

Tulsi Cookies

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Abstract:- A team of experts analyzed the true extent of global malnutrition, as well as the factors that causes it, to develop a new framework for prevention and treatment. More than 3 million children die each year because of malnutrition, accounting for more than 50 % of the deaths among those under the age of 5. As per the study led by scientists and researchers, there is a great need for treatment of acute malnutrition, promotion and child feeding and zinc or protein supplementation.

The tulsi cookie is an initiative taken in order to overcome these deficiencies.

The product developed consists of zero trans fat and cholesterol. This is free from maida, wheat flour, thus it is gluten free. It consists of potent antibiotic, antibacterial, antifungal, germicidal properties. The cookies are rich highly enriched with Vitamin K, Vitamin D and other vital nutrients. It is highly cost effective.

Keywords: Malnutrition, Antibiotic, Transfat

INTRODUCTION

A. TULSI

Tulsi belongs to family Lamiaceae. The botanical name- *Ocimum sanctum* or *Ocimum tenuiflorum*. It is a well known plant for its medicinal use. It cures bronchitis, bronchial asthma, malaria, diarrhea, dysentery, skin diseases, arthritis, painful eye diseases, chronic fever and insect bite. Tulsi has lots of nutraceutical properties i.e., antioxidative, antimicrobial and anti-inflammatory, other components such as eugenol, methyl eugenol, caryophyllene, humulene and ursolic acid. A leaf of tulsi contains 0.7% volatile oil comprising about 71% eugenol and 20% methyl eugenol. Fresh leaves and stems of *Ocimum sanctum* extract yielded some phenolic compounds (antioxidants) such as cirsilineol, circimaritin, isothymusin, apigenin and rosamerinic acid.

B. COOKIES

Cookies are usually made from wheat flour and is rich in high calories and low fiber content. Wheat is rich in gluten and leads Celiac disease, wheat allergy, non-celiac gluten sensitivity. The wheat flour is replaced with soy and sorghum flour in the product.

Soy flour is derived from roasted soybeans. It is rich in protein, iron, vitamin B and calcium. It contributes to other functional properties reported in bakery products, such as improved texture, moisture retention and shelf life. Soy flour is a great source of high quality soy protein, dietary fibres and important bio-active compounds such as isoflavones.

Sorghum flour is completely gluten free. It cures disease like Celiac disease. It contains 12.21% protein and 83.45% total carbohydrates 100gm of flour.

• Celiac disease is permanent intolerance to gluten proteins of many common cereals such as wheat, rye, barley and oat.

C. FORTIFIED FUNCTIONAL FOOD

Enrichment plays a vital role in this product. The addition of micronutrients such as trace elements, vitamins, etc., aimed for public health policy or to reduce dietary deficiency in people.

Cookies are also improved by bioactive compounds. "Bioactive products" – These are fortification of bioactive compounds or incorporation of essential biomolecules that are typically included in fractional amount and exhibit the capacity to modulate one or more metabolic processes. It is basically done to promote better health

II. MATERIALS AND METHODS

A. INGREDIENTS

1. Tulsi extract.
2. Soy flour.
3. Sorghum flour.
4. Peanut butter.
5. Milk.
6. Chocolate.
7. Flavoring agents (vanilla essence)
8. Margarine

B. PROCEDURE

Trial one: Composition of sorghum and soy flour (75% and 25% resp.) was used along with guar gum, sugar, peanut butter and 2% tulsi extract.

International Journal of Science, Engineering and Management (IJSEM)
Vol 2, Issue 4, April 2017

The hard texture of the cookies was found and the study showed that because of the low tulsi content, fungal growth was observed on the surface of the cookies.

Trial two: The composition of sorghum and soy flour was changed this time to 50% each. Moreover, the fructose corn syrup was used, along with 10% tulsi and guar gum was completely eliminated.

The cookies were still not found with that preferable texture and development of off flavor was observed, due to high amount of tulsi and even low sweetness was there due to use of fructose corn syrup.

Trial three: The composition of sorghum flour and soy flour was kept same. This time combination of peanut butter and margarine was used (25% each) along with 2% tulsi extract.

The cookies got a soft texture this time, no off flavor was observed and gained a stable and high shelf life with appreciable sweetness.

The study of tulsi leaf extract reported the presence of various bioactive compounds, alkaloids and amino acid content, proteins, minerals along with the phenolic compounds. Tulsi leaf extract is incorporated in the cookies made exclusively from soy flour and sorghum flour. The extract is reported to contain phenolic compounds (antioxidants) which prevents the cookies from getting rancid and formation of off flavor thus, imparting high shelf life without use of any specific modulations or storage conditions.

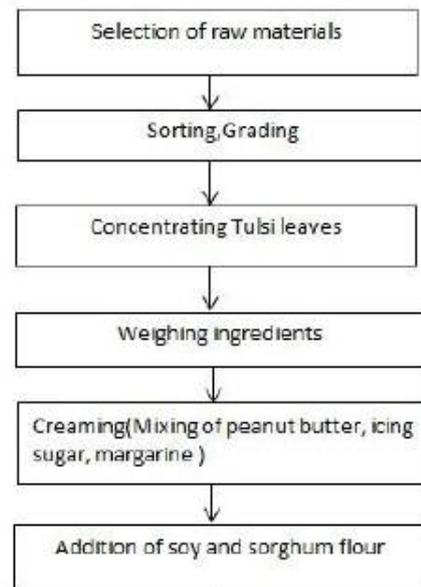
Incorporation of 2 g of tulsi per 100 gram of mixture was first tried but it resulted in fungal growth on the surface of cookies and hence shelf life of the product was decreased. The result was studied and it was found that the mold growth was due to the insufficient amount of antimicrobial components; So the another trial with 10 gm of tulsi was taken which resulted in off flavor in the product. Thus, the final product was designed and was incorporated with 5 gm of tulsi extract which gave a satisfying result. The Tulsi leaf extract incorporated, is about 5 g per 100 gram of mixture. These leaves smells and tastes like lawn clippings which is not preferable by people. So, the proximate proportion was studied, which would just increase the nutritional significance and would not alter the taste and smell of cookies with time. The also reason behind good shelf life is its moisture content.

Moreover, the soy flour and sorghum flour being rich in proteins increases its nutritional value. A high degree of variability among evaluated properties of sorghum flour was found, particularly the pasting properties. The sorghum flour that is gluten free makes the cookies available for the patients suffering from celiac disease.

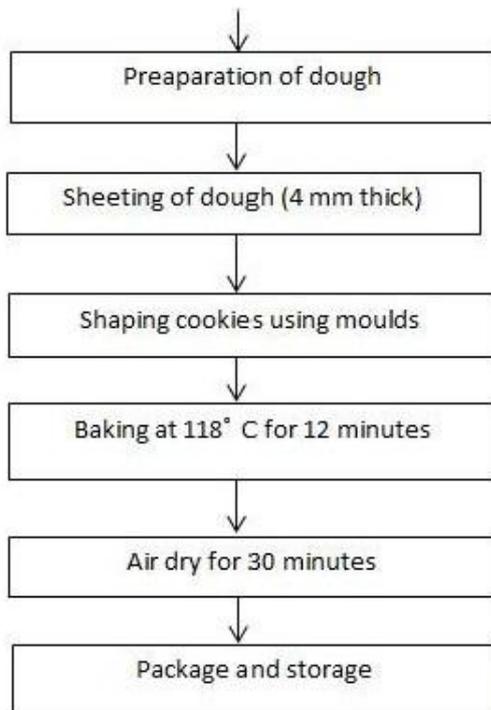
Whereas, the sorghum and soy flour were in the proportion of 1:1 (50% each). A portion of the oil in soy is lecithin, a very common emulsifier in baked products. When heat is applied to whole soy during processing, the enzymes are inactivated and the oils are stabilized, resulting in an extended shelf life, ingredient that delivers emulsification and water-binding properties at 2.5%-5.0% inclusion rate (wheat flour basis) in sweet baked products and the sorghum flour with its final viscosity (3030–4401 mPa/s) with onset temperature (T_o) and gelatinization enthalpy (ΔH) varying between 66.8 and 72.6°C, and 5.38 and 8.48 J/g, respectively has to be in the proper quantity. Various trials were conducted, studied and examined regarding the proportion of the peanut butter and margarine. First trial included full proportion of only peanut butter which gave it tough texture. Second trial included 75% peanut butter and 25% margarine which also gave hard texture to the cookies. In the third one, the proportion was 50% peanut butter and 50% margarine along with milk was used which resulted in a perfect combination.

NOTE : PEROXIDE TEST WAS PERFORMED AT MIT CFT LABORATORY AND NO FORMATION OF FREE FATTY ACID WAS OBSERVED EVEN AFTER A PERIOD OF 4 MONTHS. SO IT WAS OBSERVED THAT OUR PRODUCT HAS A STABLE SHELF LIFE WITHOUT THE USE OF ANY ARTIFICIAL ANTIOXIDANTS AND ANY SPECIAL KIND OF PACKAGING MATERIAL.

C. FLOW SHEET FOR PREPARATION OF TULSI COOKIES



International Journal of Science, Engineering and Management (IJSEM)
Vol 2, Issue 4, April 2017



Milk	0.16	0.04	Calcium-4%
Chocolate	0.21	0.13	Vit. E-15%
Margarine	0.4	0.1	Vitamin K

TABLE NO.2. COMPOSITION OF TULSI COOKIES

Nutrients	Quantity %
Carbohydrates	38
Proteins	25
Fat	14
Mineral(Phosphorus content)	0.28
Moisture content	4
Fibre	21
Ash content	20

III. RESULT AND DISCUSSION

TABLE NO.1. NUTRITIONAL VALUE OF RAW MATERIALS

Ingredient	Carbohydrates g/g	Protein g/g	Vitamins and Minerals %
Tulsi leaves extract	0	0.1	Vit. K-27%, Vit.A-6%
Soy flour	0.39	0.47	Iron-54%, Calcium-25%
Sorghum flour	0.75	1.06	Calcium-30%
Peanut butter	0.33	0.09	Vit. E-13%, Niacin-20%

TABLE NO.3. ENERGY TABLE

Nutrients	Energy(kcal)
Carbohydrates	155.8
Proteins	127.5
Fats	127.4

IV. CONCLUSION

Normally, the cookies contain good amount of fats and carbohydrates but are not protein rich. Thus, the cookies are fortified, hence increasing the protein content. Moreover, it is also rich in phosphorus content and furthermore is cost effective.

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