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Volume No.5 Issue No.2 June 2016

www.iresearcher.org

ISSN 2227-7471

THE INTERNATIONAL RESEARCH JOURNAL "INTERNATIONAL RESEACHERS"

www.iresearcher.org

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PROXIMATE AND NUTRITIONAL COMPOSITION OF SOME SELECTED LEAFY VEGETABLES COLLECTED FROM SARGODHA AND ITS VACINITIES

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ABSTRACT

To determine the nutrient composition of vegetables four different green leafy vegetables were collected and analyzed which are commonly cultivated in Sargodha city. These vegetables are Brassica campestris, Raphinus sativas, Coriandrum sativum and Spinacea oleracea. From the Overall all varieties have good source of nutrients and minerals but Results show that Coriandum sativum had the highest amount of moisture (89.47 %) While Raphinus sativas had highest ash(0.83%).The highest values of crude fibre, protein, lipid and Carbohydrates were found in Corchorus olitorius 0.33%, 6.21%, 5.08%, 6.25% respectively.

KEY WORDS: Proximate and Micronutrient profile, *Brassica compestris, Raphinus sativas, Coriandum sativum, Spinacea oleracea,* Sargodha city

1. INTRODUCTION

Green leafy vegetables represent a very vital source of nutrients present in the diet of many developing countries including Pakistan. In Pakistan, a cheap source of many important nutrients is known as green leafy vegetables Leafy vegetables are not only a useful source of nutrients but also provides us with variety of aroma, charming look and also taste. The fresh and eatable parts of herbaceous plants that can be eaten as raw or cooked are known as vegetables., (Dhellot *et al.*, 2006). Vegetables have the important components which can be helpful for regulatory and protective processes as well as a vital source of energy. Vegetables are valuable in maintaining alkaline reserve of the body. Vegetables are important as they contain high amount of carbohydrate, mineral nutrients and vitamins.

The edible parts of vegetables may be roots, stems, leaves. The contribution of each part of vegetables to the diet is in its own way (Robinson, 1990). During the digestion vegetables also act as buffer against acidity. (Fayemi, 1999). A wide range essential and toxic element of differents concentration is present in vegetables (Ajewole, 1999). The concentration of these elements is depends on the concentration of these two in the soil in which vegetables were grown. Vegetables contain low calories and negligible quantities of utilizable energy hence they are ideal for obese people who can satisfy their appetite without consuming much carbohydrate (Oke & Ojofehintimi,1988).

Secondary metabolites such as tannins, terpenoides, alkaloids and flavonoid which have been found in *Raphinus sativas and* have antimicrobial properties in vitro. (Cowan, 1999). *Raphanus sativus* belongs to family Brassicaceae and its common name is Radish. The *Raphanus sativus* roots increases the appetite and digestion, having a tonic and laxative effect upon the intestines and indirectly stimulating the flow of bile (Chevallier, 1996). *Raphinus sativas* is grown for the essential oils in its leaves and stems. Eugenol, thymol, citral, geraniol and linlool have been extracted from the oil (Sulistiarini *et al.,* 1999). Essential oils from the plant have been reported to possess an interesting spectrum of antifungal properties (Dubey *et al.,* 2000). The antinociceptive property of the essential oil of the plant has been reported (Rabelo *et* al., 2003). The whole plant and the essential oil are used in traditional medicine especially in Africa and India. The essential oil is also an important insect repellent. *O.gratissimum* is germicidal (Pessoa *et al*., 2003) and has found wide use in toothpastes and mouth washes as well as topical ointments. It is used as an excellent gargle for sore throats and tonsillitis. It is also used as an expectorant and a cough suppressant. The plant extract is used against gastrointestinal helminths of animals and man (Chitwood, 2003). In addition, *O.gratissimum* carminative properties make it a good choice for upset stomach. It is used as an

emetic and for hemorrhoids. The plant is also used for the treatment of rheumatism, paralysis, epilepsy, high fever, diarrhea, sunstroke, influenza, gonorrhea and mental illness (Sofowora, 1993). In addition, the plant is used as a spice and condiment in the southern part of Nigeria. Water leaf (*Coriandum sativum*), a leafy vegetable is among the various classes of vegetables that are grown in many parts of Nigeria. Oyolu (1978) reported that the leaves of *Spinacea oleracea,* together with the edible shoots contain moisture; crude protein, carbohydrates, oils, ash and iron, while Longe *et al*. (1983) reported that the minerals namely: calcium, potassium, magnesium, iron, sodium and phosphorus are concentrated in the testa, pulp and husk. Oboh (2004) has reported that dietary intake of the leaf could prevent garlic- induced haemolytic anaemia in rats. The aqueous extracts of *Spinacea oleracea.* Had been reported to reduce blood glucose level and also have antidiabetic effects in glucose induced hyperglycemic streptozotocin (STZ) induced diabetic mice (Aderibigbe *et al.*, 1999), while it did not alter the glucose levels in normoglyceamic mice. Recently, Dina *et al*. (2001) reported that the aqueous extract of *Spinacea oleracea.* Leaf could assist in the purging of the gastrointestinal tract as revealed by the purgative effect of the aqueous extracts of *Spinacea oleracea.* Leaf on isolated guinea pig ileum and he concluded that there are some pharmacological effects underlying their mode of action. Several works reporting compositional evaluation and functional properties of various types of edible wild plants in use in developing countries abound in the scientific literature (Ekop, 2007). However, much still needs to be done on the chemical composition of edible leafy vegetables grown in Nigeria.This study was designed to determine the nutrient contents of *Corchorus olitorius, Raphinus sativas, Coriandum sativum, and Spinacea oleracea.* and if they could be used as supplement to other scarce or non-available source of nutrients.
Lipids are important components of vegetables and in human body necessary fats that are present in lipids play a very vital role. (Saidu & Jideobi, 2009). Proper brain functioning, mobilization of joint, production of energy are important functions of lipids. vitamins A and E also absorbed by the help of lipids. (Osborne & Voogt, 1978). These leafy vegetables also contain carbohydrate which indicate that these leafy vegetables can be used to regulate various metabolic processes in the body as key molecules in the central metabolic pathways of the body. Carbohydrate can store energy in the form of glycogen in liver and muscles. Major source of energy is also provided by the carbohydrates. and breaks down fatty acids by preventing ketosis (Hassan & Umar, 2006).
Striking pathological resulting from this defect is the weakening of the endothelial wall of the capillaries due to a reduction in the amount of intercellular substances (Hunt *et al*., 1980). Therefore, the clinical manifestations of scurvy hemorrhage from mucous membrane of the mouth and gastrointestinal tract, anemia, pains in the joints can be related to the association of ascorbic acid and normal connective tissue metabolism (Okwu, 2004). This function of ascorbic acid also accounts for the requirement for normal wound healing. As a result of the availability of ascorbic acid in all the vegetables, they can be used in herbal medicine for the treatment of common cold and other diseases like prostate cancer (Okwu, 2004). In conclusion the study has showed that the leafy vegetables contain appreciable level of nutrients which are readily available. Hence they could be consumed to supplement the scarce or non-available sources of nutrients.

2. MATERIAL AND METHODS

2.1 SOURCE OF SAMPLE

Samples of different fresh leaves of four vegetables were purchased randomly from different locations in Sargodha city. The samples include Corchorus olitorius, Raphinus sativas, Coriandum sativum and Spinacea oleracea. The samples were identified and authenticated by a taxonomist at the Department of Botany, University of Sargodha, Sargodha. The leaves were removed from the stem and damaged ones excluded. Samples of fresh edible leaves were used for moisture determination at 105oC in an air-oven, drying to constant weight. Edible leaves of the remaining fresh vegetables were dried to a constant weight at 90oC (to retain volatile constituents for analysis). For each sample, all dried sub-samples were collected together and ground into a composite powder. These composite powders were packaged in air-tight plastic containers and stored in a freezer for further analysis.

2.2 PREPARATION OF FAT FREE SAMPLE

2.0g of the sample were defatted with 100 ml of diethyl ether using a sohxlet apparatus for 2 h.

3. CHEMICAL ANALYSIS OF NUTRIENTS

3.1 MOISTURE CONTENT

The leaves were removed from the stem. Fist weight the Samples of fresh leaves were used for moisture determination at 105oC in an oven for 6 to 8 hours. Then again weight the samples, moisture content will be obtained.

The % of moisture content was calculated by following formula:

$$Moisture = \frac{dry\ wt\ of\ sample}{Initial\ wt\ of\ fresh\ sample} \times 100$$

3.2 FAT

2 g of dried sample was extracted with petroleum ether (40 C -60 C) in Soxhelt apparatus to remove the ether soluble component present in it. It was dried at 70 C until the constant weight achieved.
The fat percentage was calculated by following formula:

$$Fat\ \% = \frac{Wt\ of\ ether\ extract\ after\ drying}{Wt\ of\ fresh\ Sample} \times 100$$

3.3 CRUDE PROTEIN

The protein contents were obtained by multiplying by nitrogen to a factor of 6.25determined according to the method of Osborne and Voogt (1978). Porcelain crucibl

Were properly washed and allowed to dry in an air-oven at 110ºC for 10 min to a constant weight. The crucibles were allowed to cool in a desiccator for 30 min, then labeled and weighed (W1). 2.0 g of each sample were accurately weighed into the crucibles and reweighed (W2). The crucibles containing the samples were placed in an oven maintained at 105ºC for 14 h. They were removed and transferred to desiccators to cool, finally weighed (W3). The percentage moisture content was calculated.

3.4 ASH CONTENT

2 g of dried shoot sample were carbonized on oxidizing flame until no fumes produced. It was then ignited at 600 C in muffle furnace to burn all the organic matter. And then note the weight.
The % of ash content will be obtained by following formula.

$$\%\ of\ Ash = \frac{wt\ of\ Ash\ content}{wt\ of\ fresh\ sample} \times 100$$

3.5 CRUDE FIBRE

Crude fibre was analyzed following the procedure of AOAC (1980). 2.0 g of each sample were weighed into separate 500 ml round bottom flasks. 100 ml of 1.25 % Sulphuric acid (H2So4) solutions was added to each sample in the flask, and the mixtures were boiled under reflux for 30 min. leave solution at room temperature to cool down for 20 minutes and then filtered under suction. The residues were thoroughly washed with hot water until acid free. Each residue was transferred into the round bottom flasks and 100 ml of hot 1.25 % Sodium hydroxide (NaOH) solutions was added and the mixtures were boiled again under reflux for 30 min and Cool down at room temperature for almost 20 minutes and then filtered it. Each insoluble residue was washed with hot water until it was base free. They were dried to a constant weight in an oven at 100ºC for 2hours, cooled in desiccators and weighed (C1). The weighed samples were then incinerated, and reweighed (C2). Percentage crude fibre content was calculated.

3.6 TOTAL CARBOHYDRATES

The total carbohydrate content was determined by subtracting the sum of the percentage moisture, ash, crude lipid, crude protein and crude fiber from 100% that is
Carbohydrate = 100 - (% moisture + % ash + % protein + % lipids + % fiber) (Eyeson & Ankrah, 1975). lution to get a dark end point (Baraket et al., 1973).

3.7 MICRONUTRIENT ANALYSIS

Micronutrient analysis with the help of AAS (Atomic absorption spectrometry).

4. RESULTS AND DISCUSSION

The results of the proximate and chemical analysis of four different vegetables (Brassica campestris ,*Raphinus* sativas, Coriandum sativum and Spinacea oleracea.) are shown in Table 1.
From the experimental results, moisture content ranges from 89.47 % in Coriandum sativum to 79.98% in Corchorus olitorius. Ash content ranges from 0.83% in Raphinus sativas to 0.49% in spinacea oleracea. Crude fibre ranges from 0.33% in Corchorus olitorius to 0.21% in Coriandum sativum. Protein ranges from 6.21% in Corchorus olitorius to 2.20% in Raphinus sativas. Lipid ranges from 5.08% in Corchorus olitorius to 2.57% in Coriandum sativum while carbohydrate ranges from 6.25% in Corchorus olitorius to 3.17% in Coriandum sativum.

Table: 1 of proximate composition in leafy vegetables.

Table 1.1

	Moisture Content (%)
Corchorus olitorious	79.98
Raphinus sativas	88.94
Coriandrum sativum	89.47
Spinacea oleracea	83.43

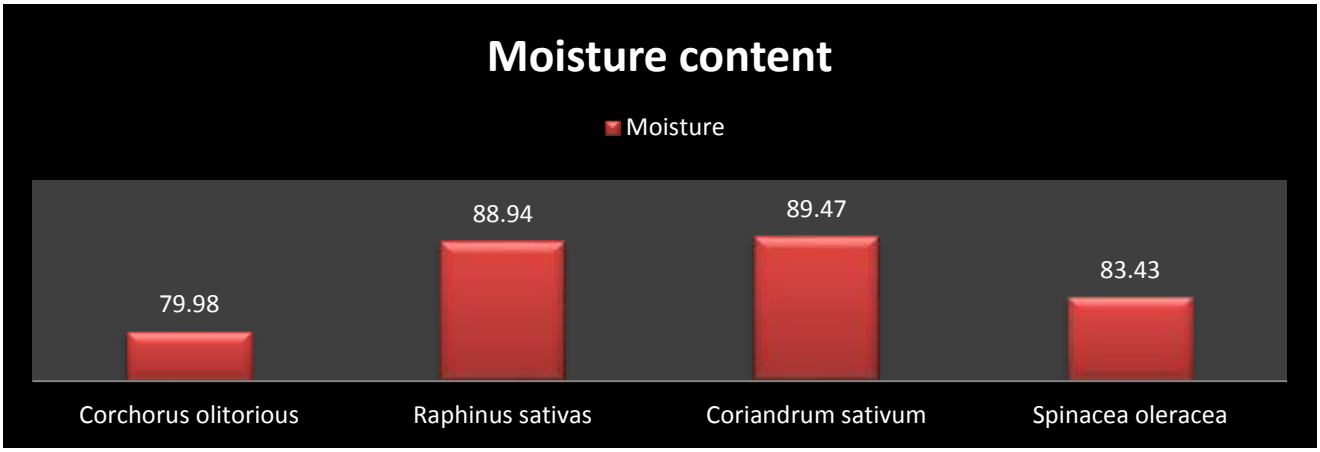


Table 1.2

	Ash Content (%)
Corchorus olitorious	0.81
Raphinus sativas	0.83
Coriandrum sativum	0.80
Spinacea oleracea	0.49

Table 1.3

Crude fibre (%)	
Corchorus olitorious	0.33
Raphinus sativas	0.28
Coriandrum sativum	0.21
Spinacea oleracea	0.29

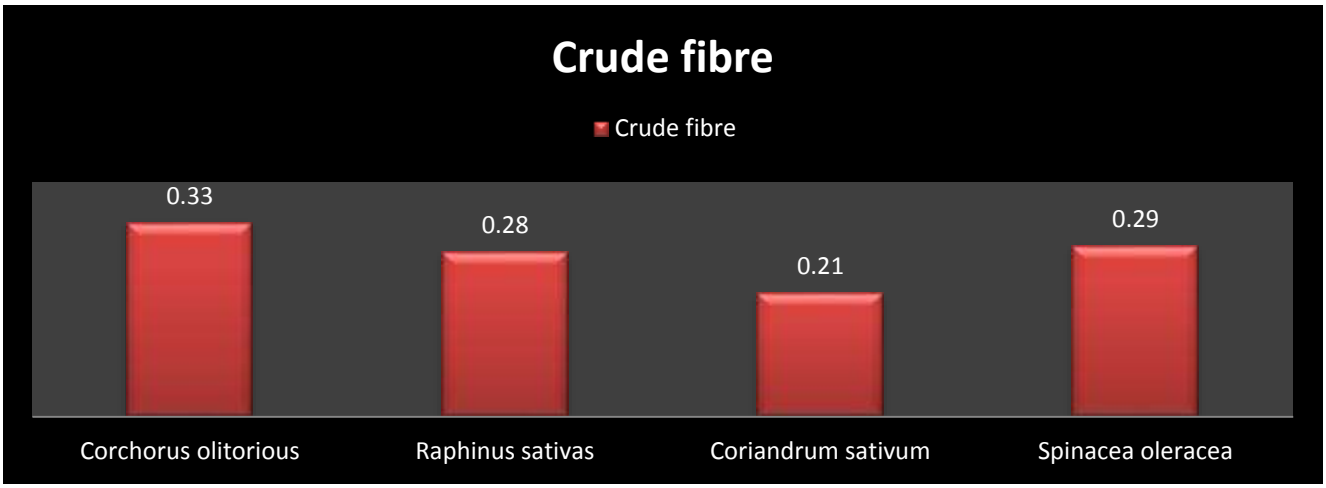


Table 1.4

Protein (%)	
Corchorus olitorious	6.21
Raphinus sativas	2.20
Coriandrum sativum	4.38
Spinacea oleracea	5.81

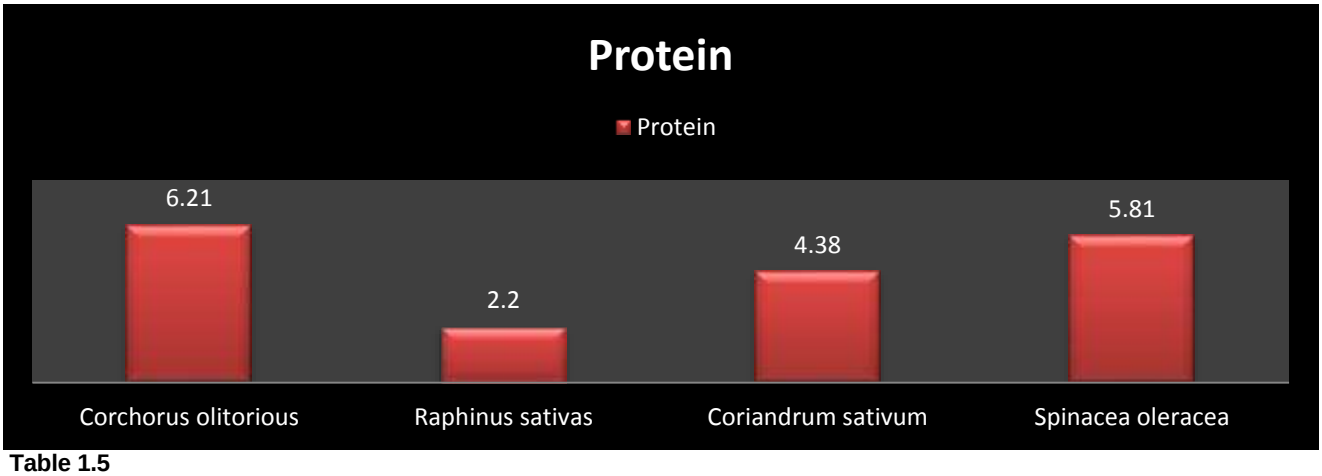


Table 1.5

	Lipid (%)
Corchorus olitorious	5.08
Raphinus sativas	4.62
Coriandrum sativum	2.57
Spinacea oleracea	4.59

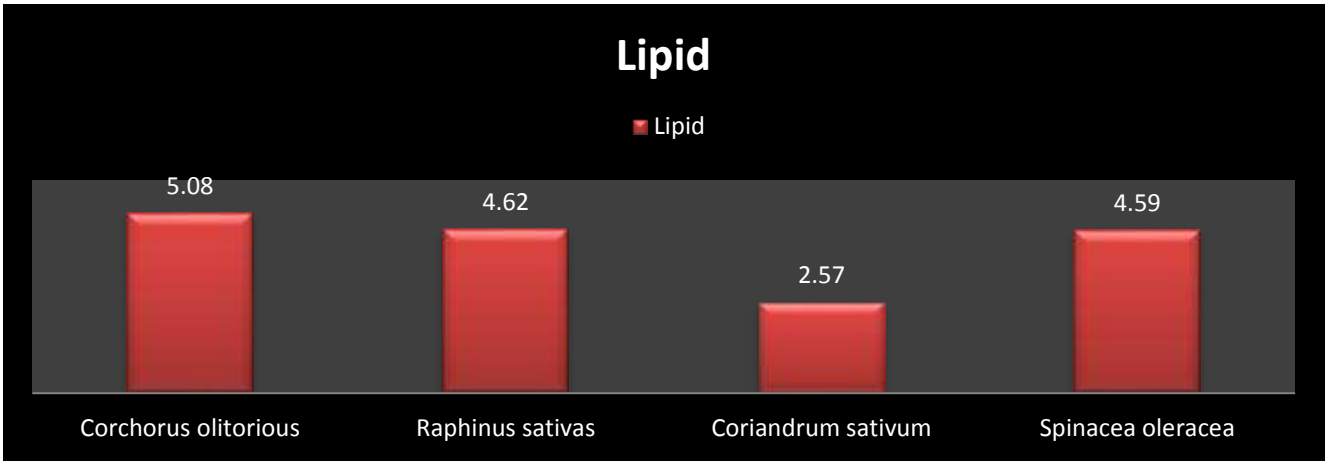


Table 1.6

	Carbohydrates (%)
Corchorus olitorious	6.25
Raphinus sativas	5.13
Coriandrum sativum	3.17
Spinacea oleracea	5.17

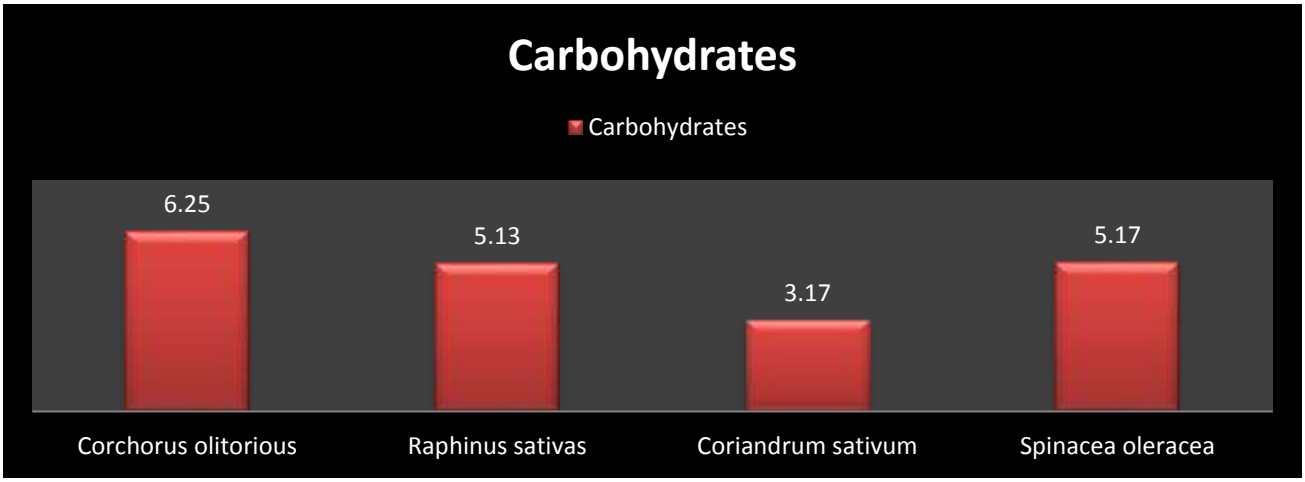
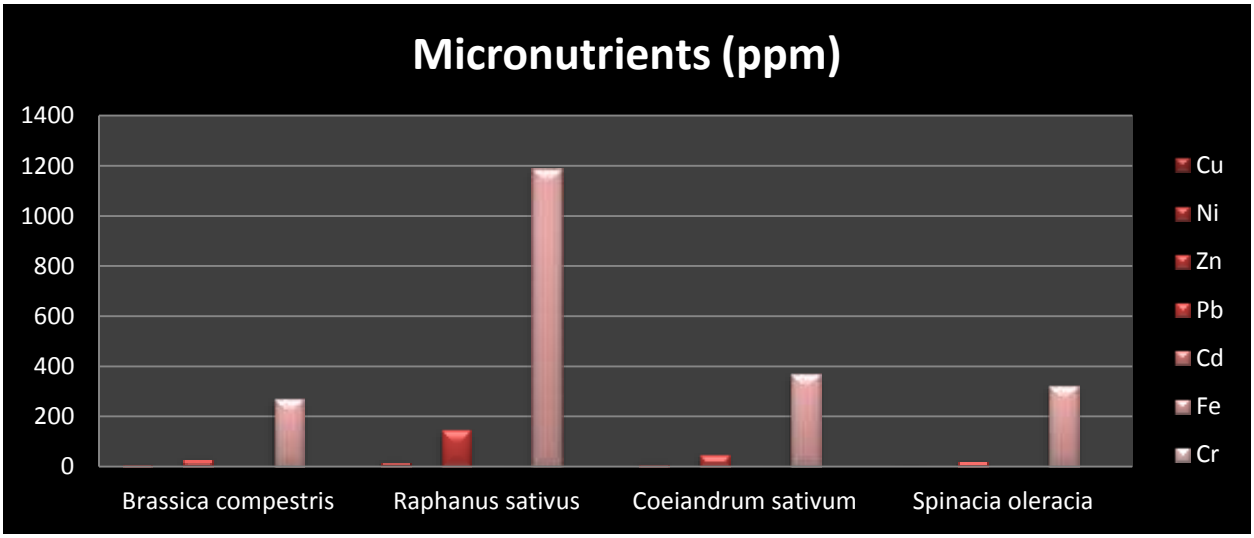


Table 2. Micronutrient composition of selected vegetable plant species.

Species Name	Micronutrients (ppm)							
	Cu	Ni	Zn	Pb	Co	Cd	Fe	Cr
Brassica Compestris	13	<0.004	30	<0.015	<0.009	<0.0008	271	<0.003
Raphanus Sativus	23	5	148	<0.015	3	<0.0008	1185	<0.003
Coriandrum sativum	14	<0.005	51	<0.015	4	<0.0008	371	<0.003
Spinacia oleracea	9	<0.007	25	<0.015	2	<0.0008	325	<0.003



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