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Preparation And Evaluation Of Herbal Cookies For Diabetic Patients

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ABSTRACT :

The majority of people eat cookies for breakfast, snacks, and leisure in order to control their hunger and obtain some energy. Refined flour, sugar, and butter are the key ingredients of the various types of cookies that are sold in stores. Are therefore typically avoided by diabetic and obese patients since they raise blood sugar levels. The goal of the current study was to create and assess polyherbal biscuits for diabetes individuals. The method used is Oats, wheat flour, and various Ayurvedic herbs were used to make the cookies. To determine the ideal cookie composition based on palatability, a variety of types were created utilizing various plants. The prepared cookies underwent nutritional analysis and physiochemical sensory evaluation. It gives a Results is Our formulation has a larger protein content than the other commercially available preparation, according to a comparison of its nutritional values. Because the herbal cookies are strong in protein and low in fat and carbohydrates, they may be taken by those with diabetes.

KEY WORDS : cookies, diabetes mellitus, Murraya konigii, fenugreek.

INTRODUCTION :

A serious metabolic disease called diabetes mellitus (DM) is typified by hyperglycemia brought on by either ineffective insulin secretion, action or both. Chronic hyperglycemia caused by insulin insufficiency disrupts the metabolism of proteins, fats, and carbohydrates. Serious diabetes complications, including retinopathy, nephropathy, neuropathy, cardiovascular problems, and ulceration, are brought on by tissue and vascular damage as the illness worsens. As a result, diabetes encompasses a variety of diverse illnesses [1].

Five percent of people have diabetes mellitus (DM), which has become an epidemic. According to estimates, the number of adults with diabetes worldwide is expected to rise from 135 million in 1995 to 300 million by 2025. By 2025, the countries with the highest numbers of diabetics will be the United States, China and India. Reduced physical activity, increasing obesity, stress, and altered eating habits are the main causes of the rise in diabetes prevalence. Over the next 25 years, diabetes mellitus will be the leading cause of disability and death worldwide [2].

Combining different herbs and grains that have a multitude of mechanisms of action to increase insulin secretion results in polyherbal antidiabetic cookies. These cookies, which include oats, Murraya konigii leaves, ashwagandha, fenugreek, honey and other ingredients, are delicious, healthful, and advantageous for diabetic patients of all ages. Additionally, because the product combines cereals and herbs, it has fewer negative effects on the body [3].

Murraya konigii also referred to as curry leaves in India, belonging to the Rutaceae family, which has more than 150 general and 1600 species. It is highly valued for its distinctive scent and therapeutic properties. Antioxidant, free radical scavenger, hypoglycemic, hepatoprotective, antimicrobial, antifungal, pancreatic lipase inhibitor, dental caries prevention, anticancer, anti-inflammatory, antipyretic immunomodulatory, kidney protective, and antiobesity are only a few health benefits of this entire plant. It has been scientifically demonstrated that feeding rats its leaves increases hepatic glycogenesis, which is demonstrated by an increase in glycogen synthase activity, resulting in hypoglycemic activity. Reduced activity of the gluconeogenic enzyme and glycogen phosphorylase indicated a reported decrease in glycogenolysis and glyconeogenlysis [4, 5].

A highly prized plant that is grown throughout India and the tropical regions of the world, Moringa oleifera is a member of the Moringaceae family. Every portion of the plant is recognized to have therapeutic benefits. More vitamin C than oranges, more potassium than bananas, more calcium than milk, more iron than spinach, more vitamin C than carrots, and more protein than eggs and milk are all found in this leaf . Glucosinolate, isothiocynates, minerals, vitamins, and carotenoids are active phytochemicals. It is more effective in treating infections, ulcers, spasms, hypertension, inflammation, high cholesterol, and hyperglycemia because of these phytochemicals [6, 7].

oats (Avena sativa) belong to Poaceae family. Beta-glucan, a polysaccharide that comprises glucose residue and binds with 1, 3, and 4 linkages, is its soluble fiber. B glucan-containing products have been used for thousands of years to improve human health, but β glucose has recently come under scrutiny as an active element. Numerous clinical investigations have employed oat β glucan to lower blood glucose levels. Oat β glucan has been shown in studies to reduce postprandial glycemia [8].

Ashwagandha, which is a member of the Solanaceae family, may help lower blood glucose by delaying stomach emptying, which would allow the dietary glucose to be absorbed more gradually [9].

The annual plant fenugreek (Trigonella foenum graecum) belongs to the Leguminosae family. It is a well-known spice in human cuisine. Fenugreek's dietary fiber reduces blood sugar levels after meals. These impacts underlying mechanisms are yet unclear. The gum of fenugreek seeds is made up of galactose and mannose, and the seeds themselves contain 45.4% dietary fiber. The latter substances are linked to a lower glycemic impact. Humans and animals with type 1 and type 2 diabetes mellitus have particularly been shown to benefit from fenugreek's hypoglycemic effect [10].

MATERIALS AND METHODS :

Raw material source :

Flour roasted black-gram flour, ashwagandha powder, milk, flavoring agents (cardamom and coco), salt, baking powder, baking soda, ghee, honey, Murraya konigii leaves, milk, and fenugreek collected from local yeola market. For usage in the preparation the raw ingredients were kept at room temperature.

Method of Preparation of Cookies :

1. Boil fenugreek in ghee and filter.
2. Mix all ingredients to prepare dough .
3. Shape dough into cookies.
4. Bake at 180º C for 25 min .
5. Cool and conditioning the cookies.

Fig: Herbal cookies after baking

Table 1: Preliminary batches of herbal cookies

Contents	F1	F2	F3	F4
Murraya Koenigii	6gm.	4gm.	5gm.	5gm.
Moringa oleifera	5gm.	5gm.	4gm.	6gm.
Ashwagandha	5gm.	4gm.	6gm.	5gm.
Honey	15ml.	15ml.	15ml.	15ml.
Salt	1gm.	1gm.	1gm.	1gm.
Oats	20gm.	20gm.	20gm.	20gm.
Baking soda	1gm.	1gm.	1gm.	1gm.
Ghee	10ml.	10ml.	10ml.	10ml.
Fenugreek	0.4gm.	0.4gm.	0.4gm.	0.4gm.
Milk	20ml.	20ml.	20ml.	20ml.
Cardamom	0.5gm.	0.5gm.	0.5gm.	0.5gm.
Wheat	50gm.	50gm.	50gm.	50gm.

EVALUATION OF POLYHERBAL COOKIES:

Phyto chemical Properties of Cookies:

Moisture content:

According to the protocol, a sample of cookies was carefully weighed in a moisture dish, heated to 105°C for approximately two hours, cooled in desiccators, and then weighed once again. For half an hour, the heating procedure was repeated. Then chilled and weighed once more. The process was carried out until the difference between two consecutive weighing in was less than 0.001 grams. The test sample's moisture content was determined using the following equation:

$$\textbf{Moisture \% by weight} = \frac{100(w1 - w2)}{w1 - w}$$

Where,

w1= weight of moisture dish with sample before drying

w2= weight of moisture dish with sample after drying

w = weight of moisture dish

Ash value :

Following the instructions, one gram of cookie material was placed in a crucible covered with tar and burned on a Bunsen burner until all of the carbon was burned. Following cooling, the sample was weighed, and the process was repeated until the weight remained constant. Following that, the equation below was used to determine the total Ash value.

$$\textbf{Total ash content (\% by weight)} = \frac{100(w1 - w2)}{w1 - w}$$

Where,

W2= Weigh of empty dish.

W= Weigh of sample taken.

W1= Weigh of crucible with sample after complete burn

Total alcoholic and water extractive values :

According to the procedure, 2.5 grams of cookie powder were placed in 250 milliliters of volumetric flasks, to which 90% ethyl alcohol or distilled water was added, and left for 24 hours. Following the 24-hour period, the samples were filtered and placed in porcelain dishes. All of the alcoholic and water extract samples were heated to 100 degrees Celsius for evaporation, after which the samples were cooled and preliminary calculations were performed using the following method.

Calculation: 2.5 gm of sample gives 4x of alcohol extract.

$$\textbf{50 gm of sample gives} = 80 \times \frac{x}{4}$$

Where,

X = Sample after drying

Nutritional analysis :

Protein estimation :

Protein estimate was carried out using the method outlined in the DGHS Manual. Using this approach, 4 test tubes were filled with 200–300 mg of powdered cookies, and 3 gm of catalyst (K2SO4 + CuSO4) was then added. 10 ml of strong sulphuric acid H2SO4 was poured to all tubes and then digested for 3 – 4 hrs. These samples were further distilled using 40% sodium hydroxide, boric acid, and potassium permanganate before being acid titrated. The following formula was used to determine the percentage of protein after this titrant was neutralized with ammonia.

$$\textbf{Protein Conc.} = \frac{\text{Amount of sample in } \mu g \times 1000}{V\ (\mu l)}$$

Fat content :

According to the procedure, 2 grams of the cookie sample were stored in a Soxhlet apparatus with a 1:1 mixture of diethyl alcohol and petroleum ether for six hours. The ether was then extracted using distillation, and the cookies were dried in a hot air oven at 110 ± 1°C before being chilled in a desiccator. The dried sample was taken and weighed once again. Two to three milliliters of diethyl rand were used to wash the remaining residue, and the procedure was repeated until the weight remained constant.

$$\textbf{\% of fat content} = \frac{(\mathbf{M1 - M2})}{\textbf{weight of the sample}} \times \mathbf{100}$$

Where,

M1 =Weigh of RBF with fat.

M2 = Weigh of the RBF.

Carbohydrate estimation :

Carbohydrate estimate was carried out using the method outlined in the DGHS Manual.50 ml of lead acetate were added to 2 mg of cookie sample powder in order to estimate the amount of carbohydrates. After adding 6 ml of 0.5 N Hydrochloric Acid the mixture was cooked in a hot water bath. Following heating, the sample was cooled and neutralized with 6 ml of 0.5 N sodium hydroxide. Finally, distilled water was added to bring the sample volume up to 200 milliliters. The Lane and Eynon method was used to calculate the inverted sugar prior to inversion. Ten millilitres of mixed Fehling A and B solution were added to the conical flask, and titration was performed using the sample solution within three minutes without inversion using 1% aq. Methylene Blue as an indicator.

$$\textbf{Reducing sugar \% before inversion} = \frac{\mathbf{F}}{\mathbf{C} \times \mathbf{R}} \times \mathbf{10}$$

Where,

R = Reading

F = Factor of Fehling solution Total invert sugar % after inversion

C= conc.

Total Energy :

Total energy was valued on the basis of carbohydrates, proteins and fats content of cookie samples.

$$\textbf{Total energy} = \textbf{Carbohydrate} \times 4 + \textbf{Protein} \times 4 + \textbf{Fat} \times 9$$

Sensory Analysis :

50 participants in all took part in the survey, which used a 9-point hedonic scale to evaluate sensory qualities such flavor, scent, taste, look, and odor. Taste panelists were given questionnaires and

mouthwash, and during the session, the product was presented and the volunteers were given an explanation of the questions. Microsoft Excel was used to evaluate the data collected according to age group.

RESULT AND DISCUSSION :

Phytochemical Properties of Cookies :

Table 2: Chemical and Physiochemical parameter

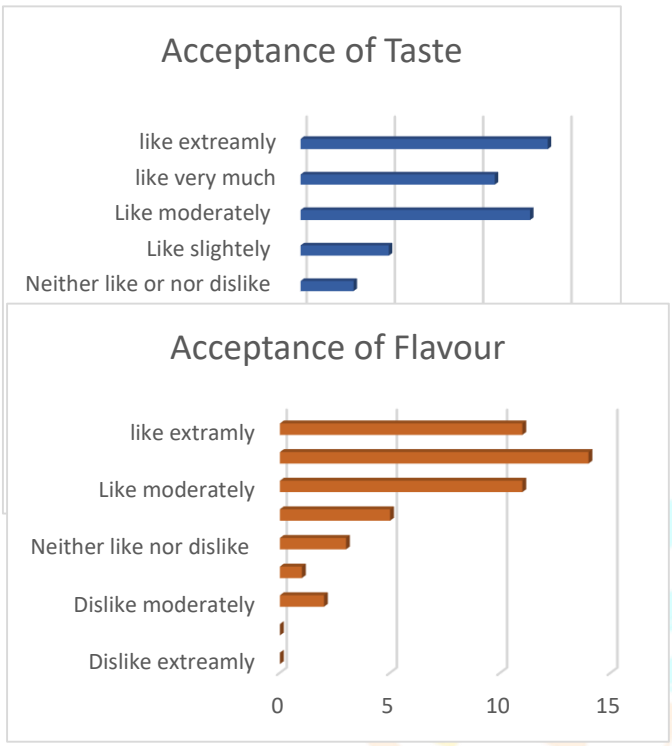
Sr.no	Chemical and physicochemical parameter	Result
1	Ash content	7.15 %
2	Moisture content	6.87 %
3	Alkaloid	Present
4	Alcohol extraction	6.55 %
5	Water extraction	5.35 %
6	Fat content	14.06 %
7	Carbohydrate content	60.50 %
8	Protein content	11.67 %
9	Total energy	415.22 Kcal

According to the data in Table 2 above, the cookies were incredibly high in protein, low in fat and carbohydrates, and well-balanced, making them suitable for growing adults, those who are health-conscious, and those who suffer from malnutrition. Curry leaves have been shown to have a flavorful and appealing impact when used as an active ingredient in comparative tests of several sensory assessment parameters. About 90–96% of the cookies' chosen composition are acceptable, which gives us hope that this formulation may be produced on a wide scale. The physiochemical characteristics, nutritional value, sensory assessment, and comparison to other commercially available products were all within an acceptable range.

Sensory Evaluation:

Taste :

One of the more promising sensory evaluation parameters is taste. Despite its intriguing qualities and remarkable energy, the product is unlikely to be accepted due to its morally dubious taste. Based on this sensory evaluation, it was determined that the usage of curry leaves caused the mean score for the 18–45 age group to be between 93 and 94%. The taste graph is shown in Figure 2 below.



Flavor :

It is a crucial component of flavor since it influences how well any food item is received. Due to its ability to operate as a taster, the flavor of curry leaves and vanilla essence was determined to be highly significant among all volunteers for the sensory evaluation; as a result, the score on Excel was between 93 and 94% (Figure 3).

Aroma and Color :

Foods aroma or smell is an intangible component of acceptance and is essential to the mouthful experience. Aroma, along with food product color, is the consumer's first impression when selecting which food to eat. It is an indication of approval that has a limitless influence on product selection. Color and scent have a sophisticated effect on acceptance. The findings indicate that a combination of powerful Murraya Koenigii, ashwagandha, and vanilla scent had a significant impact on the participants.

Overall Acceptance of Cookies :

The most crucial requirement for food, snacks, and other beverages is that they must have a palatable and flavorful effect on the tongue after consumption in order to be administered easily. The outcome of this sensory evaluation is determined by the product's taste, flavor, crispness, and aroma, all of which were found to be noteworthy with the appropriate medicated effect.

CONCLUSION :

controlled carbohydrate and fat content. The addition of ashwagandha bark and curry leaves has provided a fresh approach to turning home cures into a commercially available product with the best flavor acceptance. Additionally, the formulation's ingredients have already demonstrated a major impact in the management of non-insulin-dependent diabetes mellitus and other medical conditions. Therefore, it might be useful in producing inexpensive, highly effective Cookies.

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Reference :

1)Manik, Gauttam, Kalia, "Antidiabetic and Antihyperlipidemic Effect of allopolyherbal formulation in OGTT and STZ-induce diabetic rat model." Sep.2013

2) Jarald, Joshi, and Jain, "Diabetes and herbal medicines." Iranian journal of pharmacology and therapeutics, 2008, 7, 97-106

3) Pratley RE. "The early treatment of type 2 diabetes." Am J Med, 2013, 126: S2-S9.

4)V. Jain, M. Momin, K. Ladda, Int J Ayurvedic Herbal Med. 2012, 2(4), 607-627.

5) Ari Widayanti, Kriana Efendi, et al. "Antidiabetics activity of Koja Bay (Murraya Koenigii) leaves tea bag." Pharmaceutical science and research, 2019, 6(2), 107-110

6) A. Muhammad, R.D. Lloyd, R. Ali, R.N. Mian, "formulation of polyherbal antidiabetic cookies" Crit Rev Food Sci. 2011, 53(11), 1168-1179.

7) D. Talukdar, J Appl pharm sci. 2013, 3(3), 13-19

8) Ewenighi C., Dimkpa U., Onyeanusi J., et al. "Responses to glycemic control therapy according to age, gender, level of adiposity, and duration of diabetes in type 2 diabetic patients." Ultas Med J, 2015, 1(2), 26-30.

9) M. Baharami, A.A. Jafari, S. Hosseini, M.H. Foruzanfar, M. Rahmani, M. Pajouhi, Int J Food Sci Nutr. 2009, 60(7), 618-626.

10) A.l. Shaikh, A.l. Mufarrej, S.I. Mogawer, et al. "Effect of fenugreek seeds (Trigonella foenum graecum L) on lactational performance of dairy goat." J. App. Anim.Res. 1999, 16, 177–183.