

# Incorporation of Coriander seed Oil in Bread to Enhance its Nutritional Properties

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## ABSTRACT

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Coriander is a herbal plant that belongs to a family of Apiacea. It imparts flavor and aroma to many foods as well as provides numerous health benefits. The goal of this study is to enhance the nutritional properties of bread by utilizing coriander seed oil. Bread is a food, which is almost consumed by every other individual. Coriander is full of nutrients and contains essential fatty acids, which are required by our body and deals with multiple diseases. Over the years, essential oils have been considered as powerful antioxidant and are used as potent alternative of artificially synthesized antioxidant in preserving food. This oil is considered as a multifunctional as it has antiseptic, antifungal, anti-diabetic, anti-anxiety and many other properties. It provides tremendous health benefits as it improves digestion, help lower cholesterol, cough, bronchitis, diarrhea, insomnia and many more. It contains MUFA and PUFA, which lowers the LDL and total cholesterol level. Coriander is very popular for its antioxidant property, as its use is increasing in different parts of the world. According to the study results bread made from coriander seed oil showed good overall acceptability in terms of flavor, color, aroma and visual appearance and it can be used in different foodstuff to make them nutritious and full of health benefits.

**Keywords:** Coriander, petroselinic acid, anti-microbial, linoleic, linolenic, anti-fungal, linalool, antioxidant, anti-mutagenic, analgesic, anti-diuretic.

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## INTRODUCTION

Coriander (*coriandrum sativum*) belongs to a family of Apiaceae (Sourmaghi *et al.*, 2014) which is a herbal plant that grows annually and is a part of carrot family (Umbelliferae). Its seeds and leaves are mainly used for the flavoring of food (Mohite and Waghmare, 2020). Coriander is known by different names like dhania in Pakistan, parsley in China and cilantro in USA (Ashraf *et al.*, 2020). Coriander is chiefly produced in India, Pakistan, China, Bangladesh, Morocco, Russia and Central Europe but it is largely produced by India where its seeds and leaves are used for multiple applications of food, essential oil extraction as well as for its health benefits (Rathore*et al.*, 2013). Despite the fact that all parts of the plant possess medicinal property but its oil exhibits notable importance in preparation of medicines (Ashraf *et al.*, 2020). The essential oil is used for its scent and taste in foods, perfumes, cosmetics and pharmaceutical industry (Sourmaghi *et al.*, 2014). Coriander being a herb can be used as spice as well as for medicinal purpose (Darughe *et al.*, 2012). The oil of the spice can be used as an appetizer, carminative, antispasmodic and as a diuretic. Moreover, it is used for the treatment of numerous diseases which includes fever, nausea, convulsions, anxiety, cough, bronchitis, diarrhea, insomnia (Sourmaghi *et al.*, 2014) diabetes, ease out digestion complications and heart issues (Ashraf *et al.*, 2020). It also plays an important role in the growth and functioning of brain (Bhat *et al.*, 2014). Coriander is popular for imparting antioxidant, anti-microbial, analgesic, anti-diabetic, anti-mutagenic, diabetes modulating, neurological benefits and anti-anxiety property (Rizk *et al.*, 2022). Essential oils from scented medicinal plants have natural agents for preserving food. Over the years, essential oils have been considered as powerful antioxidant and are used as potent alternative of artificially synthesized antioxidant in preserving food. (Darughe *et al.*, 2012). Coriander seed is a small, soft and

weightless fruit which contains about 1.8% essential oil (Ashraf *et al.*, 2020) which in some cases ranges up to 2.8% depends on the type and source of the spice. The volatile oil contains useful phytonutrients in abundance, which includes carvone, geraniol, limonene, borneol, camphor, elemol, and linalool. Oil contains about 25-80% Linalool that is the vital component (Rathore*etal.*,2013). Consumption of coriander seed oil is increasing around the world because of its fatty acid content, which plays important role in human nutrition and health as it contains high content of petroselinic acid (72.6%) (Mohamed *et al.*, 2014). Coriander oil contains low amount of saturated fat (Bhat *et al.*, 2014) and contains essential fatty acids such as linoleic acid and linolenic acid, which are polyunsaturated fatty acids (PUFA) (Bhat *et al.*, 2014) and is an important constituent for retina and brain phospholipids. The omega-3 polyunsaturated fatty acids in coriander seed play vital role in protecting against diseases, which includes coronary artery disease, hypertension, diabetes, inflammatory diseases such as arthritis & dermatitis (Ertas, 2013). Coriander seed oil in a range of 0.05-0.15 plays important role in the prevention of primary and secondary oxidation (Bhat *et al.*, 2014). Essential oils composition and oil outcome differs, which depends on the cultivar, maturity of plant, extraction method, and conditions of cultivation (Singletary, 2016).

## MATERIALS AND METHODS

### Materials:

The ingredients used in the formulation of bread were wheat flour, sugar, salt, egg, yeast, and coriander oil. The raw materials were weighed according to the formula of proportions listed in Table 1 for bread making:

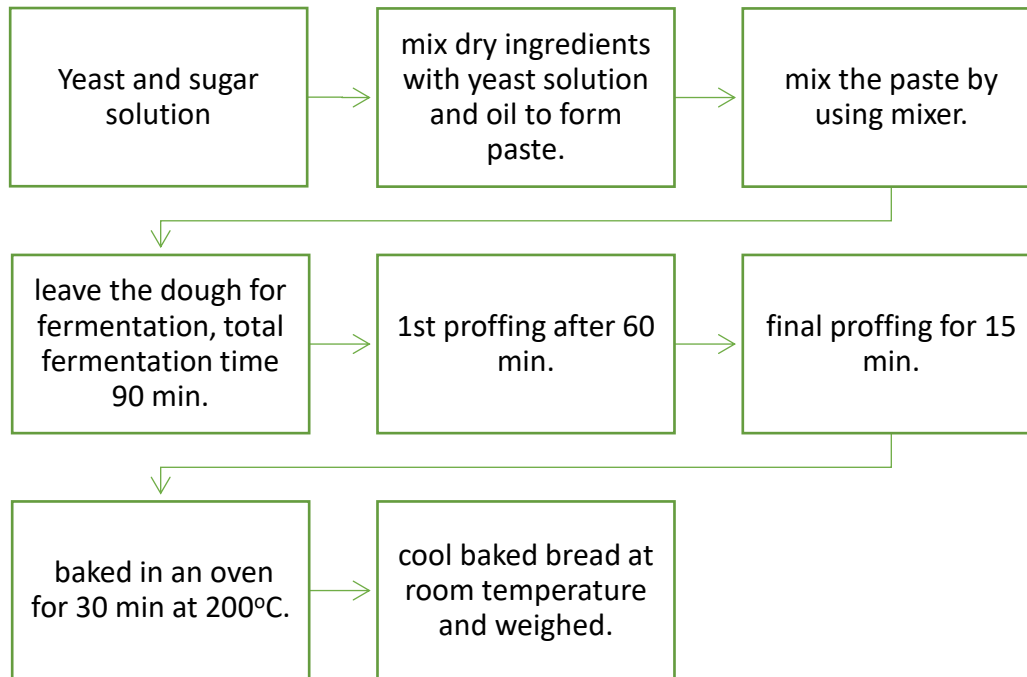
**Table 1. The bread formulation**

Ingredients	gm or ml
All-purpose flour	100
Yeast	1.3
Sugar	10
Salt	1
Milk powder	4
Coriander oil	10
Water	55
Total	181.3

### Bread making:

The straight dough method was used to make a bread dough. First yeast and sugar was dissolved in luke warm water at 28°C and the dry ingredients was mixed with yeast mixture and coriander oil to form a paste. The mixer was used to mix the paste at low speed for 2 min, followed by mixing at high speed for 6 min. After the complete mixing of dough, it was greased with coriander oil, cover and left for fermentation in warm place, the total fermentation time was 90 min. After the completion of first 60 min the dough was carried out, punched and place back for proofing. After 15 min the second punched was take place. The

dough was shaped, weighed and left for final proofing for 15 min. the conventional baking was done at 200°C in an oven for 30 min. the oven was preheated to set the oven temperature before placing the dough in it. The baked bread was taken out, cooled at room temperature for 1hr and weighed.(Lin *et al.*, 2009)



**Figure 1. Flow daigram of bread making**

**Method of coriander oil physiochemical quality tests:**

The physiochemical characteristics of coriander seed oil was determined by refractive index, specific gravity, color, appearance, pH (Anwar *et al.*, 2011) and peroxide value (PV).

**Refractive Index:**

The digital refractometer was used to check the refractive index (RI) of the coriander seed oil.

**Specific Gravity:**

The specific gravity was determined by simple RD bottle method.

S.G= Density of object/Density of water.

**pH:**

The pH of oil was determining by digital pH meter.

**Peroxide value:**

The peroxide value (PV) of coriander oil was determined according to method, by the reaction of 25 ml solvent mixture of glacial acetic acid: chloroform (3:2, v/v) with 2 gm coriander seed oil and with freshly prepared potassium iodide solution. The solution was placed in a dark place for 5 min, 1% soluble starch was added as an indicator and then it was titrated with 0.01N solution of sodium thiosulfate. The titration

continues until the blue color disappeared. The blank was also prepared. (MIRONEASA and CODINA.,2015). The PV of oil was determined by following formula:

$$PV = (V_s - V_b) * N * 1000 / \text{Weight of sample.}$$

**Bread quality analysis:**

**Physical quality:**

The physical characteristics of bread made with coriander oil determined was hardness, crust thickness, specific volume and moisture content.

**Hardness and crust thickness:**

Hardness and crust thickness of dough was determined by using texture analyzer.

**Moisture content:**

Moisture content of coriander seed oil bread was determined by using digital moisture analyzer.

**Sensory quality:**

Sensory analysis was conducted by using hedonic scale in order to analyze the acceptability of bread prepared with coriander seed oil. Numerous sensory parameters such as color, flavor, aroma, visual appearance and over all acceptability was analyzed.

**RESULTS AND DISCUSSION**

**Physical quality of oil**

The values of refractive index (25°C) and density (25°C) of coriander seed oil were found to be 1.466 and 0.86 gm/cm<sup>3</sup>, respectively (Table 2). The refractive index and density are very important parameters used to determine the purity of oils. The values of refractive index and density of coriander seed oil were found slightly lower than those reported by (Anwer *et al.*, 2011), 1.462-1.472 and 0.863-0.875 and the PV value of oil was 0.8, respectively. The oil showed a pale yellow color with liquid like appearance when inspected visually

**Table 2.** Physical quality parameters of coriander oil

S.No	Parameter	Present Study	Literature Data	Refrences
1	Peroxide value	0.8	Not found	
2	Refractive index (25°C)	1.466	1.4620-1.4720	(Anwer et al., 2011)
3	pH	4.6	Not found	
4	Physical color and appearance	Pale yellow liquid	Colorless to pale yellow liquid	(Anwer et al., 2011)
5	Density (g/cm <sup>3</sup> , 25°C)	0.862	0.863-0.875	(Anwer et al., 2011)

### Quality analysis of bread:

#### Physical quality analysis:

The hardness of bread determined by texture analyzer was 23 and moisture content found was 34% which was lower than standard value (Table 3). The hardness and moisture content of bread was very important characters which were used to determine the softness, freshness, crispiness and the effect of high making time and temperature on bread's quality.

**Table 3. Physical qualities of bread**

S.No	Parameter	Result	Standard
1	Hardness	23	Not found
3	Moisture content	34%	38%

#### Sensory analysis of bread:

Sensory analysis was performed by using hedonic scale rating with 1 being extremely dislike, 4 being like nor dislike and 7 being extremely like to analyze the acceptability of bread prepared with coriander seed oil.

**Table 4. Sensory evaluation of bread**

S.No	Parametrs	Result
1	Visual appearance	Uniform and Regular shape
2	Aroma	Fresh coriander aroma
3	Taste	Pleasant and coriander flavor
4	Chewiness	Easy to masticate
5	Crust color	Golden brown
6	Crust character	Moderately thick, soft and slightly dry
7	Crumb color	White
8	Crumb character	Soft, open, airy fine cells, spongy and moist.

## CONCLUSION

Bread made from coriander seed oil showed good overall acceptability in terms of flavor, color, aroma and visual appearance. The aim of this study was to enhance the nutritional profile of bread as it is consumed every other individual on daily basis. Coriander is an aromatic herb, which can be used in food, perfumes and in pharmaceutical industry. Apart from spice, it is also used for medicinal purpose and provides protective & preventive action against number of chronic diseases. It is very low in saturated fat and is a rich source of essential fatty acids such as linolenic acid, linoleic acid, omega-3 fatty acids. It provides antimicrobial activity, antidiabetic activity, antioxidant activity and antianxiety activity and can be used in other food products. Coriander seed oil act as a preservative and increase the shelf life of food.

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