Utilization of Beetroot Leaves with the Blend of Hazelnut Flour for Preparation of Crackers

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Keywords: Innovative, fiber-rich, antioxidants, β-carotene, zeaxanthin, palatability.

INTRODUCTION

Nowadays awareness of consumers about the correlation between food and health as well as the requirements of people following a fiber rich diet has been increased. Consumer demands and expectations for healthy food products are constantly increasing allowing the companies for the manufacturing of new products meeting those needs. This study involves the preparation of crackers with blend of hazelnut and all-purpose flour with the addition of beetroot greens powder. A cracker is an even, dry baked food product predominantly produced with flour and is frequently marked as a nutritious and an easy way to consume cereal grain or staple food. The most vital ingredient used in this formulation was beet greens. They are a great natural source of fiber and antioxidants, incredibly rich in nutrients, concentrated in vitamins and minerals as well as carotenoids such as β-carotene and lutein/zeaxanthin and have zero fat and cholesterol. It lowers the blood pressure, boosts cardiovascular function and significally improves eye health. Beet greens are beneficial for pregnant women as during pregnancy, folate (vitamin B9) is vital for ensuring healthy growth of the baby's cells and tissues. And beet greens are super rich in Vitamin B9 (folate) which is necessary for both adults and infants. In this experiment 20% of hazelnut flour was used as substitute for all-purpose flour. Hazelnut flour is a considerable choice for individuals who are gluten intolerant or sensitive or on low-carb diets. As hazelnut flour is high in vitamins, minerals, and antioxidants it is generally known as nutritional powerhouse. Another striking benefit is hazelnut flour is gluten-free, which means celiac patients can consume it without any restrictions. Hazelnut's skin is removed and it is ground to a fine powder to formulate hazelnut flour. It is highly aromatic and can bring richness and light sweetness to dishes.

OBJECTIVES

The objective of this study was to formulate & preserve delicious, innovative and fiber-rich crackers that contains good amount of nutrients, antioxidants and health benefits. The main ingredient used for preparation of crackers is beetroot greens that are the edible leaves of beetroot. Another vital ingredient used along with beet leaves was hazelnut flour which has tones of health benefits as well. The main objective was to use both of these underrated yet nutrient dense ingredients in a formulation to create an innovative, healthy and flavorful food product. To introduce a new, unfamiliar and a health rich product that outweighs a regular cracker at market level. In this we analyze how different ingredients play an important role in the manufacturing and preservation of crackers by enhancing nutritional parameters, palatability, flavor, aroma, and its overall quality.

METHODOLOGY

Materials

The material used in making of crackers were Hazelnut flour 20%, All-purpose flour 80%, Sugar 2 teaspoon, Salt 2 teaspoon, Beetroot leaves, Vegetable oil (soy bean) 3 tablespoon, Water 1 cup, Instant Yeast 1 tea spoon, Baking powder half teaspoon, Rosemary extract one teaspoon.

Preparation of Beetroot Leaves Powder

Beetroot leaves were first blanched by putting it in the hot water for 1 minute to remove any bitterness then the leaves were dried completely by oven drying and were grinded into fine powder, 2 tbsp. powder was obtained and used.

Preparation of Crackers

In a medium bowl, whisk together all-purpose flour, hazelnut flour, instant yeast, sugar, salt, beetroot leaves powder and baking powder while mixing the dry materials add oil, water and rosemary extract (which we are using as a preservative) to the mixture and stir it until a soft, sticky dough is formed. Now roll the dough by using a rolling pin into a rectangle, roughly 1/8-inch thick or thinner then cut the dough into individual crackers roughly using a pizza cutter or a sharp knife. Heat the oven to 450°F, put the crackers inside and bake it in the oven for 12-15 minutes, until the edges are browned.

Preservation Techniques

For the preservation of crackers we used plant extract as the natural preservative as they are well known for their antimicrobial activities we used Rosemary Extract as it is an effective natural antioxidant for foods like baked goods, crackers, fresh-cut salads, marinated chilled fish and meat products. The carnosic acid and Rosmarinic acid naturally present in rosemary acts as an antioxidant and slow down the effectiveness of microorganism to cause spoilage of food. We used only 1 tsp as it was enough to preserve crackers.

Packaging

Packaging of cracker is done in Nitrogen flushing in aluminum (laminated) pouches having Vacuum packaging using nitrogen inert gas or high-speed vertical form-fill-and-seal bagging system in shelf-ready stand-up pouches. An airtight bag, glass containers or plastic container works optimally for keeping insects and microbes out of your crackers after opening the packing. The sealed crackers may be stored for about eight months in a dark, cool pantry, but they hold on to their optimum freshness for only about one month after opening of the packing.

Observation

Moisture content	1.5-3.0%
pH	7.2-8.0
Flavor	Mild
Texture	Crispy
Shelf life (unopened /without preservation techniques & proper storage)	4-5 months
Shelf life (unopened/with preservation techniques & proper storage)	6 -9 months

CONCLUSION

We formulated crackers using nutrient dense beetroot leaves which have zero fats and cholesterol with several health benefits including lowering blood pressure, boost cardiovascular function and improves eye health, another ingredient used along with beetroot leaves is hazelnut flour which is used 20 % as substitute for all-purpose flour which provides aroma, richness and mild sweetness to the food product. Temperature used for preparation of crackers is 450°F for 12-15 minutes. 1 teaspoon of rosemary extract is used for the preservation of crackers as it naturally contains carnosic acid and rosmarinic acid which acts as an antioxidant and slow down microbial effectiveness to prevent food from deterioration. For packaging, vacuum packaging in air tight bag, plastic or glass container is done using nitrogen inert gas. Sealed crackers can be stored for up to eight months while crackers after opening retain their freshness for maximum 1 month. Crackers that we made found crispy with mild flavor with pH 7.2-8.0 and moisture content 1.5-3.0, the result was satisfying.

ACKNOWLEDGEMENT

IBRAS is providing many opportunities for all the global participants to share their ideas with each other and also giving us a life time chance to publish our abstract as an abstract book. They are keeping the COVID-19 situation in mind and for the sake of our safety they are holding the conference virtually.

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