



**Daffodil**  
*International*  
**University**

**A Project Work Report**  
**Preservation of lemon juice**

At

**Daffodil International University**

**SUBMITTED TO**

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Date of Submission: 20<sup>th</sup> December, 2018

# LETTER OF TRANSMITTAL

Date: 18<sup>th</sup> December, 2018

Pro. Dr. Md. Bellal Hossain  
Head  
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## **Subject: Submission of project report**

Dear Sir,

With all due respect I would like to express my gratitude for your guidance and support during my study. It would not be possible for me to complete this report without your support. I am also thankful to Daffodil International University and my teachers and many other respective persons for their supervision, support and assistance during my Project work.

To prepare the report I collected what I believe to be most relevant information to make my report as analytical and reliable as possible. I have concentrated my best effort to achieve the objectives of the report and hope that my endeavor will serve the purpose. The practical knowledge and experience gathered during report preparation will immeasurably help in my future professional life. I request you to excuse me for any mistake that may occur in the report despite of my best effort.

I would really appreciate it if you enlighten me with your thoughts and views regarding the report. If you have any queries regarding my report, I would gladly answer your queries.

Thank you again for your support and patience.

Sincerely Yours,



Signature  
MD. ABU RAYHAN  
Student ID: 153-34-462

## CERTIFICATE APPROVAL

I am pleased to certify that the Project report on “Proximate Analysis of Pumpkin & Preparation of Pumpkin Blended Cake with Different Percent of Pumpkin Powder” at Daffodil International University Conducted by **Abu rayhan** bearing ID: **153-34-462** of Department of Nutrition & Food Engineering has been approved for Defense/Viva voce. Under my supervision **Abu rayhan** worked in the laboratory at Daffodil International University.

I am pleased to hereby certify that the data & test presented in the report are authentic work of **Abu rayhan**. I strongly recommended the report presented by **Abu rayhan** for further academic recommendation & defense/Viva-voce. **Abu rayhan** bears a strong moral character & a very pleasant personality. It has indeed a great pleasure working with him. I wish him all success in life.



**Pro. Dr. Md. Bellal Hossain**

Head

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**THE PROJECT WORK  
IS DEDICATED  
TO  
MY BELOVED PARENTS**

## **Abstract**

The objective of this study was to produce pumpkin powder and use it as an ingredient in bakery products. Pumpkin powder was produced from mature pumpkin. Pumpkin powder contained 5.02% moisture, 2.625% protein, 1.16 % fat & 4.96% ash. Handwheat flour was substituted by 2 levels of pumpkin powder (5 and 10%) in pumpkin cake. Raw pumpkin contained 0.74% ash, 1.75% protein, 1.40% fat, 73.325% moisture. The products were consumer tested and their physicochemical and sensory properties were analyzed. The result showed that cake prepared from 90% wheat flour & 10% pumpkin powder was optimum and accepted by the consumer group was at the level of "like extremely" to "like very much". This thesis was carried out to evaluate cake made from pumpkin powder substituted with wheat flour 95 and 90% extraction at level 5 and 10%, respectively to give two blends. The results showed that the sensory characteristics were varied with various concentrations of the ingredients in dough during production of cake and cake prepared from 90% wheat flour & 10% pumpkin powder were acceptable to most members regarding to taste, odor, texture, color, general appearance and overall acceptability.

**Keywords: Pumpkin, Pumpkin Powder, Pumpkin Blended Cake.**

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# Chapter# 1

## **Introduction**

## 1.0 INTRODUCTION

Pumpkin belongs to the family *cucurbitaceae* and is widely grown vegetable all over the world. Pumpkin is composed of *Cucurbitamoschata*, *Cucurbitapepo*, *Cucurbita maxima*, *Cucurbitamixta*, *Cucurbitafacifola* and *Telifairiaoccidentalis*. However, worldwide there are three main common types of pumpkin namely *Cucurbita maxima*, *Cucurbita pepo* and *Cucurbitamoschata* but *Cucurbitamoschata* is a leading crop cultivated since prehistoric time. Currently, this is the most common variety of Pumpkin in Asia. The main season for growing cucurbits is the summer and rainy months in most parts of Bangladesh. Winter pumpkins are also grown in some parts of southern and western India. Majority of the country's pumpkin cultivation starts in the first week of January and harvest begins in the middle of March to early April. Bangladesh's pumpkin production stood at 956,742 tons from 40,684 hectares of lands in 2017.[1]

Large number of pumpkin varieties varying in shape, size and color offlesh are available. The color of flesh ranges from yellow to crimson and flesh thickness often varies widely. Depending upon the variety, pumpkin contains 85-90 per cent water, 2.0-2.1 per cent protein, 0.3-0.6 per cent fat. The minerals present in pumpkin pulp are sodium, potassium, calcium, iron and phosphorous.

Pumpkin is a valuable source of carotenoids which have major role in the form of pro-vitamin A, when used at the ripening stage or after storage. Carotenoids are the primary source of vitamin A for most of people living in developing countries. B-carotene present in pumpkin is converted in to vitamin A in the body and plays a crucial role in the prevention of cancer and chronic diseases during the adult life due to their antioxidant abilities and prevent skin diseases and eyes disorder. Pumpkin has a high amount of biological active compounds. Pumpkin is recommended for atherosclerosis, reduction of cholesterol in people suffering from obesity. Pumpkin can be profitably converted in to a variety of value added products such as jam, jelly, marmalade, puree, sauces, chutney, pickle and cake. Pumpkin can be processed in to flour for their supplementation in to bakery products, soups, instant noodles and natural coloring agents in pasta and flour mixes. They must be acceptable to masses besides having high nutritional quality. Cake are small, flat, baked treat, usually containing fat, flour, eggs and sugar. Cakes are made by same method as used for making conventional cakes. Weaning is a period of transition for the infant during which the diet changes in terms of consistency and source. From a liquid milk based diet, child is gradually introduced to semi-solid food. Weaning foods should be given to the baby at about the age of four to six months. At four months most babies start to need extra food in addition to breast milk because they grow fast and breast milk is no longer enough to support their growth. During weaning period more nutritious diet is required for infant because it is a critical period of child life, when it is mostly at risk from malnutrition and other diseases. So, more emphasis is required to produce such value added products which are nutritious as well as liked and utilized by the masses. Since the pumpkin is produced in bulk in Bangladesh, especially in rural areas and the crop has high nutritional as well as therapeutic value, hence with a view to utilize the production of pumpkin in the development of such products as weaning mix and cakes which can be used by large spectrum of population, the proposed investigation was undertaken with following objectives: [2]

- i) To determine the proximate composition of raw material (fresh pumpkin, pumpkin flour etc.)
- ii) To develop nutritionally enriched cookies, weaning mix by use of pumpkin.

iii) To evaluate the products for different quality attributes and storage life.

iv) To work out the cost of production of different value added products. It is therefore, hoped that developing value added products like weaning mixes and cookies supplemented with pumpkin flour and pumpkin seed flour will help to contribute to enhance the nutritional status of the society and provide new vistas to the processing industry.<sup>[3]</sup>

## **1.1 Objectives of pumpkin added blended cake**

### **General objective**

- To Study on Proximate Analysis of Pumpkin & Preparation of Pumpkin Blended Cake with Different Percent of Pumpkin Powder.

## **1.2 Specific objectives of vegetable (pumpkin) added blended cake**

- To determine the general acceptability of the sensory qualities (appearance, odour, taste, general acceptability) of pumpkin blended cake.
- To popularize the vegetable cake (freshly dried pumpkin) to the people of Bangladesh.
- To Provide energy and its very good source of Dietary Fibre, Vitamin A, Vitamin C, Riboflavin, Potassium, Copper and Manganese.
- To evaluate the chemical characteristics of blended pumpkin cake.

## **1.3 Identification of Pumpkin:**

**Scientific name:** *Cucurbita pepo*

**Family:** Cucurbitaceae

**Origin:** North America

**Local Name:** MistiKumra (In Bangladesh)

**Season:**

- Summer and winter

**Weight:** 4-5 kg/fruit

**Maturity:** 60-70 days

## 1.4 Types of Pumpkin

- ✓ Butternut Pumpkin
- ✓ Acorn Pumpkin
- ✓ Spaghetti Pumpkin
- ✓ Delicata Pumpkin
- ✓ Hubbard Pumpkin
- ✓ Sweet Dumpling Pumpkin
- ✓ Blue Hokkaido Pumpkin
- ✓ Kabocha Pumpkin
- ✓ Long Island Cheese Pumpkin
- ✓ Rouge Vifd'Etampes Pumpkin
- ✓ Red Kuri (Hokkaido) Pumpkin
- ✓ Turban Pumpkin
- ✓ Sugar Pie and Other Sweet Pumpkin
- ✓ White Pumpkin
- ✓ The Big Boys Pumpkin
- ✓ The Blues Pumpkin
- ✓ Red-Orange Pumpkin
- ✓ Cheese Pumpkin
- ✓ Ghostly White Pumpkin<sup>[7] [8]</sup>

## 1.5 Pumpkin in Bangladesh

Bangladesh generally produces about Bangladesh's pumpkin production stood at 956,742 tons from 40684 hectares of lands in 2017, said MahbubaMoonmoon. Mostly grown in southern region. These have wide demand in the market and are commercially important. Different modern farming methods have helped increase the production and farming of sweet pumpkin in the country, a healthy and nutritious vegetable. Pumpkin is rich in vitamins and minerals but low in calories. It is also called the 'cheaper nutrient' for the poor as its seeds, leaves, and juices are packed with powerful nutritional elements. Pumpkin production has gained popularity in the river basins and chars, said MahbubaMoonmoon, additional deputy director (horticulture wing) of the Department of Agriculture Extension (DAE).Pumpkin doesn't have a fixed harvesting period, farmers can harvest it anytime, and there is no post-harvest loss as well," said the horticulturist, adding that Pumpkin can be stored for up to a year. Growers usually start pumpkin farming at the end of the rainy season when water level decreases in rivers and the chars appear. Though this vegetable can be cultivated throughout the year, it is vastly cultivated in summer and winter seasons. Bangladesh Agricultural Research Institute (BARI) has developed the pit-cropping technique for pumpkin farming, which has gained popularity in char areas. This new farming method is helping improve the livelihoods of many poor people as using this method they can grow pumpkins in the sand and fallow lands. Besides, it only takes four months to harvest pumpkin after the plantation. Majority of the country's pumpkin cultivation starts in the first week of January and harvest begins in the middle of March to early April. Bangladesh's pumpkin production stood at 956,742 tons from 40,684 hectares of lands in 2017. <sup>[2]</sup>

## **1.6 Color, Flavor and Size of Pumpkin**

### **Color**

- Green
- Yellow
- Red
- White
- Blue
- Orange
- Pale green
- Dark green
- Bright yellow
- Pale yellow
- Bluish grey

### **Flavor**

Pumpkin pie spice, also known as pumpkin spice, is an American spice mix commonly used as an ingredient in pumpkin pie. It is generally blend of ground cinnamon, nutmeg, ginger, cloves, and sometimes allspice. It can also be used as a seasoning in Food Factory and general cooking. <sup>[4]</sup>

### **Size**

The lantern pumpkin is approximately the size of a volleyball. On average, they weigh 7-11 pounds. There are available in a 36" bin. The face pumpkin is the typical carving pumpkin. [5]

## **1.7 Uses of Pumpkin**

Pumpkin has a vast scope of diversification and can be utilized in the production of various processed products like jam, pickle, beverages, candy, bakery products and confectionary. Pumpkin can be processed into powder which has longer shelf life and therefore, it can be used to supplement cereal flours in bakery products, breads, cookies, cakes, soup, sauces, instant noodle, instant pumpkin kurta as well as natural coloring agent in pasta and flour mix. Therefore, attempts have been made in this experiment to prepare instant food mixes from pumpkin and its seed flour.

## **1.8 About Pumpkin Blended Cake**

This pumpkin cake reminds me of super moist spice cake in terms of preparation, ease, taste, and texture. The base of the cake is oil, eggs, and pumpkin dry powder, you'll use a standard can of pumpkin dry powder. I love recipes calling for the whole can because nothing goes to waste.

Let's talk flavor. We obviously have all the dry pumpkin powder percentage of 5 and 10% use in pumpkin blended cake. In my notes you'll see the actual spices listed out in the pumpkin pie spice like cloves, nutmeg, etc. I sweeten this pumpkin cake with both brown sugar and white granulated sugar. Because I know that's where the best flavor lies. We're actually using real pumpkin Powder here. Added some amount of vanilla, ghee, milk powder, and butter in the pumpkin blended cake. Cakes with a similar spice flavor and texture profile like carrot cake, spice cake, and banana etc.

# Chapter#2

## **MATERIALS & METHODS**

## **2.0 Materials and Methods**

The study was conducted in the Laboratories of the Department of Nutrition and Food Engineering, Daffodil International University, Dhaka.

### **2.1 Collection of Raw Materials**

The fresh, mature pumpkin was collected from kauranbazer Dhaka. Then I am washing, pilling and slicing the pumpkin and use to solar dry. At last i am doing make its powder.

### **2.2 Collection of Chemicals**

- ✓ Distilled Water
- ✓ N-Hexane
- ✓ H<sub>2</sub>SO<sub>4</sub> (Sulphuric Acid)
- ✓ Digestion Mixture(2g CuSO<sub>4</sub> + 98g K<sub>2</sub>SO<sub>4</sub>)
- ✓ CuSO<sub>4</sub> (Copper Sulphate)
- ✓ NaOH (Sodium hydroxide)
- ✓ HCl (Hydrochloric Acid)
- ✓ Methyl Red
- ✓ Ascorbic Acid
- ✓ Meta Phosphoric Acid
- ✓ 2,6Dychloroindophenol

### **2.3 Preparation of pumpkin blended cake:**

The fresh pumpkin was dried at 50°C using Solar. Power the samples were then grinded using laboratory to obtain the pumpkin powder which were then kept chilled in an air-tight container at 5°C temperature, until laboratory analysis and cake processing. The samples were evaluated in triplicate for each analysis. The control cake blend (TC) was formulated from 200 g flour, 3pcs whole fresh egg, 200 g sugar, 28 g dry milk, 12 g baking powder, ghee 1spoon, salt as per requirement, water as per requirement, oil 140ml and 3 drops vanilla. Pumpkin powder was substituted wheat flour at levels 5 &10% to give three blends (PC5 and PC10), respectively. Shortening and sugar powder were creamed together using a kitchen machine (National, Japan) for 5-10 min. Flour, dry milk and baking powder were mixed together, then the mixture was added gradually to shortening, sugar, egg, vanilla and beaten for 3 min using the mixing machine at low speed. The blend was scaled at 30 g into baking pans and baked at 180°C for 35 min. Baked cakes were left to cool for 1 hr. at room temperature and stored after packaging with poly ethylene bags at refrigerator until analysis.

## **2.4 Methodology**

The study on the Development of Pumpkin Blended Cake was made using the following equipment, ingredients and utensil. Method of baking.

## **2.5 Apparatus and Equipment**

1. Blender
2. Oven
3. Electrical Balance
4. pH Meter
5. Disc Bowl Centrifuge
6. Desiccators
7. Refractometer
8. Heater
9. Conical Flask
10. Measuring Flask
11. Mixer Machine
12. Viscosity Meter
13. Biker
14. Pan for Blanching and knives
15. Filter Paper
16. Round Bottle
17. Pyrex
18. Muffle Furness
19. Soxhlet apparatuses
20. Thimble
21. Heating mantle
22. Burette
23. Spoon
24. Tray

## **2.6 INGREDIENTS**

- ❖ Pumpkin Powder
- ❖ Flour
- ❖ Egg
- ❖ Sucrose
- ❖ Dry Milk
- ❖ Baking Powder
- ❖ Ghee
- ❖ Salt
- ❖ Water
- ❖ Oil
- ❖ Vanilla
- ❖ Milk Flavour
- ❖ Butter



## **2.7 Pumpkin Blended Cake Preparation**

Pumpkin Blended Cake Preparation used in to two step. First Step Raw Pumpkin to Pumpkin Powder, and the Second Step is Pumpkin Powder to Pumpkin Cake. The weight of the Pumpkin (without peel) was 3500gm. After Peeling and slicing the weight of the Pumpkin was 2750 gm. The final product of dried Pumpkin Powder was 210 gm. A key step of preparation of described below.

## **2.8 First Step Raw Pumpkin to Pumpkin Powder**

Fruit selection. Several requirements need to be met:

- ❖ Lack of insect infestation.
- ❖ Lack of mechanical injuries.
- ❖ Check the stage of maturity.
- ❖ Check colour and texture.
- ❖ Minimum 3° Brix.
- ❖ pH value of 6.35

### **Washing**

Pumpkins are washing by water containing 15 ppm chlorine in order to reduce microbial load. A second washing with clean water.

### **Peeling and cutting**

Pumpkin is pilling and separated from the seed with knives, on a chopping board. Then Pumpkin are cut in similar small pieces are placed in clean plastic SS tray.

### **Sun Drying**

In this Process sun is used to make it dry. Here temperature is used (40°C - 45°C) to makes it dry. It's need 3 to 4 days to make it dry depending on the moisture content of Raw Pumpkin.

### **Powdering**

Blender Machine helps to make it powder form Dry Pumpkin. Uses of Blender Machine 3 to 4 times that can powder are making smoother. Then Colander is used to separate crystallization part of powder. Now put the powder into the jar and cover with lid.

## **2.9 Second Step Pumpkin Powder added to Pumpkin blended cake.**

### **Sugar Powder**

A mixer machine is used to make sugar powder. Sugar powder have the advantage, it easy to mix with other substance.

### **Added Pumpkin powder in Sugar powder**

By the volume of sugar powder add 10% of Pumpkin powder. Then mix it perfectly.

## 2.10 Ingredient mixing

Butter, powder sugar (200mg) in bowl of a heavy-duty stand mixer on medium speed until light and fluffy, about 3 minutes. Add egg (3pcs); beat just until blended. Sift together flour (200g), pumpkin powder (23g), baking powder (12g), ghee, oil (140g), milk powder (28g) and salt in a mixing. Whisk together pumpkin powder, butter and vanilla in a separate bowl. Add flour mixture to butter mixture alternately with pumpkin mixture, beginning and ending with flour mixture, beating on low speed after each addition (batter will be thick).

### Baking

Bake the cake for 40 minutes. Rotate the pan 180 degrees halfway through the cook time to ensure it bakes evenly. The cake is finished when a toothpick inserted in the center comes out clean.

### Cooling

Pumpkin Blended Cake Cooling in normal temperature.

### Packaging

The Pumpkin Blended Cake is packed when hot in LDPE (low density polyethylene) and sealed immediately. All packaging materials must be clean before used.



Figure: 2.1 Pumpkin Cake

### 2.11 flow chart of pumpkin cake:

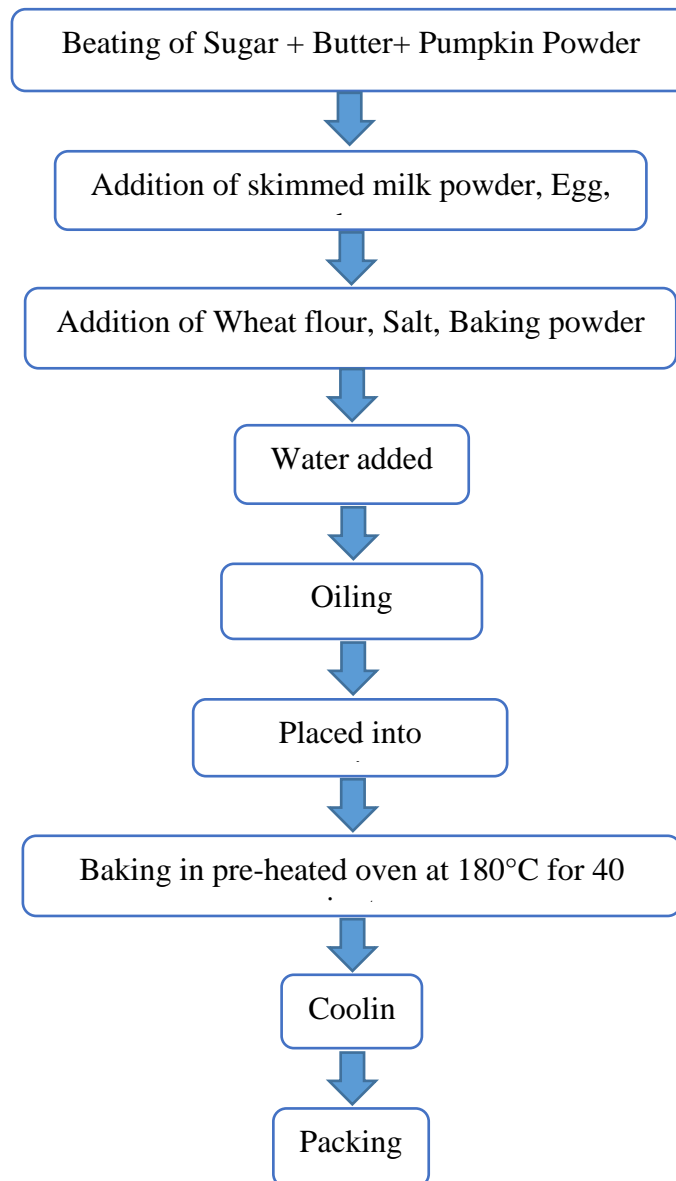


Figure: 2.2 Flow chart of Pumpkin Blended Cake

# **CHAPTER#3**

## **CHEMICAL ANALYSIS OF PUMPKIN BLENDED CAKE**

### 3 Chemical Analysis

Moisture, Ash, Fat% of Pumpkin Blended Cake were determined by following methods described by; Moisture content by Manual moisture analyzation method at 105°C for 1 hours; Ash content by muffle furnace ignition method at 550°C. Degree Brix, and pH of Pumpkin Blended Cake were determined by following methods described by; Refractometer as degree brix (°B) and pH by pH meter.

#### 3.1 Determination of PH

Apparatus

1. PH meter.
2. Biker.
3. Knife.
4. Blender.

Procedure

1. First there is no vaccine and 2/3 grams of raw pumpkin is made by distill water.
2. When we make a solution, we identify the ph. meter with a part of the meter and then we have ph.



Figure: 3.1 pH Meter

Calculation:

1. P<sup>H</sup> of Raw pumpkin 6.35
2. P<sup>H</sup> of Dry pumpkin 6.15

## 3.2 Determination of Fiber

### Apparatus

1. Oven
2. Biker
3. Analytical Balance

### Process of fiber:

1. At first take a biker and sample weight.
2. We create a solution by 2 gm sample and 50ml distill water.
3. We keep the binding on the oven until it has completely dried up to 105 degrees at the oven with 3 submissions. (Approximately 9 to 10 hours may take time.



Figure: 3.2 Oven

Calculation:

Weight of fiber = (wt. of fiber + Biker) – (wet of Biker)

Weight of dry sample = (wt. of dry sample + biker) – wt. of biker

$$\text{Fiber of raw pumpkin: fiber\%} = \frac{\text{Mass of fiber}}{\text{Mass of sample}} \times 100$$

$$\text{fiber\%} = \frac{0.110}{2} \times 100$$

$$=5.5\%$$

$$\text{Fiber of dry pumpkin: fiber\%} = \frac{\text{Mass of fiber}}{\text{Mass of sample}} \times 100$$

$$\text{fiber\%} = \frac{0.125}{2} \times 100$$

$$=6.25\%$$

$$\text{Fiber of 10\% pumpkin blended cake: fiber\%} = \frac{\text{Mass of fiber}}{\text{Mass of sample}} \times 100$$

$$\text{fiber\%} = \frac{0.018}{2} \times 100$$

$$=0.9\%$$

Fiber of 5% pumpkin blended cake=0.75%

### 3.3 Determination of Ash:

Apparatus:

1. Crucible
2. Electric muffle furnace machine
3. Weight machine
4. Spoon

Process of Ash:-

1. Samples should be taken by two different crucibles.
2. Then two crucible will be kept at the 600 degree temperature for 6 hours in the electric muffle Furnace at crucible.
3. After six hours, the crucible will be out and cool to the desiccator.
4. Then we will take the weight of samples of burnt with crucible.



Figure: 3.3 Electric Muffle Furnace

Calculation:

Weight of ash= (wt. of ash + crucible) – (wt. of crucible)

Weight of dry sample = (wt. of dry sample + crucible) – wt. of crucible

$$\text{Ash of raw pumpkin:ash\%} = \frac{\text{Mass of Ash}}{\text{Mass of sample}} \times 100$$

$$\text{ash\%} = \frac{0.037}{5} \times 100$$

$$=0.74\%$$



Ash of dry pumpkin: 
$$\text{ash\%} = \frac{\text{Mass of Ash}}{\text{Mass of sample}} \times 100$$

$$\text{ash\%} = \frac{0.248}{5} \times 100$$

$$=4.96\%$$

Ash of 10pumpkin blended cake: 
$$\text{ash\%} = \frac{\text{Mass of Ash}}{\text{Mass of sample}} \times 100$$

$$\text{ash\%} = \frac{0.098}{5} \times 100$$

$$=1.96\%$$

Ash of 5%pumpkin blended cake=1.30%

### 3.4 Determination of Vitamin C

Apparatus:

1. Biker
2. Funnel
3. Dropping pipette
4. Test tube
5. Test tube rack

Chemicals:

- ✓ Ascorbic Acid
- ✓ Meta Phosphoric Acid
- ✓ 2,6 dichlorophenollindophenol

Process

1. At first taken 10gm raw pumpkin and slice the pumpkin then made pest by motor
2. Pest filtering by filter and funnel (Filtering time maybe 3 to 4 hours)
3. Then taken a test tube rack and two test tube set at rack and taken per test tube at 10 ml 2,6 dichlorophenollindophenol

Titration:

For set under the burette for titration. From the burette Ascorbic Acid was added into trapping test tube by drop-wise (drop counted 489 drops) and test tube was shaken gently. Ascorbic acid was added until color change. The end point was color change from blue to white color.

On the other hand, for set under the burette for titration. From the burette Sample was added into trapping test tube by drop-wise (drop counted 158 drops) and test tube was shaken gently. Sample was added until color change. The end point was color change from blue to white color.



Figure: 3.4 Burette stand

Calculation:

(Drops standard) (Conc. Standard) = (Drops Unknown) (Conc. Unknown)

$489 \times (11\text{mg}/100\text{ml}) = 158 \times (n \text{ mg}/100\text{ml})$  of raw pumpkin juice

$n \text{ mg}/100\text{ml}$  of pumpkin juice =  $489 \times 158$

=  $489/158$

= 3.09

n mg vit. C/100ml of pumpkin juice

= 3.09mg.

Vit-C of Raw pumpkin: 3.09mg & Vit-C of Dry pumpkin: 2.1mg.

### 3.5 Estimation of Protein:

Apparatus:

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

Chemical

1.  $\text{H}_2\text{SO}_4$
2.  $\text{K}_2\text{SO}_4$
3.  $\text{NaOH}$
4. 0.1 N  $\text{HCl}$
5. Methyl red

Procedure:

Kjeldhal method consists of 3 steps. They are as follows:

1. Digestion of sample
2. Distillation
3. Titration

Digestion of sample:

0.4g of sample was taken in a foil paper or a weighing paper. The sample was poured in a digestion flask. 10 ml of  $\text{H}_2\text{SO}_4$  was added into it. Then 2g of digestion mixture was taken into the flask. Two digestion flask was used so that average value can be taken. The flasks were then heated in a kjeldahl digestion chamber. At first temperature was  $40^\circ\text{C}$ . Later temperature increased to  $60^\circ\text{C}$ . 3-4hours was waited for become the Solution colorless. Then the flasks were cooled and diluted with 100ml distilled water.

Distillation:

10 ml of solution from that flask was taken to the distillation flask. 150 ml of distilled water was taken into the flask. Then 10ml of 40%  $\text{NaOH}$  was added to the distillation flask. Solution was colorless.



Figure: 3.5 Distillation flask with colorless solution

Three distillation flasks were taken for this procedure where one of them was blank. In the 3<sup>rd</sup> distillation flask only reagents were taken and contained no sample. On the other hand 50 ml of distilled water and 10 ml of 0.1N HCl was taken in a trapping conical flask. 2 drops of methyl red were taken into the trapping conical flask. The solution became pink color.

Three trapping conical flasks were used and contained the same thing. Then the condenser was run for 30 min to complete the distillation process. Then the trapping conical flasks were removed and titrated with NaOH.

For titration the burette was filled with 0.1N of NaOH. Then the trapping conical flasks were

**Titration:**

For set under the burette for titration. From the burette NaOH was added into the trapping conical flask drop-wise and the conical flask was shaken gently. NaOH was added until a color change. The end point was a color change from pink to light yellow color.

Table: Burette Reading for Titration

Content	Burette Reading				Average	
	Initial		Final		Raw	Dry
	Raw	Dry	Raw	Dry		
Sample-1	7.5	9.1	15	17	7.5	7.9
Sample-2	15	17	22	25.1	7	8.1
Blanks	0	0	7.5	9.1	7.5	9.1

Calculation:

Percentage of protein was calculated by using the following formula

$$\text{Percentage of Protein} = \frac{(c-b) \times 14 \times d \times 6.25 \times 100}{a \times 1000}$$

Where,

a= sample weight (g)

b= volume of NaOH required for titration for sample

c= volume of NaOH required for titration for Blank

d= normality of NaOH used for titration

6.25= the conversion factor of nitrogen to protein

14= the atomic weight of nitrogen

Here,

a= 0.4

b= 6.25

c= 7.5

d= 0.1

$$\text{Protein \% of Raw Pumpkin} = \frac{(8.3-7.5) \times 14 \times 0.1 \times 6.25 \times 100}{0.4 \times 1000}$$

$$= 1.75\%$$

$$\text{Protein \% of Dry Pumpkin} = \frac{(9.1-7.9) \times 14 \times 0.1 \times 6.25 \times 100}{0.4 \times 1000}$$

$$= 2.625\%$$

Protein 10% of Pumpkin blended cake = 9.54%

Protein 5 % of Pumpkin blended cake=8.70%

### 3.6 Determination of Brix:

#### Apparatus

1. Refractometer.
2. Biker.
3. Knife.
4. Blender.

#### Procedure

1. First there is no vaccine and  $2/3$  grams of raw pumpkin is made by distil water.
2. When we make a solution, we identify the Refractometer with a part of the meter and then we have Brix.



Brix of raw pumpkin: 3<sup>0</sup> brix

Brix of dry pumpkin powder: 7<sup>0</sup> brix

### 3.7 Determination of Fat:

#### Apparatus

1. Crucible
2. weight machine
3. Soxhlet apparatus

#### Chemical:

N-hexane= 180-200 ml

Rules:

1. At first take thimble weight.
2. Then sample weight
3. Placing a Sox let with a sample in the thimble with the plating machine.
4. Then set it in boiling flask.
5. Put n-hexane in sample.
6. Then adjust its thermostat heating set.
7. Then Water goes through one direction and goes out in one direction
8. The n-hexane heat becomes steamy to the top of the equipment. Here water cools down to the bottom of the water and the equipment is stored. Thus, when the vapors are stored up to the thimble. Then, with the fat from the sample, the boiling flask was deposited on the n-hexane. This is to run 6 hours.
9. 6 hours after the boiling floss will be stored on the N-Hexane fat, it will be dried in oven at 40-50 degree temperature.

Calculation:

$$\text{Fat\%} = \frac{\text{Weight of flash After extraction and drying} - \text{weight of flash}}{\text{Sample weight}(gm)} \times 100$$

10% of Pumpkin blended cake:

$$\begin{aligned}\text{Fat\%} &= \frac{171.176 - 169.736}{5} \times 100 \\ &= 28.8\%\end{aligned}$$

% of raw pumpkin:

$$\begin{aligned}\text{Fat\%} &= \frac{170.206 - 170.136}{5} \times 100 \\ &= 1.40\%\end{aligned}$$

% of Dry pumpkin:

$$\begin{aligned}\text{Fat\%} &= \frac{\text{Weight of flash After extraction and drying} - \text{weight of flash}}{5 gm} \times 100 \\ \text{Fat\%} &= \frac{170.206 - 170.175}{5} \times 100 \\ &= 0.62\%\end{aligned}$$

5% of pumpkin cake: 28.02%

### 3.8 Determination of moisture:

Apparatus:

1. Crucible
2. Moisture oven
3. Weight machine

Produce:

1. At first take crucible weight then sample weight
2. To remove moisturizer at the temperature of 105 degrees, 1 hrs. Remove the moisturizer
3. There is no sample weight with crucible to cool out of the oven.

Calculation:

$$\text{Moisture\%} = \frac{\text{Crucible weight with sample} - \text{crucible weight with After dry sample}}{\text{sample Weight}} \times 100$$

% of moisture raw pumpkin:

$$\begin{aligned}\text{Moisture\%} &= \frac{29.723 - 26.788}{4} \times 100 \\ &= 73.375\%\end{aligned}$$

% of moisture Dry pumpkin:

$$\begin{aligned}\text{Moisture\%} &= \frac{30.160 - 29.920}{5} \times 100 \\ &= 5.2\%\end{aligned}$$

10% of moisture Dry pumpkin: 18.62%

5% of moisture Dry pumpkin: 18.23%



# CHAPTER#4

## NUTRITIONAL VALUE AND HEALTH BENEFITS

## 4 Nutrition Value of Pumpkin Blended cake

The nutritional value of cake prepared by substitution of wheat flour with different percentages of pumpkin powder were determined, results revealed that substitution of pumpkin powder significantly affected the nutritional compositions of cake. [9]

Proximate analysis	S1	S2
Moisture%	18.23	18.62
Ash%	1.30	1.96
Fiber%	0.75	0.9
Protein%	8.70	9.54
Ether extract	23.35	23.57
Total Carbohydrate	64.278	64.482
Fat%	28.02	28.8

### 4.1 Health Benefits of Pumpkin

It is one of the very low-calorie vegetables. 100 g fruit provides just 26 calories and contains no saturated fats or cholesterol; however, it is rich in dietary fiber, anti-oxidants, minerals, vitamins. The vegetable is one of the food items recommended by dieticians in cholesterol controlling and weight reduction programs. Pumpkin is a storehouse of many anti-oxidant vitamins such as vitamin-A, vitamin-C, and vitamin-E. At 7,384 mg per 100 g, it is one of the vegetables in the Cucurbitaceous family featuring highest levels of vitamin-A, It is also an essential vitamin for good eyesight. Research studies suggest that natural foods rich in vitamin-A may help the human body protect against lung and oral cavity cancers. It is also an excellent source of many natural poly-phenolic flavonoid compounds such as  $\alpha$ ,  $\beta$ -carotenes, kryptoxanthin, lutein, and zeaxanthin. Carotenes convert into vitamin-A inside the human body. Pumpkin indeed are an excellent source of dietary fiber and mono-unsaturated fatty acids, which are good for heart health. Also, the seeds are concentrated sources of protein, minerals, and health-benefiting vitamins. [10]

#### Weight loss

Pumpkin is rich in fiber, which slows digestion. "There's seven grams of fiber in a cup of canned pumpkin. That's more than what you'd get in two slices of whole-cake."

#### Sharper vision

Pumpkin's brilliant orange coloring comes from its ample supply of beta-carotene, which is converted to vitamin A in the body. Vitamin A is essential for eye health and retina absorb and process light.

#### Better immunity

The large shot of vitamin A the fruit provides helps your body fight infections, viruses and infectious diseases. Pumpkin oil even helps fight various bacterial and fungal infections. Plus, pumpkin is packed with nearly 20 percent of the recommended amount of daily vitamin C, which may help you recover from colds faster.

**Younger-looking skin**

Sure, eating pumpkin can help you look younger (beta-carotene in pumpkin helps protect us from the sun's wrinkle-causing UV rays), but the pulp also makes a great, mask that exfoliates and soothes.

**Lower cancer risk**

Research shows people who eat a beta-carotene-rich diet may have a lower risk of some types of cancer, including prostate and lung cancer.

**It may help treat diabetes**

In scientific tests, pumpkin has been shown to reduce blood glucose levels, improve glucose tolerance and increase the amount of insulin the body produces. [11]

# **CHAPTER 5**

## **RESULT AND DISCUSSION**

## 5.0 Chemical Composition of Raw & Dry Pumpkin

Sample	Moisture %	Protein %	Ash %	pH	Fat %
raw	73.375	1.75	0.74	6.35	1.16
dry	5.2	2.625	4.96	6.15	1.40

Table 5.0 shows the different types of quality parameters for raw & dry Pumpkin. The moisture content is higher in raw pumpkin (73.375%) than dry (5.2%) but the protein (2.65%), ash (4.96%) & fat (1.4%) content is higher in dry pumpkin.

## 5.1 Chemical Composition of Pumpkin blended cake:

Sample	Moisture %	Protein %	Ash %	Fat %
S1 (5%)	18.23	8.70	1.30	0.75
S2 (10%)	18.62	9.54	1.96	0.90

S1: 5% Pumpkin powder + 95% wheat flour. S2: 10% pumpkin powder + 90% wheat flour

Table 5.1 shows the moisture content is almost similar in both s1& s2 as 18.23 & 18.62 but the percentage of protein, fat & ash is increased with increasing the percentage of pumpkin powder in s2 as 9.54%,0.90%& 1.96% than s1 as 8.7, 0.75& 1.96 respectively.

## 5.2 Sensory Evaluation:

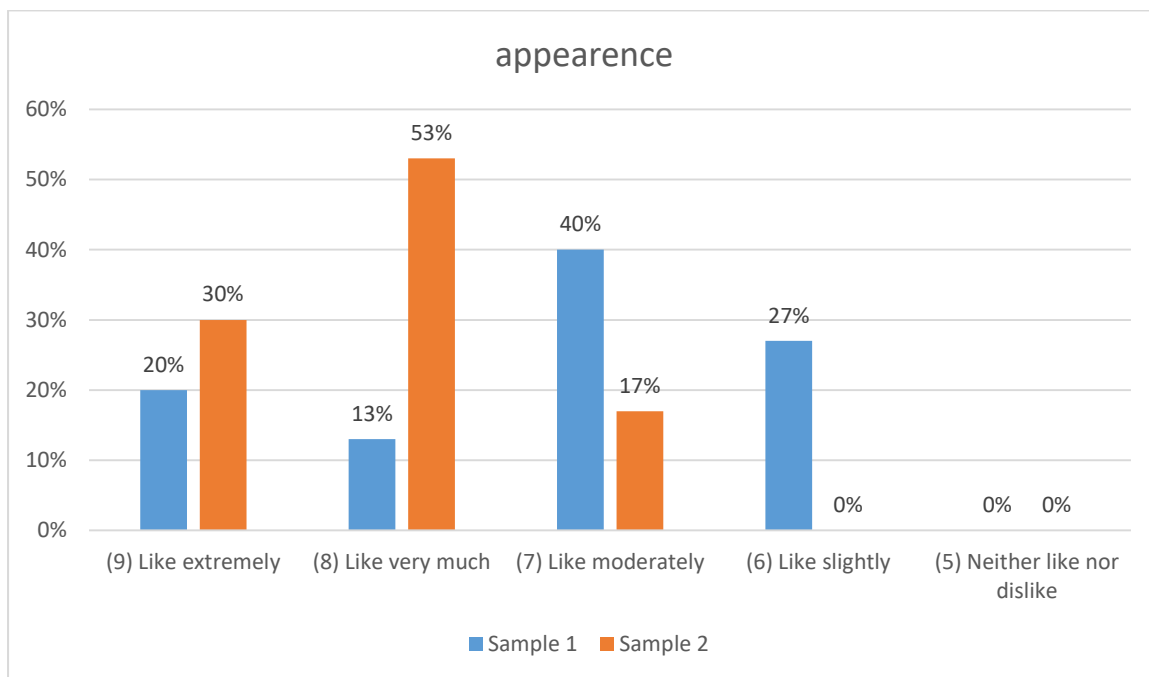
The survey was conducted among 30 panelist of Daffodil International University and other area of Dhaka city. The data are submitted below:

Name :						Product : Pumpkin Cake				
Panelist No :						Date :				
Instructions: Taste the given samples, then place a $\surd$ mark on the point in the scale which best describes your feeling.										
SCORE	SAMPLE CODE									
	S1					S2				
	Appearance	Flavor	Taste	Texture	Overall Acceptance	Appearance	Flavor	Taste	Texture	Overall Acceptance
(9) Like extremely	6	3	5	8	13	9	14	16	9	17
(8) Like very much	4	8	12	15	8	16	6	4	8	11
(7) Like moderately	12	10	8	4	7	5	8	7	11	2
(6) Like slightly	8	9	5	3	2		2	3	2	
(5) Neither like nor dislike										
(4) Dislike slightly										
(3) Dislike moderately										
(2) Dislike very much										
(1) Dislike extremely										

S1: 5% Pumpkin powder + 95% wheat flour. S2: 10% pumpkin powder + 90% wheat flour

Figure: 5.2: Table - Sensory Evaluation

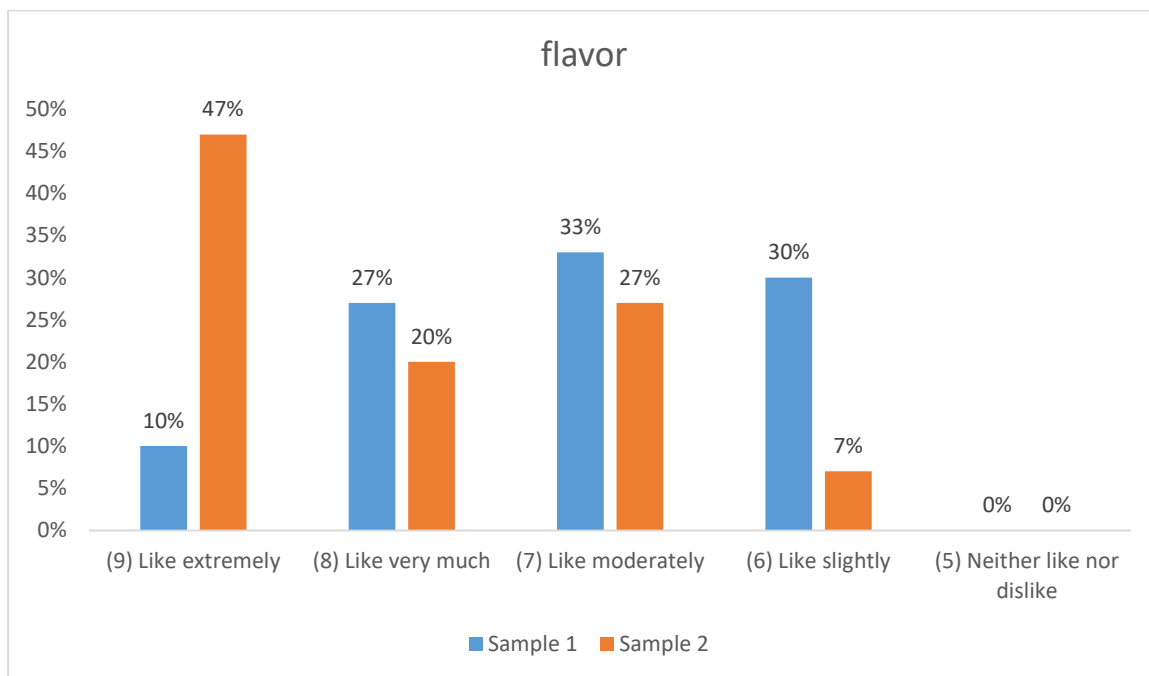
Total Respondent = 30



S1: 5% Pumpkin powder + 95% wheat flour. S2: 10% pumpkin powder + 90% wheat flour

**Figure 5.3.: Bar chart of sensory evaluation - Appearance Preference**

Table 5.3 showed that 30% panelist gave the score ‘like extremely’ & 53% ‘like very much’ to S2 whereas 40% panelist moderately liked the sample s1.

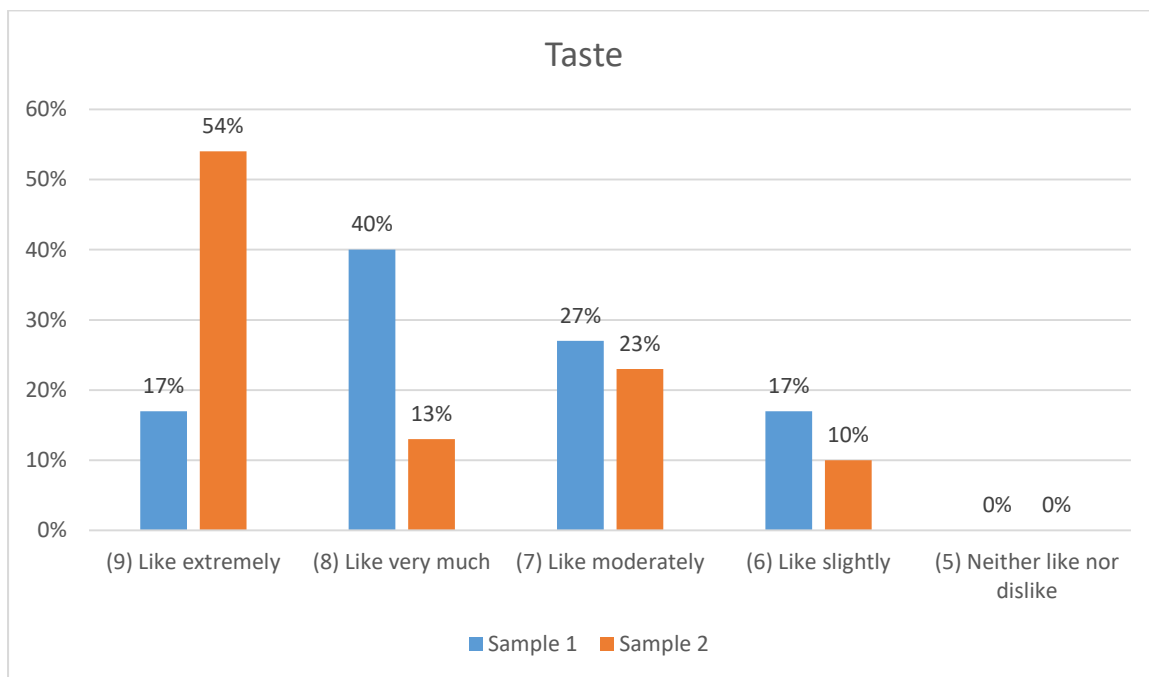


S1: 5% Pumpkin powder + 95% wheat flour. S2: 10% pumpkin powder + 90% wheat flour

**Figure 5.4: Bar chart of sensory evaluation – Flavor**

Table 5.4 showed that 47% panelist gave the score ‘like extremely’ to S2 whereas 33% panelist moderately liked the sample s1.

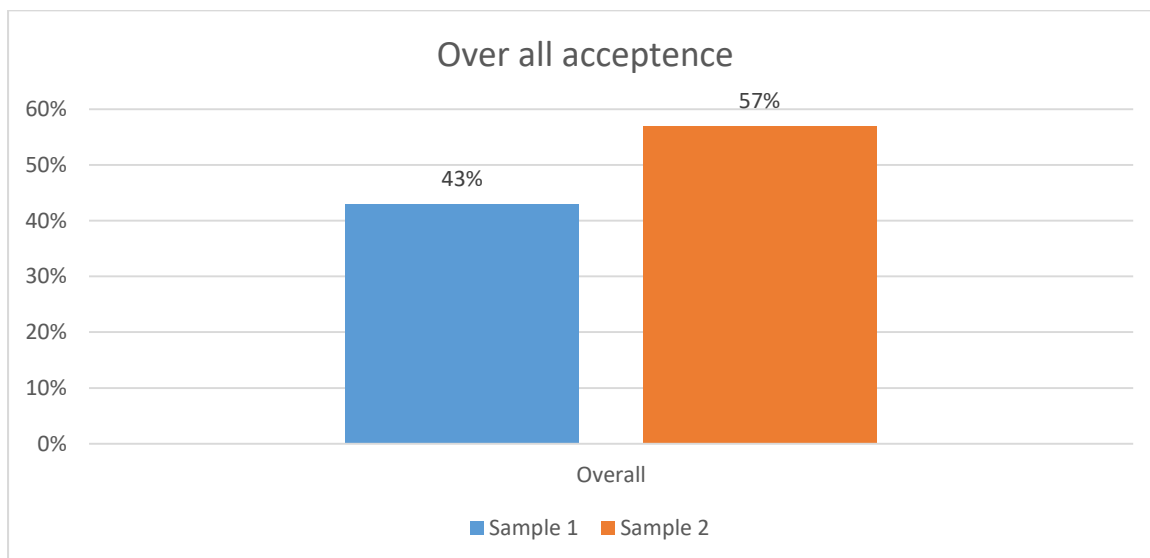




S1: 5% Pumpkin powder + 95% wheat flour. S2: 10% pumpkin powder + 90% wheat flour

**Figure 5.5: Bar chart of sensory evaluation – Taste**

Table 5.5 showed that 54% panelist gave the highest score for taste as ‘like extremely’ to s2 whereas 40% ‘like very much’ to S1.



S1: 5% Pumpkin powder + 95% wheat flour. S2: 10% pumpkin powder + 90% wheat flour

**Figure 5.6: Bar chart of sensory evaluation – Over all acceptance.**

Table 5.6 showed that 57% panelist overall liked the s2 whereas 43% panelist overall accepted s1.

# CHAPTER 6

## Conclusions

## **5.0 Conclusions**

The study was conducted on proximate analysis of pumpkin and pumpkin cake with the acceptability of pumpkin cake. The above result make it clear that pumpkin powder which otherwise processed to a limited extent can be successfully utilized for supplementation of common person food such as pumpkin cake. The products after packaging in polyethylene bags can be safely stored for more than a period of 7 days with minimal changes in physical, chemical and sensory parameters. The investigation revealed that the supplementation of both pumpkin powder and pumpkin cake enhanced the nutritional value of cake. The result showed that the nutrition value of pumpkin cake was increased with increasing the percentage of pumpkin powder in cake. The acceptance by the consumer group was at the level of "like extremely" to "like very much" for cake containing 10% pumpkin powder with 90% wheat flour to most members regarding to taste, odor, texture, color, general appearance and overall acceptability.

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