Proximate and Minor Mineral Content in Some Selected Basil Leaves of *Ocimum gratissimum L*, in Libya

A. M. Mlitan, M. S. Sasi, and A. M. Alkherraz

***Abstract*—Leaves of *Ocimum gratissinum* collected from Three different Locations in Misurata region (Zaroge, Tamena and Daphnia) in Libya was analyzed for proximate and minor minerals constituents. The proximate analysis to samples(Zaroge, Tamena and Daphnia)showed the percentage of crude protein content, moisture, lipids, ash and carbohydrate of the leaves on dry weight basis as (9.10, 10.60, 14.3 , 50.35, 10.08%), (9.80 , 10.40, 11.0, 14.5, 52.45%) and (9.22, 10.60, 55.20, 13.19, 11.16%) respectively. The percentages of minor mineral elements content were (Iron from 0.98 to 4.35 mg/100g), (Zinc from 10.44 to 17.72 mg/100g), (Copper from 0.45 to 3.75 mg/100g), (Lead from 0.061 to 0.12 mg/100g) and (Cadmium from 0.011 to 0.018 mg/100g).The results of the analysis of basic components and a high proportion of protein, carbohydrates and minor mineral elements gave the basil importance of food and indicates its potential as a source of drugs.**

***Index Terms*—*O.* gratissinum, proximate compositions, mineral elements.**

I. Introduction

Medicinal plants are plants which contain substances that could be used for therapeutic purposes or which are precursors for the synthesis of useful drugs [1]. *Ocimum gratissimum L.* (family Lamiaceae) is an aromatic perennial herb wildely grown in Libya. The medicinal value of these plant sliesin bioactive Phyto chemical constituents that produce definite physiological action on the human body [2]. *Ocimum gratissimum* belongs to the family Lamiaceae and found mostly in countries including: Libya, India, North and South America, Mexico and Brazil where it is popularly known as alfavaca-cravo, alfavacao, alfavaca [3]. It's traditionally used to relief pains and also used in the treatment of rheumatism, diarrhea, high fever, convulsions, diabetes, eczema, piles and as a repellant [4], [5].The decoction of the stem is inhaled for the treatment of catarrh and bronchitis [6] *Ocimum gratissinum* is a shrub, 1-2m tall; anthropogenic of village areas, not found in the wild. The plant is common in West Africa and generally wide spread in tropical Africa. The leaves are broadly to narrow orate, usually 5- 13cm long and 3-9 cm wide. The flowers are gamopetalous and zygomorphic and exist in whorled and panicled inflorescence. The fruits of nutlets are subglose, 1.5-2mm diameter and slightly rugose. *Ocimum gratissinum* is popularly used in folk medicine for the treatment of upper respiratory tract infection, diarrhea, cough, fever, gonorrhea, worm infection, stomach aches, headaches, pile, pneumonia and surface wound. It is also implicated in blood coagulation, anti- inflammatory, cardiovascular and renal function properties have been observed [7]. *Ocimum gratissinum* is a herbaceous plant which belongs to the Labiatae family. The plant is indigenous to tropical areas especially Libya and it is also in West Africa. The leaves of *Ocimum gratissinum* are used to prepare soups and porridge for women after delivery among the Igbos of Africa and also in the management of the baby's cord after delivery. The plant is used as food spice and for the treatment of ailments such as; malaria, diabetes, respiratory and urinary tract infections, cough, fever, diarrhea, abdominal pains, pneumonia, conjunctivitis, oral wounds and tooth infection [8], [9]. In this study, therefore, the leaves from three region of *Ocimum gratissinum* collected from Libya was analyzed for proximate and minerals constituents with view if there are variations in these accessions and if there are, to determine the heritable and non heritable components and estimates of heritability and genetic advance expected.

II. Aim of Study

This study was under-taken to know the constituent of the leaves and mineral analysis of basil leaves *Ocimum basilicum* L. *Zaroge Z, Tamena T and Daphnia D* through proximate and mineral analysis

III. Materials and Methods

A. Plant Materials

The fresh plants were collected locally from three states (Zaroge, Tamena a n d Daphnia) in Misurata region – Libya and after the species identification was done ,leaves were allowed to dry in open air in the shade area for 30 days air dered of powdered technically. Identi fication and authentication were carried out in Technology Laboratory of food science. Place of collection leaves shown in Table I.

TABLE I: *Ocimum gratissinum* Accessions Showing Place of Collection

Accession	State collected	Town
Z	Zaroge	Misurata
T	Tamena	Misurata
D	Daphnia	Misurata

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B. Processing of Plant Materials

The fresh leaves of the following plants *O. gratissimum*, were air dried at 28^{O}C for 30 days. They were grounded into fine powder using an electric blender and stored in a cool dry container until use.

C. Proximate Analysis

The proximate analysis of the samples for moisture, ash and fat were done by the method of [10]. The nitrogen was determined by micro-Kjeldahl method as described by [11], the percentage Nitrogen was converted to crude protein by multiplying 6.25. The carbohydrate content was obtained by the difference as the nitrogen free extract. All determinat jons were performed in triplicates.

D. Mineral Analysis

The minerals of the samples were analyzed using the solution obtained by dry aching the sample at 550℃ and dissolving it in HCl (25ml) and 5% Lanthanum chloride (2ml), boiling, filtering and making up to standard volume with deionized water. Cu, Cd, Zn, Fe, and Pb, were determined with a Buck Atomic Absorption Spectrometer (Buck Scientific, Model 200A/200, Inc. East Norwalk, Connecticut, U.S.A) [11] and [12]. The detection limits had previo usly been determine using the methods of Techtron [12] as Cu 0.005, Zn 0.005, Fe 0.02, Cd 0.005 and Pb 0.005 mg/100g (all for aqueous solutions).The optimum analytical range was 0.5 to 10 absorbance units with coefficient to fvariation of 0.05 to 0.40% phosphor vanado–molybdatemeth dusinga Spectronic 20 colorimeter (Galenkamp, London, UK) [11]. All chemicals were BDH analytical grade.

IV. Results and Discussion

The results of proximate analysis(in%) of *O. gratissinum, Z. D* and *T. guineensis* leaves are shown on Table II. The plants contained higher amount of carbohydrates content which were 50.35, 52.45 and 55.20 respectively.These results are similar to that reported for *A. sativum* (57.28) [13], but are higher than that of *Senna obstusfolia* (23.70) and *Amaranthus incurvatus* (39.05) [14]. It is however lower than the value reported for *P. fistulosus* (62.39) [13]. Carbohydrate constitutes a major class of naturally occurring organic compounds which are essential for the maintenance of life in plant and animals and also provide raw materials for many industries [15]. The plant is a good source of carbohydrate when consumed because it meets the Recommended Dietary Allowance (RDA) values [16].

TABLE II: Proximate Composition and pH of the Leaves of Some *Ocimum Gratissinum* from Libya

Test	*Z*	*T*	*D*
Protein	9.10 %	9.80 %	9.22%
Moisture	10. 60%	10.40%	10.60%
Fat	10.80%	11.0%	11.16%
Ash	14.30 %	14.50%	13.19%
Carbohydrate	50.35%	52.45%	55.20%
PH	5.50	5.34	5.40

Key : *Z* = Zaroge; *T* = Tamena; *D* = Daphnia

The crude protein content (%) of *O. gratissimum, Z, T and D* were 9.10, 9.80 and 9.22 respectively. These are higher than the protein content (7.00) reported by [17], but however lower than those(29.78) reported by [18] and (23.74) [19]. The ash content (in %) of *O. gratissinum, Z ,T and D* leaves were 14.03, 14.50 and 13.19 which is lower than the values reported for the leaves (22.84) by [19] and (15.09) with [20]. They are however higher than that (4.84) reported by [13]. The moisture content (in %) values for the leaves of *O. gratissimum, Z* (10.60), *T* (10.40) and *D* (10.60) were relatively low, therefore it would hinder the growth of micro organisms and life span of stored samples would be high. This is good for the long preservation and will prevent early spoilage. The moisture content of the plant is low when compared to that of *Xylopia aethiopia* (16.04) [21] and *Acalypha hispida* (11.91) Iniaghe *et al.*, (2009). The values of the crude fat (in %) for the leaves of *O.garanissimu, Z. T* and *D* were 10.80, 11.00 and 11.16 respectively which were moderate in amount when compared to those (4.80) which reported by [18] and (3.15) with [21]. The results of proximate analysis on these three kind showed that they could be good for health by providing most of the essential nutrients for normal body functions when consumed in appropriate combinations. The mineral composition in (mg/100g) of *O. grantissimum, Z, T* and *D* leaves were shown in Table III.

TABLE III: Minerals Composition (mg/100g) of *O. gratissimum* from Libya

Elements	*Z*	*T*	*D*
Zinc	17.72	20.05	10.44
Iron	4. 35	2.15	0.983
Lead	0.090	0.061	0.123
Cadmium	0.018	0.011	0.013
Copper	3.19	3.75	0.454

Key : *Z* = Zaroge; *T* = Tamena; *D* = Daphnia

The value of Zinc content of *O. gratissimum, Z, T* and *D* varied from 10.44 to 20.05 mg/100g. These are low when compared to the mineral analyzed for in *Pilostigma thioningi*(70.10) [22]. Zinc is involved in normal functioning of immune system [23] and is associated with protein metabolism. The leaves are a good source of zinc because it is far above 6.23 recommended by RDA [24]. Iron content of *O. gratissimum, Z, T* and *D* varied from 0.98 to 4.35 mg/100g. These values compared favorably with the values reported for *Ipomea batata* 16.00 [20], but low when compared to the values of other green leafy vegetables as reported by [23]. Iron is an essential trace element for hemoglobin format on, normal functioning of central nervous system and in the oxidation of carbohydrates, protein and fats [25].This perhaps justifies the already locally established function of the plant in the regulation of hemoglobin level. The values of Lead in the leaves of *O. gratissimum, Z, T* and *D* varied from 0.06 to 0.12 mg/100g, which are lesser than the suggested concentration of 2–6 mg/g in the plant species [26].This suggest that *O. gratissimum* does not contribute or rather cannot be used as a substitute for other blood forming leafy vegetables while *Z, T* and *D* are involved in the boosting of the immune system and are antioxidant micronutrient [27].

The values of Copper in the leaves of *O. gratissimum, Z, T* and *D* varied from 0.45 to 3.75 mg/100g. copper deficiency has been reported to cause cardiovascular disorders as well as anaemia, bone disorder and nervous systems. Lead and Copper are highly toxic even at low concentrations. It is known that the lead element of the unnecessary elements of the body, which may cause its presence in concentrations large health problems. Finlay the values of Cadmium in the leaves of *O. gratissimum, Z, T* and *D* varied was from 0.011 to 0.018 mg/100g. Cadmium is considered non-essential elements of the human being and existence, even in small amounts may cause some health problems such as kidney failure and heart disease [28]-[30]. And generally may be due to the high concentration of some elements of this topic in the sample to the site, which grew when this kind of trees and over the proximity of the various sources of pollution (a main road, factory)

V. Conclusion

Ocimum gratissinum is a good source of nutrients for the indigenous people. Plants have contributed immensely to the medical field. It has been the source of most drugs used for combating infections. The plants used in this study were found to contain the important constituent needed to combat various kinds of infection in human.

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Recommended

Further investigations are ongoing in our laboratory to determine the exact photochemical (plants Contain from Glycosides, Flavonoides, Risens and Alkaloids**)** for the activity of this plant and examined for Antimicrobial activity toward the bacteria: gram positive bacteria like *Bacillus subtilis*, *Bacillus cereus*, *Bacillus sterother mophilis* and gram negative bacteria like *Pseudomonas aeruginosa*, *Proteus mirabilus, Klebsiella pneumoniae*, *Escherichia coli*, and *Salmonella typhimurium*.

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