

Spiced Garlic Flakes: Value Addition Done in Kodaikanal Hill Garlic (*Allium Sativum.L*)

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Abstract

Value addition aims to transform raw produce into value-added products with increased desirability and utility for consumers and markets. This study aims to produce Value-added products using garlic, like spiced garlic flakes, in kodaikanal hill garlic. Authentication was done for kodaikanal hill garlic, after procuring varieties of garlic collected from Theni, Dindigul, and Madurai districts. In this study, an attempt has been made to expand the use of garlic into a wider range and increase shelf life. An attempt made to improve the lifestyle of the farmers growing garlic in the hilly region of Kodaikanal.

Index Terms: Cabinet drying, Garlic flakes, Shade drying, Solar drying, Sun drying. Authentication.

I. INTRODUCTION

Garlic (*Allium Sativum.L*) is one of the important bulb crops grown and used as a spice or condiment throughout India. It has a higher nutritive value than any other bulb crop. It is rich in protein, phosphorous, potassium, calcium, magnesium, and carbohydrates. It is a remedy for a variety of ailments and is also known for its medicinal uses as an antibiotic, anti-thrombotic, and antineoplastic agent. Over 3000 studies conducted in the past have substantiated the effectiveness of garlic in preventing and treating various ailments, thereby validating its traditional medicinal applications. It has been used for thousands of years for culinary, medicinal and spiritual purposes. Kodaikanal hill garlic is one of the variety known for its medicinal importance apart from culinary purposes.



S.P. Rana et.al. (2011) stated that Garlic has historically been used to treat aches and pains, leprosy, deafness, diarrhoea, constipation, parasitic infection, and fever and to relieve stomach aches. Garlic is commonly used to treat chronic bronchitis, recurrent upper respiratory tract infections, and influenza. In India and Europe, garlic is used to treat coughs, colds, hay fever, and asthma.

II. OBJECTIVES

- To identify the various forms of garlic available in and around Dindigul, Theni, and Madurai districts.
- Procurement of a variety of garlic.
- Authentication was done for kodaikanal hill garlic.
- To do value-added products (spiced garlic flakes) from Garlic.

III. REVIEW OF LITERATURE

A. History of garlic:

According to Sethi Neeraj *et.al.*, (2014), The letter garlic is derived from the old English word garlic i.e. spear leek. The “gar” means spear (referring to spear-shaped leaves) and “leac” means leek. The origin of garlic dates back from 5000 to 6000 years.

In 1858, Pasteur noted garlic’s antibacterial activity, and it was used as an antiseptic to prevent gangrene during World War I and World War II. According to Michele Meyers (2006), over the years, garlic has gone by many names including the “stinking rose” and poor man’s treacle (or cure-all).

Egyptian and Indian culture	5000 years ago
Babylonians	4500 years ago
China	2000 years ago
Kingdom	<i>Plantae</i>
Division	<i>Magnoliophyta</i>
Class	<i>Liliopsida</i>
Sub-class	<i>Lilidae</i>
Order	<i>Liliales</i>
Family	<i>Liliaceae</i>
Genus	<i>Allium L.</i>
Species	<i>A. sativum</i>

Source:USDA

B. Taxonomy of Kodaikanal hill garlic:

Botanical name	<i>Allium Sativum.L</i>
Color	White or pale yellow
Size	Around 2-3 cm in height
Diameter	0.5 – 1.5 cm
Weight	Each bulb weighs 20-30 grams in average
Shape	Rain-drop shaped bulb

Source: Geographical Indication journal



III. METHODOLOGY

A. Collection of different varieties of garlic:

Varieties of garlic were obtained from different regions including Kodaikanal, Madurai, Theni, and Dindigul districts. For instance, Mettupalayam A, Mettupalayam B, Mettupalayam C, Ooty, and Kodaikanal single clove varieties were sourced from Madurai and Kodaikanal. The remaining varieties were acquired from Periyakulam in Theni.



B. Authentication for Kodaikanal hill garlic:

After procuring varieties of garlic, authentication was done to find the original species. It was done in herbarium by Dr. Ramasubbu,

C. Preparation of dried garlic flakes using different varieties of garlic:

Drying:

Drying is one of the oldest and most important methods of preserving food. It is the application of heat under controlled conditions to remove water by evaporation. It involves the reduction of the moisture content of the food to the level where microbial growth is inhibited and the rate of deteriorative chemical reactions is minimized.

Types of drying:

- Sun drying
- Shade drying
- Solar drying
- Cabinet drying

Preparation of dried garlic flakes:

- Different varieties of garlic were procured from Kodaikanal, Vadugapatti, and local markets of Madurai.
- The garlic was peeled, and washed priorly to remove dust particles.

- Peeled garlic was then thin-sliced for a uniform and quick drying process.
- Each variety was portioned into 25 grams.
- Each variety was dried under sun, solar, cabinet, and shade drying.
- Dried garlic flakes were stored under ambient temperature.



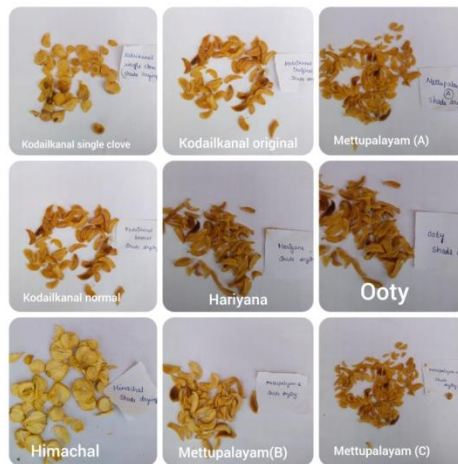
Solar-dried garlic flakes



Cabinet-dried garlic flakes



Sun-dried garlic flakes



Shade-dried garlic flakes

D. Preparation of spicy garlic flakes using dried garlic flakes:

- 100 grams of garlic sourced from Kodaikanal hills in Poomparai, Kodaikanal.
- The garlic underwent a preliminary washing process to eliminate any dust particles before peeling.
- Following peeling, the garlic was thinly sliced to ensure uniformity and expedite the drying process.
- Subsequently, the sliced garlic was dried in a cabinet dryer for a duration of two days at a temperature of 70°C.
- The dried garlic flakes were then fried like chips.
- Various seasonings such as pepper powder, chilli powder, and salt were added to enhance the flavour of the flakes.
- It is stored for shelf life analysis.
- Sensory analysis was also done for these flakes.



Chilli powdered garlic flakes



Pepper powdered garlic flakes

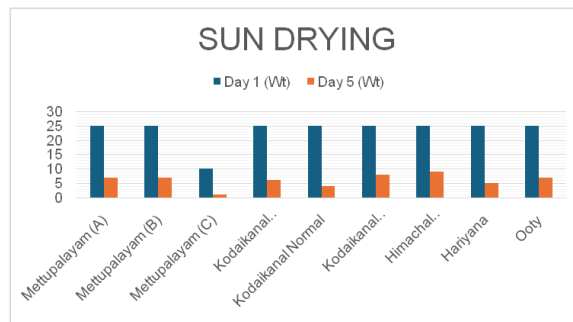


Salted garlic flakes

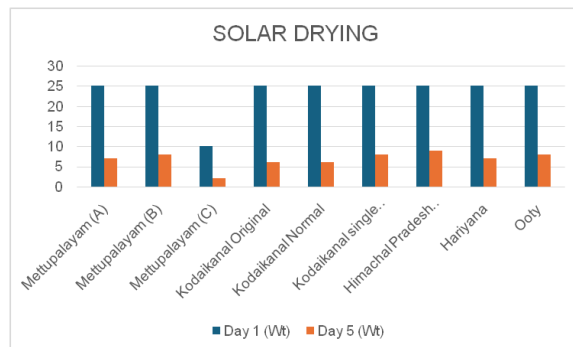
IV. RESULTS AND DISCUSSION

The products were prepared after drying the garlic using different types of garlic. The drying rate varies. The sensory evaluation, phytochemical and proximate analysis were done

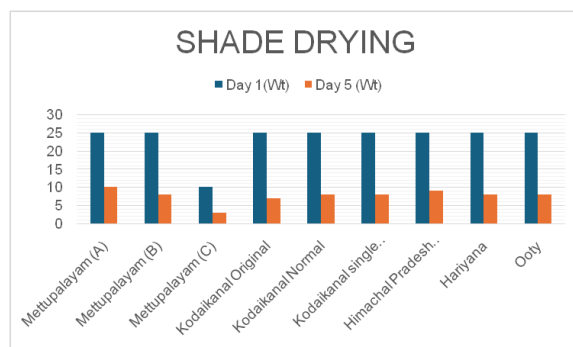
Drying rate analysis of garlic varieties:



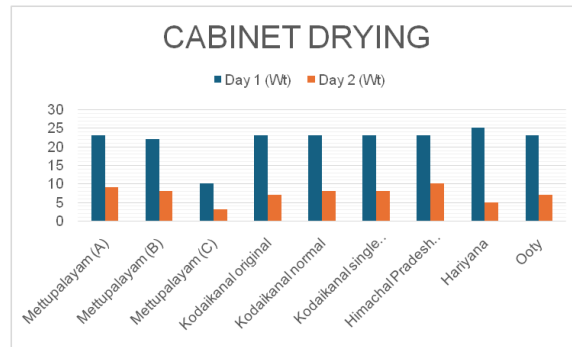
Drying rate for sun drying



Drying rate for solar drying



Drying rate for shade drying



Drying rate for cabinet drying

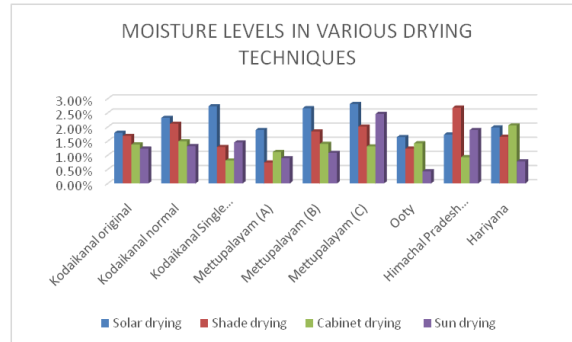
- The garlic was dried for 5 days using various drying techniques. When it comes to drying garlic efficiently and effectively, the cabinet dryer is the optimal choice compared to solar dryers, sun dryers, and shade drying methods.
- Sun drying and shade drying methods lack the precision and reliability of the cabinet dryer, often resulting in uneven drying and potential loss of garlic flavor and nutrients.
- With the cabinet dryer, garlic can be dried evenly at the ideal temperature and humidity levels, preserving its quality, flavor, and nutritional value. Additionally, the cabinet dryer minimizes the risk of contamination and spoilage, providing a hygienic and safe drying environment.
- Overall, the cabinet dryer is the preferred choice for ensuring high-quality dried garlic with optimal flavor, texture, and shelf life.

A. Moisture analysis for different varieties of garlic flakes:

Moisture content is the quantity of water contained in a food material. Excess moisture can increase the microbial growth rate, leading to spoilage. The moisture content of dried different varieties of garlic flakes was measured using a moisture analyzer machine.

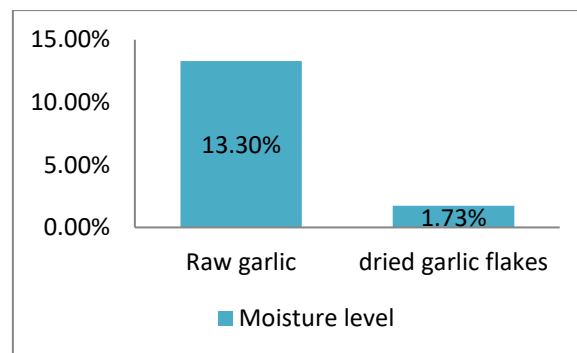
Garlic varieties	Moisture percentage			
	Sun dry	Solar dry	Shade dry	Cabinet dry
Kodaikanal original	1.23	1.79	1.68	1.38
Kodaikanal normal	1.32	2.32	2.11	1.49
Kodaikanal single clove	1.45	2.73	1.29	0.81
Mettupalayam (A)	0.89	1.89	0.74	1.11
Mettupalayam (B)	1.08	2.66	1.84	1.40
Mettupalayam (C)	2.46	2.81	2.01	1.31
Ooty	0.43	2.64	1.23	1.42
Himachal single	1.89	2.73	2.68	0.93

clove				
Hariyana	0.78	1.98	1.65	1.05



It is observed from the table and graph that cabinet drying is best in all aspects including color, flavour, and texture.

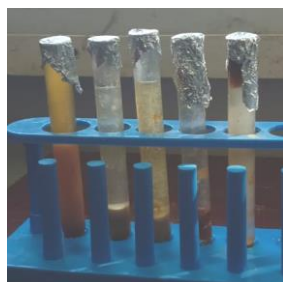
Garlic derivatives	Moisture percentage
Raw garlic	13.30%
Dried garlic flakes	> 3%



B. Proximate and Phytochemical analysis for different varieties of garlic flakes:

Proximate analysis stands for a method, which determines the values of the macronutrients in food sample. It includes moisture, protein, crude fiber, fat etc. Analysis of the Phytochemical properties of the garlic flakes used to show and isolate the lead compounds of the plant. The unique biological activity of the plants can be identified by their Phytochemical properties. It includes tannins, alkaloids, saponins, terpenoids, flavonoids etc.

Different varieties of garlic which were procured from different regions were dried and ground to powdered form for the analysis. The presence of Phytochemical components was indicated by the positive sign (+) and the absence of phytochemical components by the negative sign (-) as shown in the table.

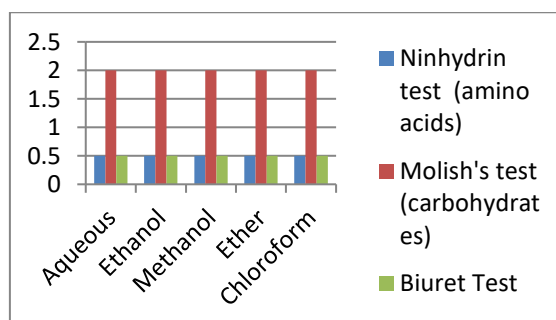


Garlic powder sample

Phytochemical analysis for dry garlic powder

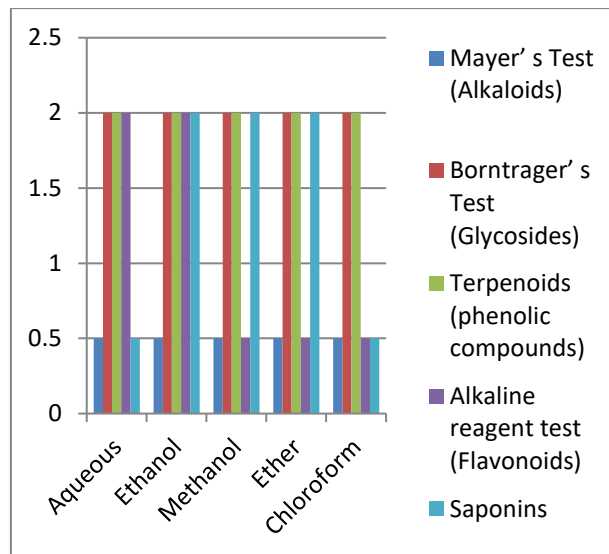
Proximate analysis:

Proximate test	Aqueous	Ethanol	Methanol	Ether	Chloroform
Ninhydrin test (Amino acids)	-	-	-	-	-
Molish's Test (Carbohydrates)	+	+	+	+	+
Biuret Test (protein)	-	-	-	-	-



Phytochemical analysis:

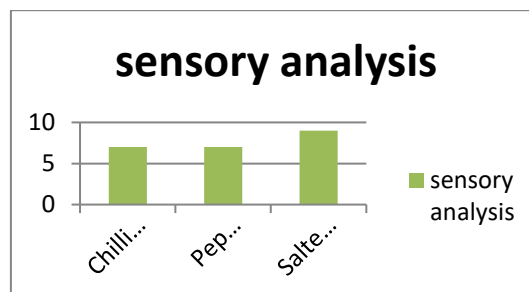
Phytochemicals test	Aqueous	Ethanol	Methanol	Ether	Chloroform
Mayer's Test (Alkaloid)	-	-	-	-	+
Borntrager's Test (Glycosides)	+	+	+	+	+
Terpenoids (phenolic compounds)	+	+	+	+	+
Alkaline reagent Test (Flavonoids)	+	+	-	-	-
Saponins	-	+	+	+	-



The presence of alkaloids and flavonoids are observed in dry garlic powder. Phenolic compounds are decreased after drying. Saponin content in dry powder is decreased in ethanol and chloroform.

Sensory evaluation:

Products	Overall acceptability of the product
Chilli powdered garlic flakes	7
Pepper powdered garlic flakes	7
Salted garlic flakes	9



The products showed best keeping quality after fifteen days of storing in air tight pouches, cardboard pouches.

V. SUMMARY AND CONCLUSION

The study on “Spiced Garlic Flakes -Value Addition Done In Kodaikanalhill Garlic (*Allium Sativum.L*)”. Different types of garlic were procured from the markets of Theni, Madurai, and Dindigul districts. Authentication was done for Kodikanal hill garlic. All the garlic was peeled, weighed, and dried. Moisture level was analyzed. Products like spiced garlic, pepper garlic etc. were done. Phytochemical, proximate analysis were done. Moisture level were checked and Sensory evaluation was done.

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