

# PRELIMINARY STUDIES TO ASSESS THE SUITABILITY OF UTILIZING CORRIANDER LEAF EXTRACT IN PRODUCTION OF FLAVORED BUTTER

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ABSTRACT

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*Flavored butter is prepared by seasoning pasteurized unsalted butter with herbs, spice or other flavorings. So far, no standardized procedure has been adopted to prepare flavored butter commercially. Preliminary study has been carried out to investigate the suitability of utilizing Coriandrum sativum leaf extract which is a very common kitchen ingredient in Indian households for producing flavored butter as it has proven antioxidant property. In the present study, the leaf extract was incorporated at 400, 600 and 800ppm levels to the pasteurized butter. The physical properties of leaf extract and its influence on proximate composition and sensory attributes of the flavored butter was studied. The flavored butter containing 600ppm of leaf extract received higher consumer acceptance. Further, it was noted that the extract exhibited good dispersibility in butter emulsion. From the studies, least variance in the composition of the treatments and control was observed which is due to the level of incorporation of leaf extract.*

**Keywords:** Flavored butter, coriander, natural antioxidant, natural additives

## 1. INTRODUCTION

Butter is a popular ingredient used in preparation of many dairy delights, frozen entrees, baked foods, confections and sauces. Producing flavored butter in a variety of natural and artificial flavors is not a new concept. The butter in which additional flavor ingredients are infused purposefully is termed as 'compound butter' or 'flavored butter'. Flavored butter is prepared by seasoning pasteurized unsalted butter with herbs, spice, wine or other flavorings. It is an existing practice in foreign households. The home-made flavored butter is used to quickly season meat, poultry, fish or vegetables so as to add unique flavor and mouth feel to the product. Many flavor combinations like fig, cranberry, garlic, roasted red pepper, horse radish, chive, Mexican herb, Italian

herb, basil, parsley, sage, rosemary, ginger, lime, almond-lemon, orange-cinnamon, black olive-rosemary have been tried so far depending upon the need, availability of the flavor ingredients and desirability.

Khalaf *et al.*, (2007) cited that extracts of many higher plants have been found to contain appreciable amounts of phenolic antioxidants, tocopherols and flavonoids which possess antiageing, anticarcinogenic, and cardioprotective effects. Coriander (*Coriandrum sativum*) is one such annual herb in the family Apiaceae. It is an important spice crop which occupies a prime position in Indian kitchen but least utilized. Coriander is available throughout the year providing a fragrant flavor that is reminiscent of both citrus peel and sage. Coriander contains active

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phenolic acid compounds including caffeine and chlorogenic acid. The flavonoids include quercetin, beampferol, rhamnotic and apigenin. Most of these compounds are known to inhibit free radicals generated in the cellular system. No standardized practice has been so far adopted to prepare flavored butter commercially on a large scale.

Preparation of flavored butter using coriander extract is possible as butter acts as a carrier for flavor compounds and aids in the even distribution of oil-soluble flavors throughout the product. By solubilizing the flavor producing compounds butter retain the infused flavor. The current study is carried out to investigate the suitability of utilizing *C. sativum* leaf extract for production of flavored butter thereby incorporating underutilized functional ingredient with antioxidant potential may open up new opportunity to produce flavored butter free from preservatives. Further, it has been observed that coriander leaf extract has antioxidant potential which can act as natural antioxidant to extend the shelf life of butter.

## 2. MATERIALS AND METHOD

### 2.1 Materials

2.1.1 Unsalted Butter (Brand: Amul)

2.1.2 Fresh Coriander Leaves

### 2.2 Methodology

#### 2.2.1 Preparation of coriander leaf extract

Fresh, young leaves of coriander was collected, authenticated, washed and soaked in water for 3 hours. The leaves were then allowed to dry at room temperature for 24 hours. The dried leaves were then ground to fine powder. Water was added at 10:1 ratio (v/w) to the powdered leaf and concentrated by boiling to one-tenth of its volume. The mixture was filtered using whatman no. 1 filter paper to obtain a clear aqueous extract as described by Sidhuraju and Becker (2003). The prepared leaf extract was stored in light-resistant brown glass bottles at 4°C for subsequent usage.

#### 2.2.2 Preparation of flavored butter

At the laboratory scale, flavored butter was prepared by softening unsalted butter at room temperature and the leaf extract is infused to butter using an electric mixer set to function at medium speed until the flavor ingredient completely got distributed throughout the butter. The extract was incorporated into butter at three different concentrations, i.e. 400 ppm (T1), 600 ppm (T2), and 800 ppm (T3), and compared with control. The butter was then allowed to cool for at least an hour to facilitate flavor development. Later, the same was packed in aluminum foil and refrigerated to harden.

#### 2.2.3 Physical Evaluation of coriander leaf

The physical parameters like moisture (hot air oven method), loss on drying, extractive value and total ash of coriander leaf was determined by the method described by Shalini and Mohanty (2013).

#### 2.2.4 Butter quality analysis

The proximate parameters like moisture, fat and fat free dry matter content of the treatment and control butter sample was assessed as per the standard procedure described in AOAC manual (1995). The most preferred combination was identified by conducting consumer acceptance test by serving the samples to a group of untrained sensory panelists by using 9-point hedonic scale.

## 3. Results and Discussion

In the current study, flavored butter was prepared by adding coriander leaf extract at (T1) 400ppm, (T2) 600ppm and (T3) 800ppm levels to the unsalted butter samples respectively. The physical properties of *C. sativum* leaf and extract, influence of leaf extract on proximate composition of butter and sensory attributes of coriander flavored butter are presented as follows:

#### 3.1 Physical properties of *C. sativum* leaf and extract

The physical properties like moisture content, loss on drying, yield, extractive value and total ash content of *C. sativum* leaf are presented

in table-1. In the present study, it was noted that approximately 20-24g of fine dried leaf powder could be obtained by drying 100g fresh coriander leaf under normal drying conditions. The solubility of the extract holds great significance in the current study as it determines the suitability of the extract to be used in flavored butter formulation. The extract solubility value and total ash content of the *C sativum* was found to be in agreement with the results obtained by Shalini and Mohanty (2013). The authors cited that the extract from coriander leaf is soluble both in water and alcohol. Hence in the present study, the matter of dispensability of leaf extract was not challenging as butter exhibits water-in-oil type emulsion. The main reason is that, the fat present in the butter acts as flavor carrier and thereby aids in uniform distribution of extract throughout the sample upon uniform mixing at slow speed. Hence, distribution of flavor may not be a problem in formulation of flavored butter, as butter itself acts as flavor carrier and almost all the volatile components present in the extracts are fat soluble in nature.

### **3.2 Influence of leaf extract of *C. sativum* on the proximate composition of butter**

The influence of *C sativum* on the proximate composition of treatment (T1, T2 and T3) and control butter are presented in table-2. From, the current study it was noted that, the treatment samples did not have any negative effect on the composition and sensory attributes of butter. Fat, Fat free matter and moisture content of all the treatments were almost identical to the control ( $p>0.05$ ). Thus, the incorporation of *C sativum* did not pose any problem to the standard of the butter. The result obtained in the current study was in agreement with Nadeem et al. (2013) who conducted similar studies by incorporating *Moringa olifera* leaf extract on butter. The reason for the observation of least variance in the composition of the treatments and control is due to level of incorporation of *C sativum* extract was too low to bring about the change. In addition, the

minimum fat loss in treatment samples may also be attributed due to the melting loss resulted during blending of butter. However, this difference in values have not attributed to existence of highly significant difference in between the samples.

### **3.3 Consumer acceptance test**

The results of sensory evaluation of *C sativum* flavored butter incorporated with different levels of leaf extract is presented in table-3. Addition of leaf extract up to (T2) 600ppm did not have any negative effect on taste, flavor, color, appearance and overall acceptability of the flavored butter. But, as the level of incorporation increased to (T3) 800ppm, the sensory scores on the parameters decreased ( $p>0.05$ ). This may be due to strong coriander flavor perseverance and development of bright green color in the flavored butter which made the leaf extract not acceptable above 800ppm level.

Overall, T2 sample received higher consumer acceptance. From the study, it was also observed that both T2 and T3 samples retained all sensory attributes even after 30th day of storage at refrigerated temperature. The results obtained in the present study was in agreement with Nadeem et al. (2013) who found that 600ppm concentration of moringa leaf extract retained sensory attributes of butter stored at refrigeration temperature till 60th day of storage.

## **4.CONCLUSION**

From the above studies, it can be concluded that, *C sativum* leaf extract at 600ppm level can be used effectively in the production of coriander flavored butter. When the flavored butter is properly packed in aluminum foil and stored under refrigerated condition it can retain sensory attributes till 30 days of storage. Further studies have to be conducted to investigate the potential of *C sativum* leaf extract as natural antioxidant in stabilization of butter at different storage conditions to eliminate the use of artificial preservatives and food additives.

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**Table 1- Physical properties of *C. sativum* leaf extract (mean  $\pm$  SD)**

Parameters	Coriander leaf extract
Moisture (%)	48.24 $\pm$ 0.32
Loss on drying (% w/v)	0.72 $\pm$ 0.05
Yield (% w/w)	24.31 $\pm$ 0.51
Extractive Values (% w/v)	
Water soluble extractives (% w/v)	2.1 $\pm$ 0.03
Alcohol soluble extractives (% w/v)	1.4 $\pm$ 0.06
Total Ash (% w/v)	10.8 $\pm$ 0.13
Acid soluble (% w/v)	3.5 $\pm$ 0.18
Water soluble (% w/v)	7.1 $\pm$ 0.48

**Table 2-Influence of the leaf extract of *C. sativum* on the proximate composition of butter**

Parameters	Control	Treatments		
		T1	T2	T3
Fat (%)	83.16 $\pm$ 0.48	82.98 $\pm$ 0.97	82.53 $\pm$ 0.84	81.72 $\pm$ 0.42
Fat free dry matter (%)	2.05 $\pm$ 0.21	2.13 $\pm$ 0.14	2.21 $\pm$ 0.63	2.18 $\pm$ 0.51
Moisture content (%)	15.02 $\pm$ 0.13	14.62 $\pm$ 0.25	15.2 $\pm$ 0.06	16.1 $\pm$ 0.49

(mean  $\pm$  SD)

**Table 3-Influence of *C. sativum* on sensory scores (mean  $\pm$  SD) of butter stored at refrigeration temperature**

Period of observation	0 <sup>th</sup> Day			15 <sup>th</sup> Day			30 <sup>th</sup> Day					
	C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3
Color	8.7 $\pm$ 0.21	8.80 $\pm$ 0.64	8.77 $\pm$ 0.16	8.80 $\pm$ 0.36	8.5 $\pm$ 0.03	8.53 $\pm$ 0.42	8.3 $\pm$ 0.34	8.01 $\pm$ 0.98	8.1 $\pm$ 0.21	7.80 $\pm$ 0.64	7.80 $\pm$ 0.16	7.37 $\pm$ 0.36
Taste	8.7 $\pm$ 0.22	8.6 $\pm$ 0.33	8.7 $\pm$ 0.72	8.01 $\pm$ 0.22	8.5 $\pm$ 0.33	8.4 $\pm$ 0.23	8.5 $\pm$ 0.14	7.9 $\pm$ 0.22	8.3 $\pm$ 0.46	8.3 $\pm$ 0.11	8.0 $\pm$ 0.52	7.3 $\pm$ 0.23
Smell	8.8 $\pm$ 0.16	8.7 $\pm$ 0.23	8.7 $\pm$ 0.37	8.2 $\pm$ 0.18	8.6 $\pm$ 0.07	8.62 $\pm$ 0.04	8.5 $\pm$ 0.35	8.1 $\pm$ 0.48	8.4 $\pm$ 0.24	8.50 $\pm$ 0.39	8.3 $\pm$ 0.24	8.2 $\pm$ 0.13
Acceptability	8.7 $\pm$ 0.32	8.5 $\pm$ 0.31	8.77 $\pm$ 0.16	8.1 $\pm$ 0.04	8.48 $\pm$ 0.13	8.1 $\pm$ 0.58	8.4 $\pm$ 0.12	7.9 $\pm$ 0.13	7.6 $\pm$ 0.45	7.50 $\pm$ 0.86	7.20 $\pm$ 0.55	6.6 $\pm$ 0.22

# Sensory scores in mean  $\pm$  SD. Average of six trails.

C- Pasteurized butter

T2– Pasteurized butter containing 600ppm leaf extract

T1 – Pasteurized butter containing 400ppm leaf extract

T3– Pasteurized butter containing 800ppm leaf extract