Development studies on Low-glycemic confessionary product using biomaterials

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Abstract: *A muffin is an individual-sized, baked product. Generally, muffins are not recommended for the diabetic peoples. A diabetic diet is consisting of Vegetable, Greens, Low-calorie drinks, fruits, higher-fibre food, whole-grains foods, a little fat, protein. This muffin contains refined whole wheat flour and foxtail millets, Where the refined whole wheat is the source of protein, fats and carbohydrates but limiting in minerals and dietary fibres. For enhance these minerals and dietary fibre contain we use the foxtail millet flour which contain vitamin B1, Fe Ca, K. Olive oil is the good source of fat which contain saturated fat, monounsaturated fat and small amount of polyunsaturated fat. Sugar contain is less in the muffins. Foxtail millet flour is mixed with refined whole wheat flour at different proportion and ratio to finalize the softness of the cake and nourishment of the cake. Sensory scores of cake sample prepared with 50% whole wheat flour and 50% foxtail millet has good textural properties. These diabetic cakes may be beneficial for diabetics, etc. The developed cakes will be a promising alternatives diabetic diet for all age group people due to its high nutritional set of value.*

Key Words: *Diabetics diet, Foxtail millet, Olive oil, Diabetic food, etc.*

1. INTRODUCTION:

Diabetes mellitus (DM) was first recognized as a disease around 3000 years ago by the ancient Egyptians and Indians, illustrating some clinical features very similar to what we now know as diabetes. [1] DM is a combination of two words, "diabetes" Greek word derivative, means siphon - to pass through and the Latin word "mellitus" means honeyed or sweet. In 1776, excess sugar in blood and urine was first confirmed in Great Britain. [2, 3] With the passage of time, a widespread knowledge of diabetes along with detailed etiology and pathogenesis has been achieved. DM is defined as "a metabolic disorder characterized by hyperglycemia resulting from either the deficiency in insulin secretion or the action of insulin." The poorly controlled DM can lead to damage various organs, especially the eyes, kidney, nerves, and cardiovascular system. [4] DM can be of three major types, based on etiology and clinical features. These are DM type 1 (T1DM), DM type 2 (T2DM), and gestational DM (GDM). In T1DM, there is absolute insulin deficiency due to the destruction of β cells in the pancreas by a cellular mediated autoimmune process. In T2DM, there is insulin resistance and relative insulin deficiency. GDM is any degree of glucose intolerance that is recognized during pregnancy. DM can arise from other diseases or due to drugs such as genetic syndromes, surgery, malnutrition, infections, and corticosteroids intake. [5-7]
T2DM factors which can be irreversible such as age, genetic, race, and ethnicity or revisable such as diet, physical activity and smoking. [8], [9].
Foxtail millet (*Setaria italica L.*), a crop rich in nutrients, originated in China [10,11]. Presently, foxtail millet is extensively cultivated as a food and fodder crop throughout Eurasia and the Far East [12]. Meanwhile, foxtail millet is being promoted as a model crop for cereal crops [13–17]. However, the yield and quality of crops are seriously affected by weed growth [18]. The competitions from weeds have been reported to reduce foxtail millet grain yield by as much as 55.56% [19].

2. MATERIALS AND METHOD:
A. Raw Material:

The foxtail millet and wheat grains were purchased at Chennai, Tamil Nadu's local market (India). The millet grains were washed and debranned to eliminate any foreign materials. Following that, the grains were roasted and then ground, and flour was made. Wheat grains were cleaned, sorted, and processed as well.

B. Preparation of blend / mix

Muffin's recipe was a modification [20] and contains the following ingredients: white sugar, salt, foxtail millets, wheat, baking powder, butter, olive oil, fresh large egg, vanilla essence as Table 1.

TABLE 1: Ingredients for Muffin's Recipe

Ingredients	%
Foxtail millet flour	27.7
Wheat flout	27.7
Baking powder	0.4
Olive oil	15.1
Fresh large egg	15.1
Butter	13.8
Total	100

Foxtail millet flour (FMF) and Wheat flour (WF) is blead by the ratio of 2:0, 3:1 and 1:1 to prepare muffins. Therefore, there were total of 3 formulations were tried in terms of flour compositions and they will be assigned as F¬1 (100% FMF), F2 (75% FMF and 25% WF) and F3 (50% FMF and 50% WF) for now.

In a separate bowl, flour, sugar, baking powder, and salt were combined, then moved into the wet ingredients at speed 4 for 10 seconds. The mixture was poured into muffin pans (55-65 g each) and cooked at 180°C in a preheated oven for 20-30 minutes or until done. Muffins were taken from the pans and allowed to cool on wire racks after a 40-60 minutes of setting period.

C. Sensory evaluation

A panel of 25 semi-trained judges, both male and female, ranging in age from 18 to 50, rated the muffins on a 9-point hedonic scale (1=extreme hate, 5=neither like nor dislike, 9=love tremendously). Muffins were split in half and given a three-digit random number to identify them. The samples were served to the judges in individual booths under white light on a white plate at room temperature. Before tasting the samples from each formulation, panellists were given room temperature water to cleanse their palates. The panellists were not given any previous training. Each panellist was offered one of the five samples at a time. An attribute rating form was used to assess general appearance, flavour, texture, sweetness, and overall acceptability.

3. RESULT AND DISCUSSION:

The three formulations were made ad trails in our university lab with the ratio 2:0, 3:1 and 1:1. Therefore, the outcomes of the trails were shown in the Table 2.

TABLE 2: Outcomes of the trails

Trails	Outcomes
T_1	Muffins are hard and not fluffy
T_2	Muffins are moderate hard and fluffy
T_3	Muffins are soft and fluffy

A. Sensory evaluation

Three samples of the trails were analysed for the sensory evaluation, out of which the T3 shown the best outcomes among the local community people with more overall acceptability (8.12), T2 shows overall acceptability around (5.59) followed by T1 (3.18).
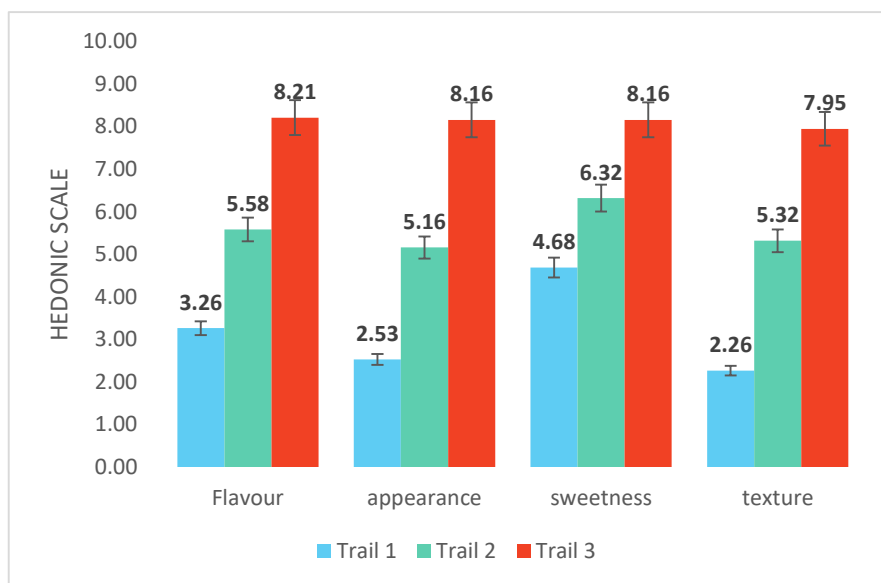
Figure 1: Sensory evaluation of the trails

This shows then the equal amount of the FMF and WF gives the good, soft and fluffy muffins, this may be the gluten present in the WF plays the role to give this texture. Therefore, we shouldn't reduce the percentage of the WF in the formulation.

FMF in the muffins has the high fibre content, it will help the consumers with T2DM.

In T2DM, the insulin will not be secreted by the pancreas. Its plays the main role to control the glucose level in our blood stream. Due to this the cell are not able to get glucose for energy which leads to increased hunger. So, the FMF has dietary fibre which will take more time to digest. This is because the fibre in FMF is fermented by the bacteria in large intestine which convert the fibre into short chain fatty acid and butyrate and this will provide energy to the cell and muscles of the consumers with T2DM.

4. CONCLUSION:

Among the three-trail formulation we came to know that below 50% WF will not give the fluffy texture to the muffins. According to the sensory evaluation we came to know that T3 (50% FMF and 50% WF) gave the best overall acceptability from the semi-trained local society. Thus, this product developed will be beneficial for the consumers with T2DM.

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