

The Utilization of Roasted/Toasted Flour in Bread-Making: Analyzing its Impact on Flavour and Texture

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Abstract-Bread is the simplest food item frequented in every household and consumed in some form or the other. Not only is it a simple preparation, but it also is very versatile. Flour is one of the main/core ingredients that give bread its sought-after characteristics and is a good source of nutrients and proteins. This main ingredient of flour has a variety of types, each with its contributing qualities and peculiarities. A simple product with a simple and common main ingredient, yet the possibilities are endless. Toasted/Roasted flour has its own unique properties and flavour profiles that it brings to light in bakery products. The objective of this study is to evaluate the different outcomes and results in bread, by varying the proportion of toasted/roasted flour that is used to make the dough. As toasting/roasting contributes to unique product outcomes, this research aims to focus on the most suitable proportions of toasted/roasted flour to obtain the most desirable end product with its associated nutritional value.

Keywords: Bread, Toasted, Roasted, Flour, Nutrients, Proteins, Main Ingredient, Characteristics.

I. INTRODUCTION

The human body needs food and nourishment to survive and thrive. Essential supplements and vitamins from foods act as sources of energy for us. Food has always provided the body more than just nutrition, it goes above and beyond, catering to satisfaction and cravings. This evolution has continued throughout the years and continues to do so. There is a need and want to partake in something new and different. From new Flavors and cooking techniques to portability and sustainability, food never ceases to amaze and delight. Research shows that consumers want to live a healthier and more sustainable life, and eat a healthy diet; Both academics and industry are working hard to satisfy

these demands, but measuring only nutritional composition and calculating the environmental impacts are insufficient, food must also be attractive and tasty. (Alejandra Fernandez Castaneda, Sunera Zulficar Nurmomade and Johanna Ostlund, April 2024)

A survey conducted by FMCG Gurus: Flavour, Colour, and Texture, shows that almost three-quarters of consumers like new and unusual Flavors in food and drink products. The top kind of Flavors consumers like to see are sweet Flavors, local traditional Flavors, and savory Flavors. Consumers like to try new and unusual Flavors for many reasons. (FMCG Gurus- Flavour, Colour & Texture: New Flavors are Sparking Consumer Interest, November 2022). As far as the Bakery sector is concerned, there is a lot that is taking place to cater to consumer needs in this regard. There is constant testing and trailing that goes on in the bakery kitchens to come up with a product that caters to exact guest needs while also addressing other societal concerns.

79% of Indians agree that introducing novel Flavors motivates them to consume sweet bakery products. About one-third of consumers have expressed interest in more innovative sweet bakery products, particularly seasonal Flavors (32%) and flavour combinations (30%) (Dr Anamika Banerji, Research Analyst, Food & Drink for Mintel Reports of India, May 2023). Baked goods or bakery products hold great market value due to not only their freshness but also their capability to bring innovation and uniqueness to the table; Breads being at the forefront of it all. The alteration and tweaking of the very basic ingredients in itself opens up a window of possibilities and provides the maker with multiple opportunities to create something new.

The main focus of this tweaking and alteration is to understand how certain ingredients react with other ingredients, behaving in a certain way to provide certain results.

The incorporation or alteration of one of the main components in bread i.e. Flour, helps bring about a different texture and flavour profile of the bread. For example, the addition of roasted/toasted flour in this research of breadmaking is to impact the overall quality of the bread, in terms of taste, colour, texture, and flavour profile. This simple yet transformative ingredient brings a nutty essence and a smooth, velvety texture to creations (Aishwarya Korgaonkar, Research Dive, April 2024). Bread has yet to be explored to its full extent and its complete potential unlocked. Refined flour was the starting point for this study, transforming it by roasting, in addition to the basic ingredients of granulated sugar, fresh yeast, water, fresh yeast, salted butter, and milk. The focus was to then alter the percentages of toasted flour used in combination with ordinary refined flour to yield different results, creating new flavour profiles in the bread.

II. RESEARCH METHOD AND DATA COLLECTION

2.1 Raw Materials Used for the Study

This research was carried out to test out the most suitable percentage of toasted flour that can be used in bread making to obtain desirable results and to understand how the changes to the same affect the other ingredients, in the way that they react with each other. The Mumbai local market was used to obtain the simple ingredients of refined flour, granulated sugar, fresh yeast, salted butter, and milk; the water used during this testing was packaged drinking water. The research work was conducted in a domestic kitchen with access to simple tools and equipment such as mixing bowls, dough scrapes, weighing scales, pastry brush, baking trays and a gas oven.

III. SAMPLE METHOD

The main component used was refined flour. In T0, T1, T2, and T3 the percentage of refined flour that was separated, toasted, and used was at the rate of 0%, 10%, 20%, and 30%. In each of the treatments, the same amount of 4% granulated sugar and salted butter was used. A 6.4% leavening of fresh yeast and a 64% hydration ratio (water) was used. A small percentage of 16% full-fat milk was used to enhance overall appearance & bread quality.

Table 1.0 contains the bread dough's ingredients and their respective test proportions. The bread doughs were prepared and kneaded by hand incorporating the refined and toasted flour, along with the granulated sugar and fresh yeast, adding the bottled water as needed. The salted butter was incorporated into the dough, post which a gluten formation test was conducted, and the bread dough was left to ferment. This dough was then accurately portioned and shaped into 0 portions, each weighing 00gms, and then left to ferment once again. The last step involved the full-fat milk being brushed on top of the bread portions. These breads were baked in a commercial-sized Rational-branded fan-forced oven at 210°C for 8 minutes.

Water, bottled (ml)	
72	80
87	93

Table 1.0 - Ingredients and dough composition; with Toasted Flour expressed as a percentage ratio.

Ingredients	Bread without any addition (T0)	Bread with 10% Toasted Flour (T1)
Refined Flour (g)	125	112.5
Toasted Flour (g)	0	12.5
Granulated Sugar (g)	5	5
Fresh Yeast (g)	8	8
Water, bottled (ml)	72	80
Butter, salted (g)	5	5
Milk, full-fat (ml)	20	20

Bread with 20% Toasted Flour (T2)	Bread with 30% Toasted Flour (T3)
100	87.5
25	37.5
5	5
8	8
87	93
5	5
20	20

Thus, from the above table of testing comparison, it can be noted that from T0 to T4, as the percentage of roasted/toasted flour was increased the amount of water needed to make the bread dough proportionately increased. Due to the nature of roasting, which includes the removal of moisture from a product the corresponding bread dough of T-0 to T-3 required the addition of more water to ensure sufficient gluten formation and desired texture in the dough.

IV. DEGREE OF ROASTING



Image 1



Image 2



Image 3



Image 4

The flour used in the testing recipes was toasted to a certain degree to obtain the required level of flavour, aroma, and colour. Image 1 shows the flour at its first stage, at the beginning, before the commencement of the roasting process. As the flour was subjected to heat in a pan over a medium to low flame for 30 minutes, it began to develop a nutty aroma and corresponding colour change, as seen in Image 2 & Image 3.

The final stage of this roasting process, as seen in Image 4, resulted in the flour obtaining a deep intense nutty aroma and comparatively darker colour. At this stage, the flour developed the desired flavour profile as required for usage in the testing recipes.

V. RESULTS & DISCUSSION

As per Table 1.0, the following were the results of the conducted testing:



T0



T1

T0 – Light texture with mild sweetness. Light brown crust and even, white, airy crumb.

T1 – Light brown crumb & crust with a subtle nutty/toasted aroma.



T2



T3

T2 – Mild nutty aroma with a medium brown crumb and crust.

T3 – Prominent nutty aroma & flavour. Lightly dense crumb with minimal colouring of crust.

The results of this initial study have provided a good foundation for further study and analysis into this area of research.

As one can see in the above results of T-0, T-1, T-2, and T3, there are visible changes in the colour and texture of the product due to the change in the percentage of roasted/toasted flour used in the product. It is also important to note that, though not visible, the increase in the usage of roasted/toasted flour also greatly impacts the flavour of the major and this is one of the major outcomes of this study.

There is a strong foundation laid down by this study to conduct further nutrition analysis into the usage of roasted/toasted flour in bread-making. This study also creates further scope for the usage of 100% roasted/toasted flour to make bread, hence providing a thorough intense flavour profile to the bread. One may only contemplate the aroma and taste of the product when T-3, using a mere 30% roasted/toasted flour revealed great promise about nutty aroma and flavour.

This study also revealed that the shelf life of the bread was considerably altered as the percentage of roasted/toasted flour used in them increased. There is yet to be a measurable component to analyse the shelf life of the product with the usage of roasted flour used in its making. Nevertheless, as per common and technical knowledge, moisture plays a big role in the shelf life of items and when it comes to perishable bakery items like bread, its 'Best Before' date could potentially be enhanced if not considerably extended.

VI. CONCLUSION

The usage of roasted/toasted in the cooking process has been greatly adopted in Indian cuisine. This shows in the production process of a variety of dishes and foods but when it comes to bread there are not many instances of its usage. Bread is a completely different area, when it comes to production steps and usage of ingredients, there is a need to thoroughly understand the science behind bread-making before experimenting with the ingredients. First understanding the role of ingredients in the process of bread-making is a prerequisite; the reason being, that each ingredient contributes in its own unique way to the final appearance, texture, consistency, and flavour of the bread. There is also a need to have a basic understanding of baking and working in a bakery/kitchen environment, as this has an effect on the produced results of the conducted tests and its processes. In order to get the most accurate and reliable of results the above factors play a key role in determining the same.

This conducted study creates scope for further experimenting and research with not just flour and an ingredient but also, potentially, with other

common ingredients. There are many possibilities for this type of product to be introduced into the market.

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