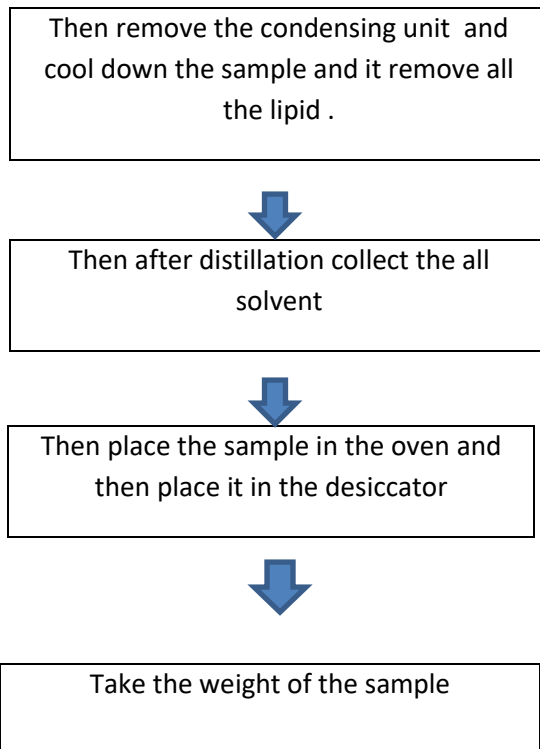
1. Weight machine 2. Soxhlet apparatus . 3. drying oven 4 .Thimble 5. Glass rod 6.Desiccators with silica gel . 7. petroleum ether (boiling tem 60° -80°c) .

#### Chemical:

N-hexane= 210 ml

#### Procedure:





**Calculation :**

Weight with Sample - S

Thimble weight –  $W_1$

Thimble with sample weight –  $W_2$

After extraction thimble with sample –  $W_3$

$$\text{So , \% of fat} = \frac{w_2 - w_3}{s} \times 100 \text{ [8]}$$

### 3.4 Determination of Protein:

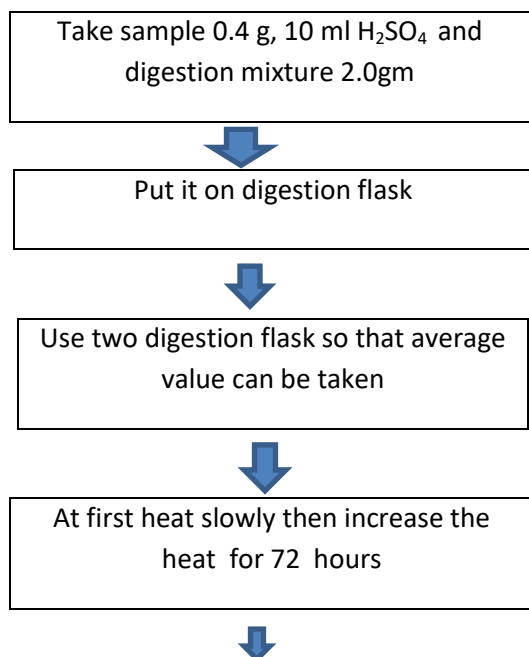
#### Apparatus:

1. Burette stand 2. Conical flask 3. Measuring test tube 4. Boiling flask 5. Analytical balance

#### Chemical:

1.  $H_2SO_4$
2. Digestion mixture (2g  $CuSO_4$  + 98g  $K_2SO_4$ )
3.  $NaOH$  40 %
4. 0.1 N  $HCl$
5. Methyl red in dicator
6. distilled water .
7. 0.1 N  $NaOH$

#### Procedure:



#### Digestion

The last point will no smoke of  $H_2SO_4$   
and solution will be crystal clear



Then cool it some time

### Distillation :

Pour the solution in a conical flask and  
make it 100ml using distilled water



Than take 10 ml from conical flask to the  
distillation flask



Then add 150ml distilled water and 10 ml  
of 40% NaOH to the distillation flask



Then added 50 ml of distilled water and  
10ml of 0.1 N HCL and 2 drops methyl red  
in the conical flask



Sue 3 distillation flask where one of them  
will be blank i.e no sample



Then use 3 trapping solution in 3 trapping conical flask the same thing



Set up the condenser and start it



Start the distillation unit and run for 30 min at 65°C

### Titration :

Fill the burette with 0.1 N NaOH



Do 3 times with 3 trapping solution



The end point will be color change from pink to light yellow

### Calculation :

B= Titration value of blank

S= Titration value of sample

1.4= Molar mass of Nitrogen

10= Volume of liquid sample

5.95= Nitrogen factor

0.1= Strength of NaOH

$$\text{So, \% of protein} = \frac{B-S \times 1.4 \times 10 \times 5.95 \times 0.1}{0.4 \text{ g}} [9]$$

### 3.5 Determination of Carbohydrate:

Carbohydrates is the sugar molecules of food or any other substance .It's provides energy level. It's a different types of –glucose and sucrose .In the body it is the main source of energy. Their calculation is little bit easy than other content .

#### Calculation :

So, % carbohydrates =  $100 - (\text{fat}\% + \text{crude fiber}\% + \text{crude protein}\% + \text{moisture}\% + \text{Ash}\%)$  [10]

### 3.6 Determination of Crude Fiber :

#### Apparatus:

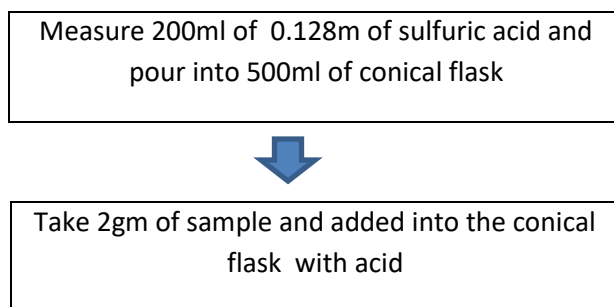
1. Balance machine
2. Muffle furnace
3. Hot plate
4. measuring cylinder
5. funnel
6. Conical flask
7. Beaker
8. Crucible
9. Hot air oven .

#### Chemical :

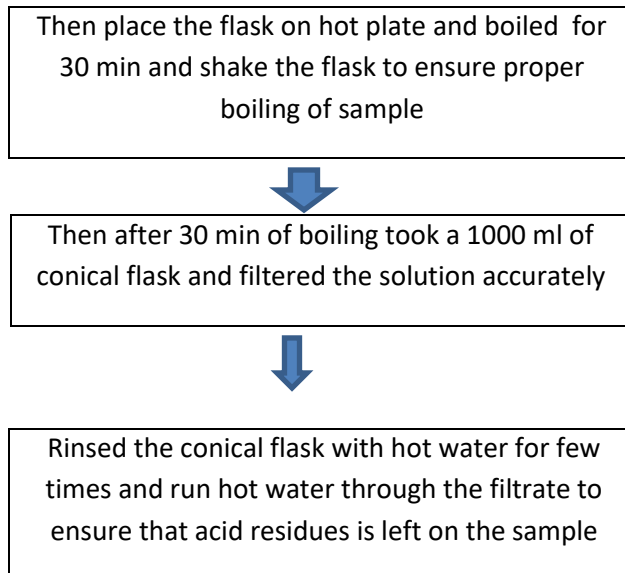
1. 0.128m sulfuric acid ( Diluting 3.49ml conc H<sub>2</sub>SO<sub>4</sub> in 500ml distilled water) .
2. 0.313m NaOH ( Dissolving 6.25g NaOH palletete in 500ml distilled water) .

#### Procedure:

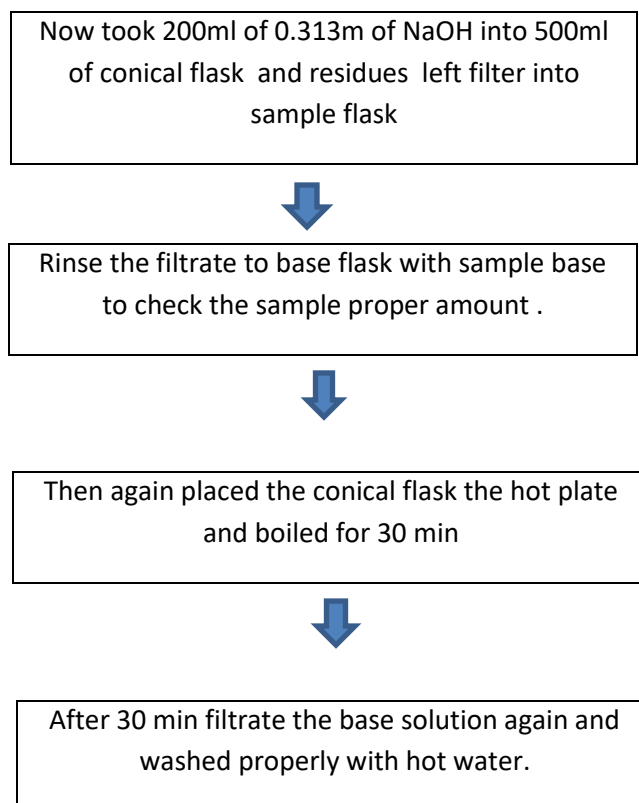
##### Boiling in acid :



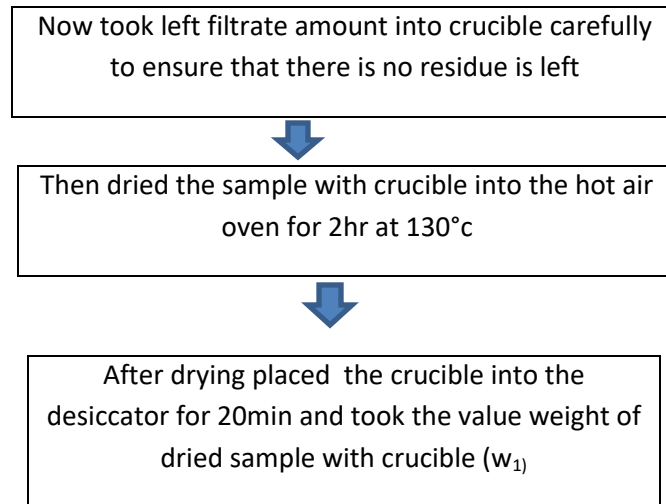




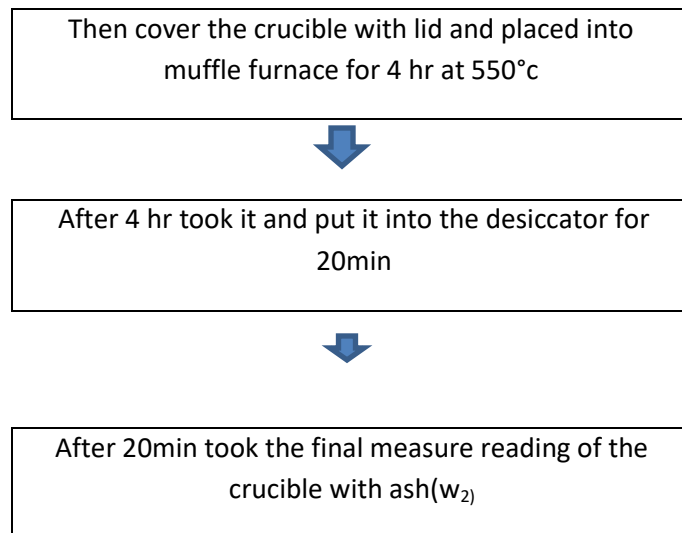
### Boiling in base:



### Oven drying :



### Ash :



### Calculation :

Weight of the sample ( $w_s$ )=

Weight of the crucible with dried fiber ( $w_1$ )=

Weight of the crucible with ash ( $w_2$ ) =

Crude fiber % =  $\times 100$  [11]

# **CHAPTER 4**

## **HEALTH BENEFITS OF ALMOND FLOUR**

## 4.1 Health benefits of Almond flour :

Almond flour is inconceivably nutritious . It's especially healthy in vitamin E and magnesium , two imperative supplements for wellbeing , which offer assistance decrease the hazard of genuine wellbeing conditions like cancer ,diabetes ,stroke ,and heart illness .

It's also an excellent source of :

- Magnesium
- Phosphorous
- Manganese
- Calcium
- Iron
- Copper.

✚ **Almonds and cholesterol** : Almond flour is a high in fat , but unsaturated fat . This type of fat doesn't increase low – density lipoprotein or bad cholesterol. An American heart Affiliation my note that unsaturated fat move forward person's blood cholesterol states .A 2005 think about propose that expending almonds may increment vitamin E levels in plasma and ruddy blood cells .2018 they note that in case individuals expend 45 grams almond to secure heart wellbeing .it's boost up our body .

✚ **Almonds and cancer risk** : Two to three times who expended almond flour are the lower hazard of breast cancer .

✚ **Protein** : Almond flour is high in protein . Almond flour is about 21 percent protein by weight .

- ✦ **Minerals:** Almond flour is high in manganese , magnesium ,calcium . That's boost up our body well .
- ✦ **Monounsaturated fat:** Almond flour contains half of fat is monounsaturated, which suggests that imperative our wellbeing benefits.
- ✦ **Vitamins:** Almond flour are the exemption source of vitamin E. It's develop up our plasma level in ruddy blood cell.
- ✦ **Diabetes** : Almond flour is a very low glycemic index . which effect a little or no effect on blood glucose. It's very beneficial for diabetic.
- ✦ **Obesity** : A diet rich in almond help to lose weight . Because fiber content make you feel fuller thus limiting your food intake.
- ✦ **Gluten intolerance**: Almond flour is gluten free, which is a fine wheat flour substitute for people who cannot consume gluten .
- ✦ **Blood Sugar:** It's maintain the blood sugar level. It refine the blood level . Some people are suffering type 2 diabetes. In 2011, 20 people consume 60gram of almonds for 12 weeks that they saw the improvement level.
- ✦ **Digestive Health:** Almond flour contains lots of prebiotic dietary fiber. This types of fiber is digested by bacteria in small intestine. Enough of prebiotic dietary fiber leads to a healthier, more efficient digestive system.
- ✦ **Fiber:** Almond flour are good source of dietary fiber, but it is not as great a source as whole almonds. [12]

# **CHAPTER 5**

## **Result and Discussion**

### 5.1 Table 2: Composition of Almond nuts : [13]

The sustenance realities for 3.5 ounces (100 g) of whole almonds are:

<b>Ingredients</b>	<b>Amount</b>
Ash	2.99
Protein	21.22
Fat	49.9
Water	4.4
Carbohydrates	21.6
Vitamin E	26.22

**Table 2: showed that 100 gram of Almond nut contains 2.99% ash, 21.22% protein, 49.9%, fat, 4.4% water, 21.6% carbohydrate, 26.22% vitamin E.**

### 5.2 Table 3: Comparison between Chemical Composition of Almond Flour and All Purpose Flour :

sample	Protein (%)	Fat (%)	Carbohydrates (%)	Moisture (%)	Ash (%)	Fiber
S1	14	22.5	50.65	5.91	3.83	3.11
S2	12	7.55	70.05	4.90	2.80	2.7

*(S1: Almond flour and S2: All Purpose flour)*

Table 3 showed that S1 contains 14% protein, 22.5% fat, 50.65% carbs, 5.91% moisture, 3.83% ash, 3.11% fiber and the other hand S2 contains 12% protein, 7.55% fat, 70.05% carbs, 4.90% moisture, 2.80% ash , 2.7% fiber . S1 is high source of protein, fat, moisture, ash, fiber then S2. S2 is high source of carbohydrates then S1.



### 5.3 1.Graphical representation of proximate analysis of Almond flour:

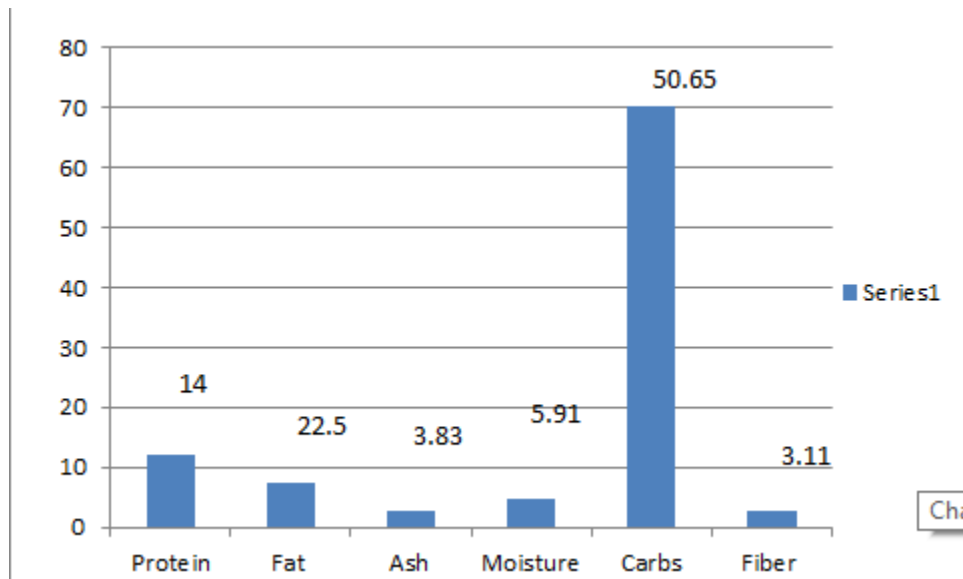


Figure: 3

Figure 3 showed that S1 contains 14% protein, 22.5% Fat, 3.83% ash, 5.91 % moisture, 50.65% carbohydrates, 3.11% fiber .Almond flour contains higher source of protein, fat, moisture, ash then All Purpose flour. Almond flour also rich in fiber, that good for our immunity system.

## 5.4 2. Graphical representation of proximate analysis of All Purpose flour:

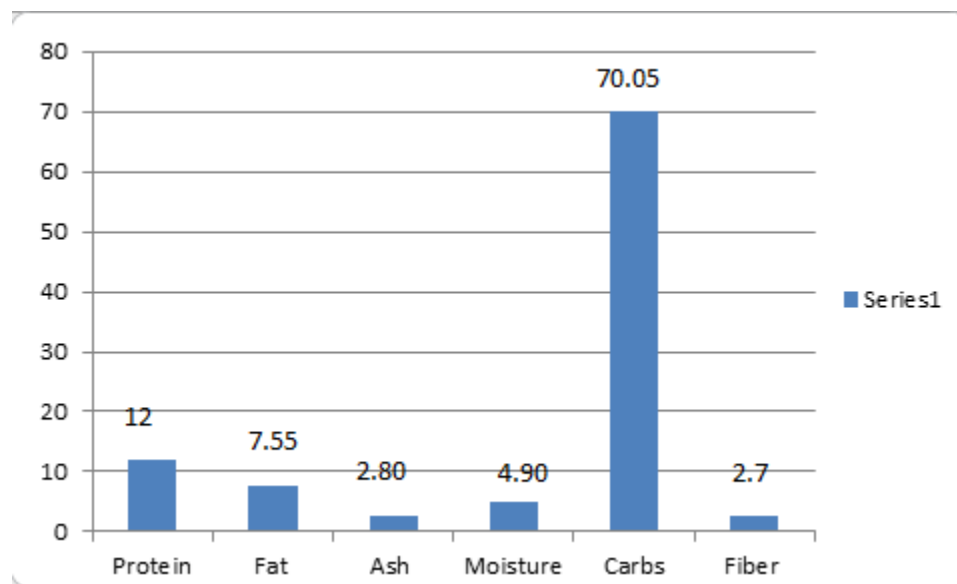


Figure: 4

Figure 4 showed that S2 contains 12% protein, 7.55% Fat, 2.80% ash, 4.90 % moisture, 70.05% carbohydrates, 2.7% fiber. All Purpose flour rich in carbohydrates then Almond flour. It is good for our health but not for diabetes, kidney, cholesterol patients.

# **CHAPTER 6**

## **Conclusion and Reference**

## **6.1 Conclusion:**

Almond is a rich source of protein and high source of fiber and it is very healthy food for people. From this analysis it's showed that Almond flour contains high source of protein, unsaturated fat, ash, moisture, fiber than to all-purpose flour. It will help to boost up our immunity system. Almond flour contains less percentage of gluten compare to all-purpose flour, so gluten intolerance people can easily consume it. Almond flour is also a good source of fiber which is helpful our digestive system .On the other hand all-purpose flour contains high percentage of carbohydrates than Almond flour which is not healthy source of energy for diabetes, kidney and cholesterol patients. Almond flour was also good source of vitamin E that will boots up our immunity system. This study shows that Almond flour can be a good alternative source than all-purpose flour for healthy lifestyles, especially for those who are on a gluten-free, low-carb or diabetic diet but more research is needed in this field.

## 6.2 Reference:

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