

Development of Gluten-Free Carrot Cake Truffle

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ABSTRACT

The development of Gluten-free Carrot cake Truffle was studied at the Department of Food Technology, Parul Institute of Applied Science, Parul University, Vadodara. The main goal of developing truffle is to provide Protein, Fat, Carbohydrates. The main objective of the study was to develop a truffle that will provide enough energy & protein to the body. Carrot cake truffle was developed using carrot, dates, almond, amaranth flour, cinnamon powder, dark chocolate, and coconut oil. Truffle with T2 formulation was found to be the best based on sensory evaluation like, taste, texture, color, mouth feel, and overall acceptability. Selected truffles had 27.95% moisture content, 1.71% ash content, 11.6% protein content, 16.19% fat content, 42.55% carbohydrate content, and 192.07 Kcal. Our final product can be consumed by people who have gluten intolerance, celiac disease people since it's the only diet taken by these people and can be consumed by all age groups.

KEYWORDS: Carrot cake, Truffle, Gluten-Free, Vegan, Chocolate

1. INTRODUCTION

Truffles were unfortunately not invented by anyone in particular, and there is even less evidence available regarding when they were. Most experts agree that the first truffles were produced between 1890 and the 1920s. Our favorite urban legend is that the discovery of truffles, like many other significant discoveries, was an accident. During the preparation of a pastry cream, the renowned French chef Auguste Escoffier is said to have carelessly dumped the hot cream's contents into a dish of chocolate pieces rather than the intended bowl of sugared eggs. He discovered that the chocolate paste that formed as a result of his mishap could be readily moulded into balls. Once he noticed the chocolate balls' striking physical similarity to the priceless truffle fungus, he gave them the name "truffle".

A growing body of horticultural literature appeared in the 18th and 19th centuries, and carrots were used in a number of homoeopathic treatments. For instance, John Wesley recommended that asthmatics "live a fortnight on boiled Carrots only, it seldom fails" in his short treatise Primitive Physic; Or, an Easy and Natural Method of Curing Most Diseases (1761). It's also advised to use a carrot poultice on foul sores. Carrots were brought to America by the Pilgrims in

1609, and they quickly became a staple food. The indigenous Indians used it as a food source as well. In 1788, the British transported the carrot to Australia. Throughout Victorian times, the readily available and affordable orange root remained a staple food that never lost its appeal. The versatile and delicious humble carrot was praised in numerous books and works of literature on household management, including Mrs. Beeton's Cookbook of 1861, the most well-known and respected English cookery book of the time, which disseminated basic cooking knowledge in a format and structure that is still in use today. The popularity of the carrot was restored during World War II, turning it from a minor food source to a big one. The UK Ministry of Food created the figure Doctor Carrot in 1941 to promote carrots as a replacement for other more scarce vegetables in the campaign known as Dig for Victory. The British government spread a myth that the Royal Air Force gunners' success during the Blitz was due to their consumption of special high carotene carrots as a ruse to conceal the introduction of the new airborne radar system as a means of reducing food shortages during World War II, giving rise to the legend that eating carrots can reduce night blindness as well as the

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usage of red light in aeroplane instruments (which helps preserve night vision). Even though carrots are high in vitamin A and can prevent night blindness, eating them won't make your vision better.

CeD can only develop if gluten-containing foods are consumed. The viscoelastic protein known as gluten, which is made up of both alcohol-soluble gliadins and alcohol-insoluble glutenins, is what is left over after dough has been washed. Since of its rheological characteristics, gluten is highly valued in the food business because it gives food a light, extensible texture. The hexaploid genome that gives rise to modern wheat gluten makes it diverse and genetically more complicated than the human genome. Similar proteins with high glutamine and proline content, collectively known as prolamins, are also toxic to CeD and may be found in rye and barley under the names hordeins and secalins, respectively. The prolamin found in oats, avenin, differs phylogenetically from the prolamin found in wheat, barley, and rye. Oats are regarded as safe to eat despite the fact that particular cultivars may be more immunogenic and that unfavourable immunological and clinical consequences have been noted, most patients have CeD. Further investigation regarding the toxicity of oats in CeD is required, according to several expert studies.

1.1. Benefits of Carrot Cake Truffle

- Recommended to celiac diseases people
- Vegan
- High calorie value
- Gluten-free

2. Material and methodology

2.1. Material

Amaranth flour was purchased from a local market in (Vadodara, Gujarat) India. Carrot, Dates, Almond, cinnamon powder, vanilla extract, dark chocolate, and coconut oil were purchased from a local market in (Vadodara, Gujarat) India.

2.2. Equipment used

- Weighing balance: weighing balance is used for weighing raw material.
- Electronic grinding machine (mixer jar): It is used for mixing ingredient.
- Gas: gas used for melting the chocolate.
- Store in the fridge.

2.3. Method

Preparation of carrot cake

- Dates with pits should be removed and processed in a food processor or blender until smooth and creamy.
- Pulse the other ingredients in the food processor until everything is blended after adding them all.

- One and a half teaspoons of the mixture should be rolled into balls, which you should then arrange on a baking sheet covered with parchment paper.
- After placing the sheet in the freezer, melt the chocolate.

Preparation of Chocolate

- About 3 tablespoons of the chocolate should be slowly melted in a basin over simmering water (double boiler).
- Remove from heat and gradually combine with additional chocolate and coconut oil until completely melted.
- One by one, dip the cold truffles in the chocolate and place them back on the parchment paper.

Note: Store in the fridge.

Table2.1: Formulation of Carrot Cake Truffle

Sr.no	Ingredient	T0	T1	T2	T3
1	Carrot	25	20	24	20
2	Dates	24	19	20	20
3	Amaranth flour	-	10	5	9
4	Almond	6	6	6	6
5	Cinnamon powder	1	1	1	1
6	Dark Chocolate	40	40	40	40
7	Coconut oil	3	3	3	3

3. Proximate Analysis

Amaranth flour, carrot, dates, almond, cinnamon powder, chocolate, coconut oil was used and prepared truffles were analyzed for proximate composition including moisture, ash, protein, fat, carbohydrate, and calories content according to the standard operating procedure (AOAC 2005).

3.1. Moisture content

In the processing and testing of foods, moisture content is one of the most significant and frequently used indices. The words "water content" and "moisture content" are interchangeable in literature when referring to how much water is present in various foods and other substances. Food processors and consumers place a high value on moisture content since the dry matter content of food is inversely related to its moisture content. The most significant ingredient in beef, accounting for up to 75% of its weight, is water or moisture.

$$\text{Moisture \%} = \frac{\text{Initial weight (W1)} - \text{final weight (W2)}}{\text{Initial weight (W1)}} \times 100$$

3.1.1. Ash content

The inorganic residue (minerals) left over after the complete oxidation of organic matter is represented by the ash content. The sample is heated to between 500 and 600 oC in a muffle furnace during dry ashing. Wet ashing can also be done using acids or oxidising agents alone or in combination with other

oxidising agents to oxidise organic materials since some elements, such as Fe, Se, Pb, and Hg, may be partially volatilized during dry ashing.

$$\text{Ash \%} = \frac{\text{Weight before heating} - \text{Weight after heating}}{\text{weight of sample}} \times 100$$

3.1.2. Determination of Protein content (By Micro-Kjeldhal Method)

$$\% \text{ N} = \frac{\text{Sample} - \text{blank N of HCL vol. of digest 0.014}}{\text{Aliquot taken Wt. of sample}}$$

3.1.3. Determination of Carbohydrates

The amount of carbohydrates was determined by subtracting the total of the values for moisture, fat, protein, total ash, and crude fiber. The formula below was used to calculate the NFE.

$$\text{NFE \%} = 100 - (\text{CP\%} + \text{CF\%} + \text{CF\%} + \text{TOTAL ASH\%})$$

CP = crude protein.

CF= crude fat.

CF= crude fiber.

3.1.4. Determination of Fat

The amount of fat in the bar was examined using Soxhlet. A 5g sample was weighed and collected in a thimble. After being dried for 15 minutes in an oven at 130° C, the extraction cups were weighed. The extraction cups were cooled before adding 70ml of petroleum ether. The extraction cups were affixed to the apparatus and set to boil for 30 minutes, rise for 20 minutes, and then recover solvent for 10 minutes when the apparatus had achieved the desired temperature. Both the recovered ether and the estimated fat content of the extraction cups were collected.

$$\text{Fat} = \frac{\text{W2} - \text{W1}}{\text{W}} \times 100$$

3.2. Microbial Parameter

Microbial inspection is the ideal quality evaluation procedure used in food product quality analysis. The developed vegan milk's microbiological quality was assessed. In the current investigation, several microbiological characteristics such as total plate count, yeast, mold, and coliform were evaluated, as well as the samples' preservation at room temperature. Microbial tests were performed in accordance with APHA guidelines (1992).

3.2.1. Determination of Total Plate Count

The nutrient agar medium was made by adding 28 g of nutrient agar to 1000 ml of distilled water and heating the mixture until the agar was thoroughly dissolved. Its mouth was covered with cotton, and it was sterilized for 20 minutes at 120°C and 15 lbs of pressure in an autoclave. The sample solution (serial dilution) was made by taking nine sterile test tubes

and numbering them. 9 ml of distilled water was placed in each tube. The test tubes were sterilized in an autoclave at 121 °C for 15 minutes using cotton plugs less than 15 lbs of pressure. A sterile test tube containing 9 ml of distilled water received 1 ml of sample serially. Pipettes and Petri dishes were sterilized using an autoclave (moist heat treatment) or a hot air oven (dry heat treatment). A sterile petri dish was placed in the laminar airflow cabinet, and ultraviolet light was turned on for 30 minutes. After 30 minutes, the UV light was turned off, the fan was turned on, and 70% ethanol was used to clean the work surface. Plates were appropriately labeled before 1 ml of samples was put onto them, and 1 ml of samples was added to each plate. Each plate received 15–20 ml of molten medium. This was carried out close to a flame to avoid microbial contamination of the plate. The plates were vigorously stirred and kept there to solidify. After 48 hours at 37°C in the incubator, the plates were taken out to be checked for colonies.

3.2.2. Determination of Yeast and Mould count

Potato dextrose agar medium preparation: In 1000ml of distilled water, 39g of Potato dextrose agar medium was added and boiled to dissolve adequately. The mouth was closed with a cotton plug and sterilized in an autoclave at 121°C for 15 minutes at 15 lbs pressure.

Preparation of the sample solution (serial dilution): Nine sterile test tubes were acquired and given the corresponding numbers. 9ml of distilled water were given to each tube. The test tubes were sterilized in an autoclave at 121°C for 15 minutes under 15 lbs of pressure. Cotton plugs were used to seal the test tubes. In a clean test tube, 1 ml of the sample was serially added to 9 ml of distilled water.

Petri plates and pipettes were sanitised using either a hot air oven (dry heat treatment) or an autoclave (wet heat treatment) to prepare the plates. In a laminar airflow cabinet, sterilized Petri dishes were placed, and they were exposed to UV radiation for 30 minutes. The UV light was switched off after 30 minutes, the blower started, and 70% alcohol was used to clean the work area. Before placing 1 cc of samples on each plate, labels were properly applied. There were 15–20 ml of the molten material placed on each plate. To avoid microorganism contaminating the plate, this was completed close to a flame. The plates were spun rapidly and then left to set.

3.2.3. Sensory Evaluation

Carrot cake truffle was evaluated by 3 panelists. The sample was evaluated for appearance, colour, texture, taste and overall acceptability.

Scores to Be Given As Follows

1. Liked extremely – 8.
2. Liked very much – 10
3. Liked moderately – 6.
4. Liked slightly – 2.
5. Neither liked nor disliked – 0.
6. Disliked slightly – 0.
7. Disliked moderately – 0.
8. Disliked very much – 0.
9. Disliked extremely – 0.

4. Result Discussion

Table 4.1 provides the results of the evaluation of the parameters for the bar, including content, protein, fat, carbs, ash, and moisture content.

Table 4.1: Proximate Analysis of Carrot Cake Truffle

Sr.no.	Test Parameter	Result
1	Total Ash	1.71%
2	Total Fat	16.19%
3	Protein	11.6%
4	Total Carbohydrate	42.55%
5	Moisture	27.95%
6	Yeast & mould	Absent
7	Total plate count	Absent

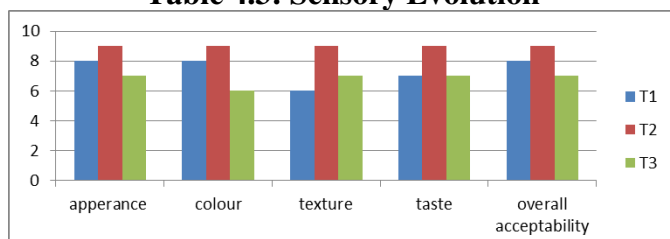
Organoleptic evaluation of Carrot Cake Truffle

Sensory evaluation acceptance tests was performed for Carrot Cake Truffle which was formulated by addition of Date paste, carrot, almond, amaranth flour, cinnamon powder, dark chocolate, coconut oil in different proportions to know the acceptability of products prepared. The acceptance scores were assigning for varies sensory parameter like colour, flavor, taste, texture, appearance and overall acceptability.

Table 4.2: Organoleptic Evaluation of Carrot Cake Truffle

Sr.no	Parameter	T1	T2	T3
1	Appearance	8	9	7
2	Colour	8	9	6
3	Texture	6	9	7
4	Taste	7	9	7
5	Overall acceptability	8	9	7

Table 4.3: Sensory Evolution



It was observed that higher acceptability was given to T2 because it showed acceptable results in appearance, texture, taste, consistency. So based on sensory analysis T2 was finalized for further analysis.

4.1. Proximate composition of Carrot Cake Truffle

The mean value for the moisture content of Truffle(27.95%), ash content (1.71%),protein content(11.6%), fat content(16.19%), carbohydrate content (42.55%) and calories were found in T2 (192.07 Kcal).

5. Conclusion

The conclusion drawn from the above results is that T2 was determined to be the most effective treatment out of all the formulations that contained various concentrations of carrot, date paste, almond, amaranth flour, dark chocolate, and coconut oil. Truffle with T2 formulation has the following composition: 42.55% carbohydrate, 11.6% protein, 16.19% fat, and 27.95% moisture. The body can receive enough calories and protein from the prepared truffles. The shelf life of truffles at refrigeration is up to 5 days. Truffles have significant nutritional value because they have 2.61 g of protein, 27.02 g of carbohydrate, 9.14 g of fat, and 192.07 Kcal of energy per 100 g. Since our final product is gluten-free and suitable for celiac disease sufferers, some folks follow this diet exclusively, and people of all ages can eat it.

Reference

- [1] Founded in 1875, Charbonnel et Walker is one of Britain's earliest chocolatiers. Encouraged by Edward VII, (then the Prince of Wales), our company first formed as a partnership between Mrs. Walker and Mme. Charbonnel.
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