IJMPR 2019, 3(5), 50-53

International Journal of Modern Pharmaceutical Research
www.ijmpronline.com

ISSN: 2319-5878
IJMPR
Research Article
SJIF Impact Factor: 5.273

NUTRITIONAL COMPOSITION OF CARDAMOM (*ELETTARIA CARDAMOUM*) SEED CULTIVATED IN ETHIOPIA

Sileshi Abera*[1], Belay Gezahegn[1] and Biruk Hirko[2]

[1]Food Science and Nutrition Research, Ethiopian Institute of Agricultural Research, Teppi Agricultural Research Center, P.O. Box 34, Teppi, Ethiopia.
[2]Crop Research, Ethiopian Institute of Agricultural Research, Teppi Agricultural Research Center, P.O. Box 34, Teppi, Ethiopia.

Received on: 02/09/2019
Revised on: 23/09/2019
Accepted on: 13//10/2019

***Corresponding Author**
Sileshi Abera
Food Science and Nutrition Research, Ethiopian Institute of Agricultural Research, Teppi Agricultural Research Center, P.O. Box 34, Teppi, Ethiopia.

ABSTRACT

This study aimed to study the nutritional composition of released variety of Cardamom (Elettaria cardamomum Maton) cultivated in Ethiopia. Therefore our country Ethiopia has one released variety of cardamom and this study showed that the analyzed composition of the cardamom variety which found in Ethiopia is between in the ranges of different countries cardamom variety. The results of the analysis shows that it contains 8.51 % moisture, 6.72 % ash, 9.29 % crude protein, 10.025 % Oleoresin, 8.01 % Essential oil, 24.14 % crude fiber and 41.08 % total Carbohydrate. Its macro and micro mineral content were calculated to be rich where Calcium (Ca), Potassium (K), Magnesium (Mg), Phosphorus (P), Sulfur (S), Manganese (Mn), Iron (Fe) and Zinc (Zn) were determined at the amount of 109.87, 843.28, 102.76, 151.29, 37.14, 29.32, 11.66 1.573 mg/100g respectively. As it seen from different studies the crude fiber and Potassium content of Ethiopian cardamom was greater than other countries result.

KEYWORDS: Cardamom, Ethiopia, Nutritional, Mineral and Essential oil.

1. INTRODUCTION

The cardamom *Elettaria cardamomum* (L.) Maton (*Zingiberaceae*), commonly known as queen of the spices is native to South Asia but is commercially cultivated in Southern India on the shady slopes of Ghats (mainly in Kerala, Tamilnadu and Karnataka), Sri Lanka, Guatemala, Nepal,Mexico, Thailand, Tanzania and Central America.[1-2] The chemical of composition of cardamom has been extensively documented,[3-7] as have studies involving the colour and storage properties of the capsule of cardamom.[8-9] Natural products have garnered the attention of many researchers in recent years as complementary and alternative antimicrobial agents.[10] Cardamom is used for flavoring various food preparation, confectionery, perfumes, beverages, liquors and preparation of medicine in India and other countries. In medicine it is used us a powerful aromatic, stimulant, carminative, stomachic and diuretic, but rarely used alone. It also checks nausea and vomiting helps in combating digestive ailments. Herbal lores on this spice suggest that can be used to freshen breath and support smooth digestion.[11] Research has implicated cardamom potential therapeutic value as an inhibitor of human platelet aggregation.[12]

In Ethiopia whole and ground cardamom seeds are added to flavor coffee, tea, confectionery and baked foods. The efficiency of the EOs depends on its chemical composition, genotypes, environmental, and agronomic conditions.[13]

Researches have shown that the quantitative composition is widely influenced by the genotype, development, and environmental and growing conditions.[14–15] It also implies the possibility of different medicinal uses of the same plant species grown in different regions.[16] In the present study one Cardamom samples obtained from Tepi Agricultural Research center were used the objectives of the present study were an exhaustive study on these Cardamom samples with respect to chemical analysis. No previous reports are available on the chemical analysis of these Gene variety of cardamom.

2. MATERIALS AND METHODS

2.1. Sample collection and preparation

Fresh Cardamom Gene Variety capsule used in this study was collected from the filled site of Tepi Agricultural Research Center, Ethiopia. The samples were cleaned manually to remove all foreign matter, dust and dirty and immature capsule. The required plant materials were air dried for two week. After air drying, the seeds were powdered, sieved in 0.5 mm mesh size and divided in to three parts, and is used for triplicate analysis.

2.2. Proximate composition analysis

Proximate composition including moisture, protein, total carbohydrate, ash and mineral content were determined as per the method given by AOAC, (2005).[17]

2.3. Oleoresin determination

Ten (10) gm of powder Cardamom sample were taken into a thimble and placed in a Soxhlet apparatus 300 mL of hexane was added and extracted according to their boiling point for six hours. After completion of extraction the dark black extract was then cooled, concentrated using rotary evaporator get a crude dried extract yield was calculated based on dry weight of plant material.

2.4. Essential oil determination

Essential oil content of cardamom seed were determined by hydro-distillation. Three replicates were distilled simultaneously for oil extraction and the oil were weighed and stored in dark at 4^{o}C. The yields obtained were averaged and calculated based on dry weight of the plant material.

3. RESULTS AND DISCUSSION

3.1. Proximate composition of cardamom

The data pertaining to the proximate composition of cardamom with respect to moisture, protein, crude fiber carbohydrates and ash content were determined and results obtained are depicted in table 1.

Table 1: Proximate composition of cardamom (Gene variety).

Types of analysis	%
Oleoresin	**10.025**
Essential oil	**8.01**
Moisture	**8.51**
Ash	**6.72**
Protein	**9.29**
Crud fiber	**24.14**
Carbohydrate	**41.08**

Table 1: represents the proximate analysis were total carbohydrate contents were found as the most dominant nutrient in Ethiopian cardamom seeds that were resolute at the amount of 41.08 % which is less than to the carbohydrate value of Indian cardamom seed reported by Sontakke *et al*., (2018).[18] and Padmakumari Amma *et al*., (2010).[19] Subsequently crude fiber was originated as 24.14 % which was the second for most nutrient in this analysis but found to be 10.08 % and 2.10 % greater than the reported values of cardamom seed Padmakumari Amma *et al*., (2010).[19] and Shankara charya *et al*., (1990) respectively.[20] Following then the oleoresin content was estimated as the amount of 10.025 %. The moisture content was estimated as the amount of 8.51 % where as the Indian seeds were determined as in the range of 10.33 % to10.75 % as reported values Sontakke *et al*., (2018).[20] The protein content 9.29% which was 4.25 less than Indian cardamom Padmakumari Amma *et al*., (2010).[19] and 3.29 % greater than the reported values of Shankaracharya *et al*., (1990).[22] Essential oil of Ethiopian cardamom was 8.01 % which was similar to reported values by Keezheveettil et al., (2010).[21] and greater than reported values of Shankaracharya *et al*., (1990).[22] Ash content 6.72 % which was 1.44% less than the reported values by Keezheveettil *et al*., (2010).[21] And that clearly indicated the Ethiopian cardamom was good source of dietary fibers which have many significant roles in human nutrition.

3.2. Mineral composition of cardamom

The various mineral composition of cardamom including potassium, calcium, phosphorus, sodium, and iron were investigated and results are accordingly reported in table 2.

Table 2: Mineral composition of Ethiopian cardamom.

Variety	Constituents (mg/100g)								
	Ca	**K**	**Mg**	**P**	**S**	**Fe**	**Mn**	**Zn**	**B**
Gene	109.87	843.28	102.76	151.29	37.14	11.66	29.32	1.573	0.414

Table 2. represents the major mineral content of Ethiopian cardamom seeds where K was the prime element and found at the amount of 843.28 mg/100gm. P was measured at the amount of 151.29 mg/100gm net in order but found to be greater than the reported value 61 mg/100gm by Bhandari *et al*., (2011). Ca was measured at the amount of 109.87 mg/100gm but found to be less than the reported value 666 mg/100gm by Bhandari *et al*., (2011). There after Mg, S, Mn, Fe as well as Zn were determined as amounts of 102.76, 37.14, 29.32, 11.66, and 1.57 mg/100gm consequently.

4. CONCLUSION

The present work aimed to study the nutritional composition of cardamom Gene variety used for food spice in Ethiopia. Nutritional composition of Ethiopia Cardamom seed were performed and the results obtained from the analysis indicated that 8.51 % moisture content, 6.72 % ash, 9.29 % crude protein, 10.025 % Oleoresin, 8.01 %,Essential oil, 24.14 crude fiber, 65.19 total Carbohydrate and its macro and micro mineral content were calculated to be rich where Calcium (Ca), Potassium (K), Magnesium (Mg), Phosphorus (P), Sulfur (S), Manganese (Mn), Iron (Fe)

and Zinc (Zn) were determined at the amount of 109.87, 843.28, 102.76, 151.29, 37.14, 29.32, 11.66 1.573 mg/100g respectively. The cardamom Gene variety nutritional composition is comparable and within the ranges of different cardamom producing country. The data will help the spices/cardamom breeders for further improvement of varieties.

5. REFERENCES

1. Krishnan S, Bhosale R, Singhal RS. Microencapsulation of cardamom oleoresin: Evaluation of blends of gum arabic, maltodextrin and a modified starch as wall materials. Carbohydrates Polymer, 2005; 61: 95-102.
2. R. Susheela, Handbook of Spices Seasonnig and Flavouring. 2ed Edition. CRC Press Tylor and Francis group. London New York, 2007; 79–82.
3. Govindarajan, VS, Narasimham S, Raghuveer KG, Lewis YS. Cardamom-Production, Technology, Chemistry and Quality. *CRFSNC*, 1982; 16: 229-326.
4. Nigam M.C, Nigam IC, Handa KL, LeviL. Essential oils and their constituents XXVIII Determination of oil of cardamom by gas chromatography. *J. Pharm. Sci.*, 1965; 54: 799-801.
5. Bernhard RA, Wijesekera ROB, Chichester CO. Terpenoids of cardamom oil and their comparative distribution among varieties. *Phytochemislry*, 1971; 10: 177-184.
6. Baruah, AKS, Bhagat SD, Saika BA. Chemical composition of Alleppy cardamom oil by gas chromatography. *Analyst*, 1973; 98: 168-171.
7. Wellendorf M, Gaschromatografisk undersogolese af kardemommetyper. *Dansk Tidsskr. Farm*, 1966; 40: 156-163.
8. Natarajan CP, Kuppuswarmy S, Krishnamurthy MN, D'Souza T, Gopalan KK. Preservation of green colour in cardamom. *Indian Spices*, 1967; 1: 5-7.
9. Natarajan CP, Kuppuswarmy S, Krishnamurthy MN. A study on the maturity, regional variations and retention of green colour of cardamom. *J. Food Sci. Technol.* 1968; 5: 65-68.
10. Jeon JG, Rosalen PL, Falsetta ML, and Koo H. Natural products in caries research: current (limited) knowledge, challenges and future perspective. aries Res., 2011; 45: 243–263.
11. Johnya, Kallupurakal and Ravindran PN. (2002 "Hints for cardamom Cultivation high production Technology" *Plant Hortitech*, 2002; 13(6): 21-26
12. Sunnetha WJ, Krishnakantha TP. Cardamom extract as inhibitor of human platelet aggregation. Phytother Res., 2005, 19: 437-440.
13. Mohamed AA, Ali SI, El-Baz FK, Hegazy AK, and Kord MA. Chemical composition of essential oil and in vitro antioxidant and antimicrobial activities of crude extracts of Commiphora myrrha resin. Ind. Crops Prod, 2014; 57: 10–16.
14. Rhyu, H.Y. Gas chromatographic characterization of sages of various geographic origins. *J. Food Sci.*, 1979; *44*: 758–762.
15. Piccaglia R., Marotti M, Galletti GC. Characterization of essential oil from a *Satureja montana* L.chemotype grown in northern Italy. *J. Essent. Oil Res.*, 1991; *3*: 147–152.
16. Mohagheghzaded A, Ardakani MS, Ghannadi A. Linalol-rich essential oil of *Zataria multiflora* Boiss. (Lamiaceae). *Flavour Frag. J.*, 2000; *15*: 119–122.
17. AOAC Official Methods of Analysis of AOAC International. Association of Official Analytical Chemists, 18th ed Gaitherburg, MD, 2005.
18. Sontakke MD, Syed HM and Sawate AR. Studies on extraction of essential oils from spices (Cardamom and Cinnamon). Int J Chem Stu., 2018; 6(2): 2787-2789.
19. Padmakumari Amma KPA, Venugopalan Nair PN, Sasidharan I and Priya Rani M. Chemical composition, flavonoid-phenolic contents and radical scavenging activity of four major varieties of cardamom. Int J Biol Med Res., 2010; 1(3): 20-24.
20. Shankaracharya NB, Raghavan B, Abraham KO and Shankaranarayana ML Large cardamom chemistry, technology and uses. *Spice India*, 1990; 3(8):17-25.
21. Bhandari AK, Negi JS, Bisht VK, Baunthiyal M, Sundriyal RC. An assessment introduction of *Amomum subulatum* Roxb. (Large Cardamom) in Uttarakhand. Proceedings of Uttarakhand 6th USST Cong., India, 2011; 13.