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PSEUDOSTEM INFUSED PEARL MILLET COOKIES

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Abstract

Banana plants have been used in the field of medicine. It offers a huge range of health benefits. Consumption of pseudostem with other iron rich foods like pearl millet can help in meeting our daily iron requirements. Iron is a key component of hemoglobin that carries oxygen from the lungs to throughout the body tissues. Cookies are Ready-To-Snack and it can be the best vehicle to infuse with functional food. This study aims to formulate the iron rich cookies using dried pseudostem of banana tree infused with pearl millet. Cookies were prepared using pseudostem power, pearl millet flour, wheat flour, brown sugar, butter, and cashew for flavoring. Sensory evaluation was done by 46 semi-trained panelists using a 9-point hedonic scale. The formulated pseudostem infused pearl millet cookies were highly acceptable and had a better sensory evaluation score. It can be consumed on a regular basis by all age groups for iron supplement.
Key words: Pseudostem, pearl millet, cookies, iron.

Introduction

Various parts of the banana plant have been used in medical systems for centuries. India is the largest producer of bananas in the world. The Pseudostem has Protein 2.5%, Fat 1.7%, Free sugar 3.4%, Soluble dietary fiber 1.4%, Insoluble dietary fiber 27.4%, Starch 27.3%, Ash 0.3%, Moisture 15.1% (Bhaskar et al., 2012). The pseudostem also has detoxification properties that helps to cleanse the body from toxins and impurities. But its shelf life is limited due to enzymatic browning, catalyzed by the enzyme polyphenol oxidases (PPOs) (Corzo-Martínez et al., 2012). Addition of vitamin C like lemon juice prevents this browning reaction. Since it is high moisture food 15.1% (Bhaskar et al., 2012), it takes 2 days to completely dehydrate. The dehydrated pseudostem powder can be used in preparation of many food items.

Pearl millet is packed with various vitamins and minerals. Pearl millet grains contain 8–9% dietary fiber, 9–20% protein, 2–7% fat and 63–78% carbohydrates (Taylor and Kruger et al., 2016). It is used to make rotis, porridge and other dishes. It also has a low glycemic index and gluten free properties. It is the great choice for people on gluten free diets like celiac patients. It can be combined with other flours like wheat flour to make baked goods like bread and cookies. And the pearl millet is an excellent source of iron which helps in preventing anemia by increasing hemoglobin levels.

Wheat flour is a basic ingredient that is commonly used in cookie preparation. Gluten is a protein found in wheat, it gives elasticity and allows it to rise and hold its shape during baking. In the context of cookies made with wheat flour, gluten plays a crucial role in determining the texture and structure of the cookies. However, for those with gluten intolerance or celiac disease, alternative flours can be used to make gluten-free cookies.

Brown sugar is a natural sweetener derived from sugarcane. Its higher moisture content keeps cookies soft and chewy, even after baking. It also add a slight crunchiness to the cookies due to caramelization during

baking. The molasses present in brown sugar gives cookies a darker color and also a good flavor. In Spite of its added advantage, it adds calories as it is a sugar and hence it is advisable to consume in moderation.

Iron is an essential mineral that plays an various role in physiological functions in the human body. It is a key component of hemoglobin, a protein in red blood cells that carries oxygen from the lungs to tissues throughout the body. Iron deficiency anemia is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet the body's physiological requirements, which vary by age, sex, smoking habits, and during pregnancy. The prevalence of anemia among six groups as per the National Family Health Survey (NFHS) (2019-21) is 25.0 percent in men (15-49 years), 57.0 percent in women (15-49 years), 31.1 percent in adolescent boys (15-19 yrs), 59.1 percent in adolescent girls, 52.2 percent in pregnant women (15-49 years) and 67.1 percent in children (6-59 months). Severity of anemia was defined as per the World Health Organization (WHO) classification for adolescents: severe anemia – Hb level below 8 g/dL; moderate anemia – Hb level 8 to 10.9 g/dL; mild anemia – 11 to 11.4 (for 5 to 11 years), 11 to 11.9 (for 12 to 14 years), and 11 to 12.9 (for males >15 years).

Cookies are baked products with ingredients like flour, sugar, butter and flavoring such as nuts and choco chips. Cashews were added to cookies as a flavoring agent and cookies can be customized with various add-ins, flavorings, and decorations to create endless variations to suit personal preferences and dietary restrictions. They are often enjoyed with a glass of milk, tea, or coffee as a delicious snack or dessert. Cookies differ from biscuits in their sugar and fat content along with toppings. Pseudostem contains a small amount of iron content compared to other foods. But consumption of pseudostem infused with other iron rich foods like pearl millet can help in meeting our daily iron requirements.

1. Materials and Methods

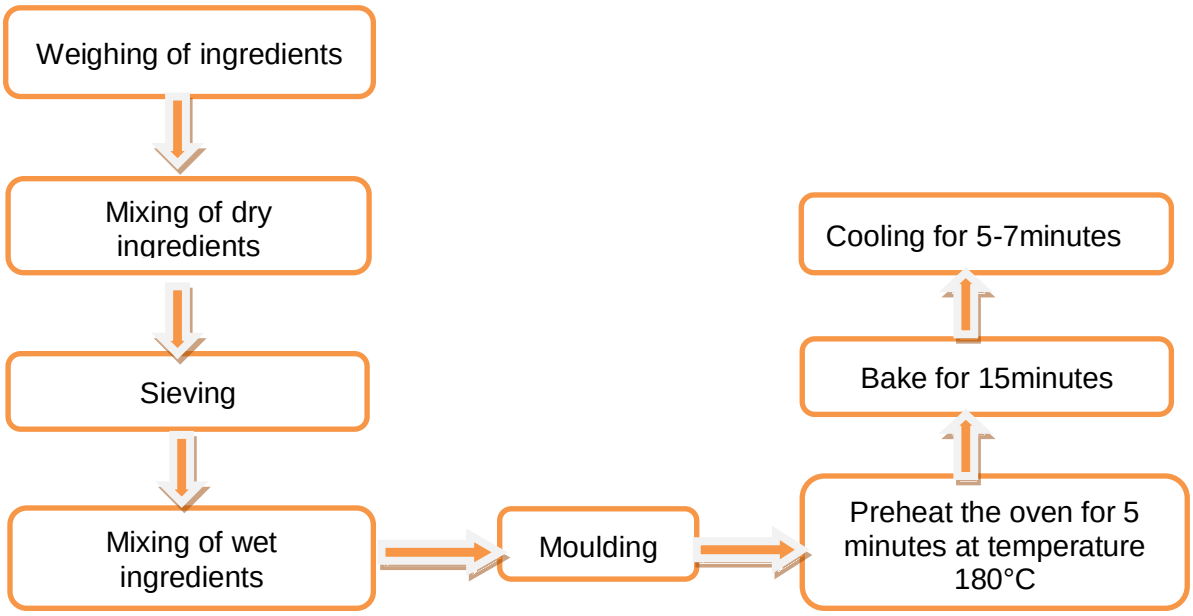
1.1 Raw Materials

Raw materials such as Pseudostem, pearl millet, wheat flour, palm sugar, butter, cashew was used for making this product.

1.2 Methodology

The inner core of the stem is sliced into a thin layer and then soaked in lemon (5 ml of lemon in 100ml of water) for 10 minutes to prevent enzymatic browning. Then the slices were sundried for 2 days to remove the moisture of the pseudostem. The dehydrated pseudostem is blended into a fine powder. 50g of powdered pseudostem, 50g of pearl millet flour, 25g of wheat flour, 50g of brown sugar, 150g of butter and 10g of cashew for flavor are mixed into dough, cut by using suitable mold and baked for 10 - 15 minutes.

Process flow sheet for pseudostem infused pearl millet cookies



Sensory analysis

Sensory analysis of prepared cookie samples was done using a 9-point hedonic scale rating (Ranganna, 2015).

Result And Discussion

Proximate Composition of Raw Materials

The proximate composition of raw materials such as Pseudostem powder (50g), pearl millet(50g), wheat flour (25g), brown sugar (50g), butter (150g) and cashew (10g).

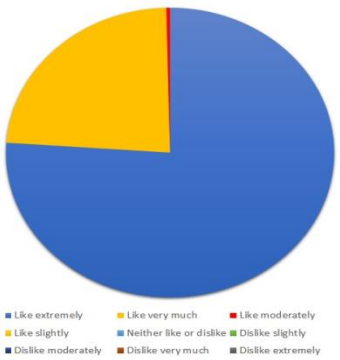
Physical characteristics of cookies

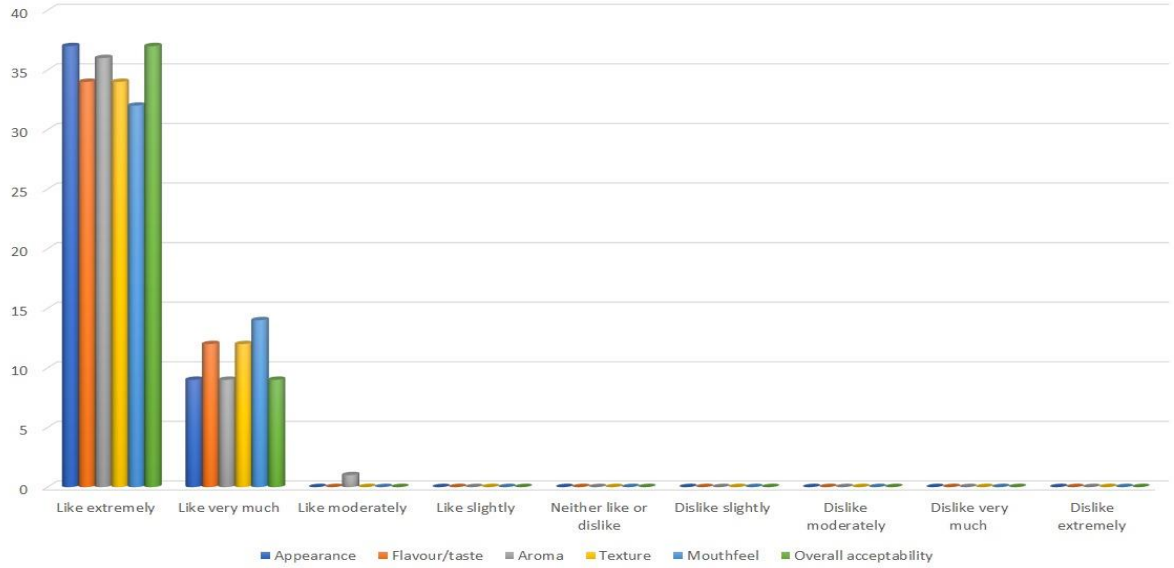
No marked difference was observed in size, shape, weight and hardness of cookies. The size and weight of cookies were found in the range of 3.5-4.0cm, 9-10g respectively. All the samples were round in shape and recorded Brown color in cookies.

Sensory Evaluation

The sensory analysis for overall quality was carried out with 46 semi-trained panelists. The parameters for sensory evaluation were texture, crispiness, color, taste, and overall acceptability. This product has demonstrated the appearance (37 like extremely), flavor/taste (34 Like extremely), aroma (36 like extremely), texture (34 like extremely), mouthfeel (32 like extremely), so overall acceptance is (37 like extremely) most palatable product. It is evaluated by a 9-point hedonic scale (Ranganna, 2015).

Like extremely	210
Like very much	65
Like moderately	1
Like slightly	0
Neither like or dislike	0
Dislike slightly	0
Dislike moderately	0
Dislike very much	0
Dislike extremely	0





scorecard of sensory evaluation for pseudostem infused pearl millet cookies

Conclusion

Pseudostems, abundant in iron and fiber, present a nutritionally superior alternative; however, their nutritional benefits often go unnoticed, resulting in reluctance to include them regularly in diets as It requires time consuming pre preparation. Moreover, their incorporation into meals is prevented by a lack of awareness about their potential health advantages. Infused pseudostem in cookies seem to be a better way to include it in our day-to-day life. In recent days, the priority of snacking has been shifted to a healthier trend and this product is made with pearl millet, unlike others which use refined wheat flours, also add advantage. Cookies are a well-known product for all age groups and can serve as a better vector for iron supplementation and also make a better choice for people with diabetes. Furthermore, efforts to promote their consumption could be encouraged by highlighting their versatility in the cookies to contribute overall well-being.

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