Journal of Xi'an Shiyou University, Natural Sciences Edition ISSN : 1673-064X

ANTIOXIDANT AND ANTIMICROBAIL ACTIVITIES, PROXIMATE ANALYSIS AND NUTRIENT COMPOSITION OF EIGHT SELECTED EDIBLE WEEDS OF PESHAWAR REGION

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ABSTRACT

A study work was carried out to evaluate antioxidant activity, antibacterial activity, proximate analysis and micronutrients analysis of eight edible weeds namely *Celosia argentea, Trianthema portulacastrum, Amaranthus viridis, Solanum nigrum, Medicago denticulata Portulaca oleracea, Digera arvense* and *Mentha longifolia*. The results of conducted research work indicates that all the weed plants under observation showed variable values of micro and macro nutrient, antioxidents and antimicrobial activity. Plants of *Celosia argentea* showed highest amount of protein (43.1 g/L), moisture content (10.43 %) and zinc (0.382 mg/100g), *Trianthema portulacastrum* exhibates highest amount of ash (18.2 %) and manginese (0.192 mg/100g) while *Amaranthus viridis* had highest fiber (4.53 g/m^2). The plants of *Medicago denticulata* found to have highest carbohydrates (62.86 mg/L) and copper (0.287 mg/100g), whereas *Portulaca oleracea* showed highest fat (25.2 kcal/g), magnisum (42.112 mg/100g) and calcium (119.92 mg/100g), while on the other hand plants of *Mentha longifolia* had highest iron content (5.22 mg/100g). Results of antioxidant activity showed that palnts of *Digera arvense* have highest antioxidant activity (83.5 mg) while the plants of *Solanum nigrum* had showed highest zone of inhibition (7.71) against *ralstonia solanacearum.*

Key Words*:* antioxidant activity, micronutrients, macro nutrient, *Celosia argentea*

INTRODUCTION

Weeds are unwanted plants growing in actual crops. Weeds cause high economic, social and environmental costs in many parts of different countries. Some weed species are so widespread and dangerous that they have become of national significance. Generally weeds are consider harmful in crops but all weeds are not harmful, a large number of weeds used as fodder for animals and green vegetables for human and also used as medicinal purpose in Pakistan and other countries (Khan *et al*., 2013). The preservative effects of many weed plants consisder that they might have antimicrobial and antioxidant constituents therefore can be used for the treatment of various inflammatory diseases (Emamia *et al*., 2011). Human cells are not able to produce antioxidant substance by themselves therefore obtaine these antioxidant from palnts and animal sources (Karuppusamy and Muthuraja 2011). Certain plants have phrmacultical effects due to presence of antioxidant which produces oxidative stress on living organisms hence can be used as antibiotic suplimentaion (Mehmood *et al.,* 2012).

The easy and sustabile access of food commodities is sole challenge for the citizens of Pakistan specilly for Khyber Pakhtunkhwa province due to rapid increase in population, poverty, lack of resources, natural and men created catastrophes. This condition is typically observed in FATA, PATA and suburbs of suburbs of many major districts like Swat, Charsadda, and Peshwar etc. Inadequate income and jod opertunities due to frequesnt natural disaster, manmade crises coupled with political uncertinity of the country are major culprits of food insecurity (Sher et al., 2004). In the rular areas it can be easily observed that a large portion that male population is engaged as unskilled lanour, while women aregenerally self-employed in filed of agriculture like raising of livestock, collection and trade of wild medicinal and edible plants. In the northern mountanus areas of Khyber pakhtunkhwa the situation is more terribale as the major source for income and food of those areas are livestocsk and agri realted business, but due to afghan crisis and terrorist activities in the tribal areas has seriously put a blow to food availbilty. Furthermore, the old and traditional methods of agriculture and livestock rearing have further reduced the income of the locals. A recent study confirms that all the above mentioned constrains strongly affect the purchasing power of local people (Sher and Hussain, 2009). In terms of current caloric intake, roughly 40 percent of households in the area could be classified as food insecure (Khalil, 2007).

Celosia argentea, Trianthema portulacastrum, Amaranthus viridis, Solanum nigrum, Medicago denticulata Portulaca oleracea, Digera arvense and *Mentha longifolia* are most common edible wild plants for mosy of the population in study area. These plants are key component in the daily diet and source of survival during natural or manmade catastrophes. According to Food and Agriculture Organization (FAO) figures about 1 billion people of the world, especially those from developing countries depends mostly on edible wild plants for daily diet (Bharucha and Pretty 2010). Wild plants have been proven to sustain a balance between population and agricultural productivity in developing countries. In case of Pakistan foods rich in starch like rice, maize and wheta are major stable foods and are sole source of energy and protein intake; but they lack many other essential nutrients required for healthy growth and development. Due to availbilty of remarkable climatic zones, flora of Pakistan had huge diversity and is rich with waste number of plants types which still need to be explore. Most of these plants are domesticated for food and phramcutical purposes but still a huge number of other plants still grow in the wilderness. To ensure the intake of balanced diet, the increased consumpsion of wild edible plants is a sutiable alternate as these plants have rich reservoirs of many nutrient alond with many medicinal effects on human bodies. Analyzing such plants for nutritional and medicinal potential would enable the identification of unconventional food resources that can be used by the local inhabitants (Shad *et al*., 2013).

Several studies have been carried out on green vegetables but there are limited studies on nutritional values and biological potentials of wild edible plants of Pakistan. Despite the use of these plants, inadequate knowledge hinders intensive use and wider acceptance by some people in the society. So present study was designed to evaluate the nutritional profile of selected edible and to acess their antioxidant and antibacterial potential.

Table 1: Names, Classification, Distribution and Uses of the selected edible weed plants collected from Peshawar region

Plant's Name		Family	Discription	Uses
Botanical Name	Commen Name			
Mentha longifolia	Velani	*Lamiaceae (Labiatae)*	It's a perennial herb all most found in wet area	All parts of plants are used. Used for treament of wound, problem in glands, cold, cough, asthma, chest, muscles and digestive tract inflammation and infection (Jamzad et al.,2013)
Amaranthus viridis	slender amaranth	*Amaranthaceae*	It is one of the most common weeds in the tropics, subtropics and warm temperate regions	Amaranthus viridis is used as traditional medicine in the treatment of fever, pain, asthma, diabetes, dysentery, urinary disorders, liver disorders, eye disorders and venereal diseases.
Solanum nigrum	black nightshade	*Nightshade*	usually grows as a weed in moist habitats in different kinds of soils, including dry, stony, shallow, or deep soils,	naturally occurs in Africa and is used as food as well as medicinal plant in Cameroon to treat pneumonia, aching teeth, stomach ache, tonsillitis, wing worms, pain, inflammation and fever, tumor, inflammation, and also as hepaprotective, diuretic, antipyretic
Portulaca oleracea	Common purslane	*Purslanes*	Purslane grows wildly in India and is also known as luni-bhaji or kulfa in other parts of the country	What is common purslane used for? Its use as a purgative, cardiac tonic, emollient, muscle relaxant, and anti-inflammatory and diuretic

				treatment makes it important in herbal medicine.
Digera arvensis	Digera muricata	*Amaranthaceae*	Its native range is Northeastern and Eastern Tropical Africa to Malesia	In Senegal Digera arvensis is used internally against digestive system disorders and in India seeds and flowers are used to treat urinary disorders
Celosia argentea	Plumed Cockscomb	*Amaranthaceae*	Herbarium. Royal Botanic Gardens, Kew (K) · Collection. Useful Plants of West Tropical Africa	It is a unique source of Semen Celosiae whose contributions include purging the hepatic pathogenic fire, improving eyesight, and treating other eye diseases.
Trianthema portulacastrum	Black Pigweed	*Stone plants*	Trianthema portulacastrum is a species of flowering plant in the ice plant family known by the common names desert horsepurslane, black pigweed, and giant pigweed.	are traditionally used as analgesic, stomachic, laxative, treatment of blood disease, anemia, inflammation, and night blindness.
Medicago denticulate	California burclover	*Legumes*	It is native to the Mediterranean basin but is found throughout the world.	Medicago sativa (Family: Fabaceae) was used traditionally for the treatment of arthritis, kidney problems, fever, as diuretic, anti-cancer, anti-rheumatic, cardiotonic, depurative, lactagogue, emmenagogue, antiscorbutic and in the treatment of boils.

MATERIALS AND METHODS

The current study was carried out to evaluate the antioxidant; antibacterial, proximate and micronutrients composition of eight edible weeds of district Peshawar namely *Mentha longifolia, Solanum nigrum, Amaranthus viridis, Portulaca oleracea, Digera arvensis, Medicago denticulate, Celosia argentea, Trianthema portulacastrum*. Weeds were collected from different field of Larama, Charsadda road. Plant samples were shade dried for 45 day and grinded with the help of electric grinder and sieved with cheese cloth to obtain fine powder.

Proximate analysis

The samples were analyzed for moisture, ash, crude protein, crude fiber, crude fats and carbohydrate contents. All analysis was performed three times in accordance with standard procedure of AOAC-2012 food analysis method.

Moisture Percent (%)

One gram powder of each weed sample was taken in a petridish and was weight along with petridish. The initial weight was noted and the petridish was placed in an oven at $105C^0$ for 24 hrs. After 24 hrs the petridish was again weighted and the reading was noted. The moisture content was analyzed by using following formula.

$$Moisture\ \% = \frac{Weight\ of\ sample\ before\ drying - Weight\ of\ sample\ after\ drying}{weight\ of\ sample} \times 100$$

Ash Percent (%)

One gram of sample was taken in sterilized crucible and weight crucible and note initial reading. Crucible placed in furnace at 550 ^oC for six hours and destroyed all organic contents except minerals in the sample ash. Weight again all samples and note readings. Apply following formula for ash percent,

$$Ash\ \% = \frac{W1 - W2}{Wt\ of\ Sample} \times\ 100$$

Crude protein (%)

Crude protein was determined by the process on Kjeltech Appratus. 1 g of dried plant sample was added to mixture of CuSO4 and KSO_4 (in conc. of 1:7)

and 15 mL of H_2SO_4 (conc.) was then addaed to the mix in a digestive flask. This solution was heated until it became transparent and later cooled down. After that the solution was pored into a volumatory flask and distalled water is added to obtain 100mL volume. 10 mL of digested mixture was poured into kjaldal apparatus along with 10mL NaOH and 20mL Boric acid. 2-3 drops of methyl red indicator was added and heated until the appearance of yellow color. Later on this solution was titrated against 0.1 N of HCl in burette till appearance of pink color. Crude Protein percent were finding by the following formula;

$$Crude \text{ Protein } \% = \frac{(Sample\ reading - blank\ reading) \times N \times 0.014 \times D}{Wt\ of\ Sample \times volume} \times 100$$

Where; N = normality of acid; 0.014 = equlent weight of nitrogen; D = dilution

Fiber analysis

2 g of plant sample was mixed with 200mL NaOH (2%) in a beaker and heated for 30min in water bath and let to cool under room temperature. The solution was then filter with the help of Whatmen filter paper No.4. Filtrates was washed with hard water to remove any acid from it. Filtrate was then transfered to a crucible and dried in oven at 105 ^{0}C for 4 hours and weight of crucible (W1) was noted. After that crucible was again placed in muffle furnace for 4 hours at 550C^0. The crucible was cooled in dissector for 30 minutes and then weight again (W2). Total fiber content was recored with the help of following formula;

$$Fiber\ (\%) = \frac{W1 - W2}{Wt\ of\ sample} \times 100$$

Fat analysis

1 gram of plant sample was wraped in a filter paper and placed in a thimble. The thimble was then fixed in soxhlet extraction by using 1/3 petroleum ether as a solvent having a boiling point of 40-60C^0. Petroleum solvent absorbed the fat within 4-6 hours. The weight of beaker was noted to find the total fat content.

Carbohydrates analysis

Carbohydrates were find out by applying the following formula

$$\text{Carbohydrate \%} = 100 - (\text{moisture} + \text{protein} + \text{lipid} + \text{ash contents})$$

Mineral analysis

Minerals were find out by using atomic spectrum. One gram plant sample was taken in digestion flask and 10 ml conc. HNO_3 was added to it and left for overnight so that the digestion of minerals can be completed uniformly. Than next day 4 mL perchloric acid was added to the mixture and heated till the appearnec of transparent color. The solution then tranfered to a volumetric flask and 100mL of distal water is added to it. The solution was introduced to atomic spectrometer and analyzed for copper, zinc, manganese, iron, calcium and magnesium contents.

Antioxidant analysis

The antioxidant activity of the samples was calculated on the source of the scavenging activity of the stable 1, 1- diphenyl 2- picrylhyorazyl (DPPH) free radical. 0.0005 gram of sample in 100 ml of methanol and form a solution of 0.004% of DPPH by the addition of 100 ml of methanol. 4 ml of DPPH solution in a test tube and add it 1 ml of sample solution and then test tubes were incubate in dark region for 20 minutes. After incubation prepare solution were introduce to absorbance spectrum at 517 nm. DPPH in methanol was taken as control the difference between absorbance of control and test sample showed the percentage scavenging of DPPH radical. Experiment was performed three times. Higher scavenging activity were be indicated by lower absorbance.

The percentage of scavenging activity calculated by the following equation:

$$\text{scavenging activity (\%)} = \frac{\text{control} - \text{test}}{\text{control}} \times 100$$

ANTIBACTERIAL ACTIVITY (Agar well method)

Extracts preparation

To calculate the antimicrobial activity of selected edible weed plants. Stock solution was made by mixing dried plant powder with sterilized distilled water (SDW) at a ratio of 1:10 in 20mL beakers. The beakers were then coverd with alimunium foil and left for 48 hours at room temperature. Different concentration were made from the stock solution which were 0% (only

SDW), 25% (1ml stock and 3ml SDW), 33% (1ml stock and 2ml SDW), 50% (1ml stock and 1ml SDW) and 100% (only stock extract) for antimicrobial assay.

Media preparation

Take nutrients agar (28 g/L) was mixed in distilled water and mixture was sterilize at temparture of 121 ºC in autoclave for 20 minutes. Petri dishes were also washed and sterilized at 121 ºC for 20 minutes. When the temperature of media fall to 45ºC it was poured in 90cm petridishes and were placed in Laminar Flow Unit until the solidication of media. Bacterial strain of *Ralstomia solanacearum* at value of 100µl was spread on the media in each plate and with the help of bent rod. Cork borer of 3mm size were used for wells. Six wells were made in each plate. The plant extracts were added in 5 wells whereas central well was used as positive control by adding 50µl of Streptomycin sulfate. These plates were incubated for 24 hrs at 28 ºC and data were recorded on zones of inhibition in mm.

Statistical analysis

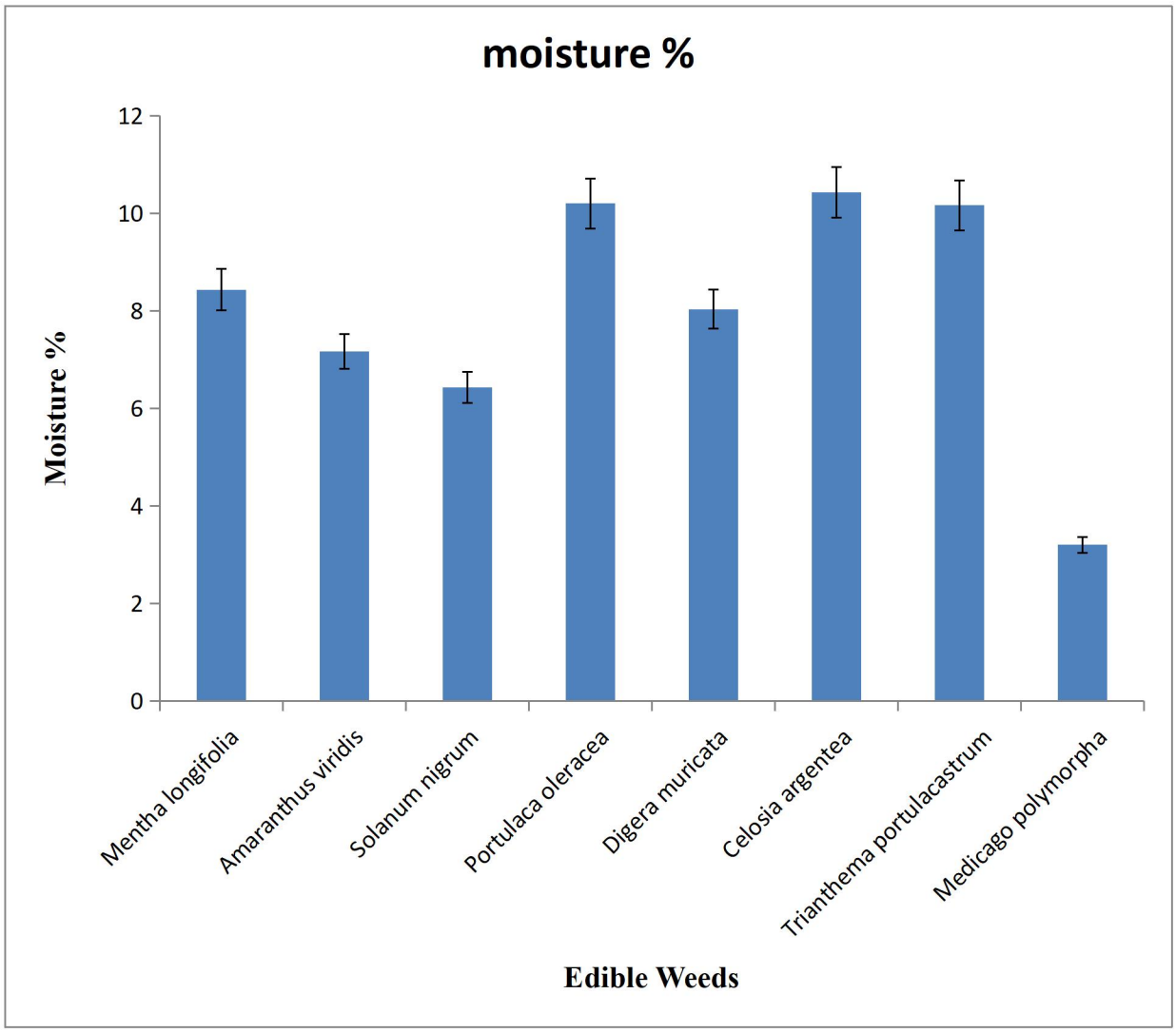
Using Completely Randomized Design (CRD) and means were subjected to "Statistix 8.1" software for analysis.

RESULT AND DISCUSSION

Moisture percentage

Moisture percentage of plants can be calculated by removing water from plants material through keep them under sunlight or oven. The dry material contain protein, carbohydrates, lipids, fiber, vitamins and microelements etc. (Bacha, 2011). The present results showed that *Mentha longifolia* has 8.433± 0.50, *Amaranthus viridis* has 7.166± 0.351, *Solanum nigrum* has 6.43±0.64 , *Portulaca oleracea* has 10.2±0.608, *Digera muricata* has 8.033±0.901, *Celosia argentea* has 10.43±0.503 *Trianthema portulacastrum* has 10.16±0.35 and *Medicago polymorpha* has 3.2±0.608. The results show that *Celosia argentea* contain higher percent of moisture and *Medicago polymorpha* has have lower percent of moisture.

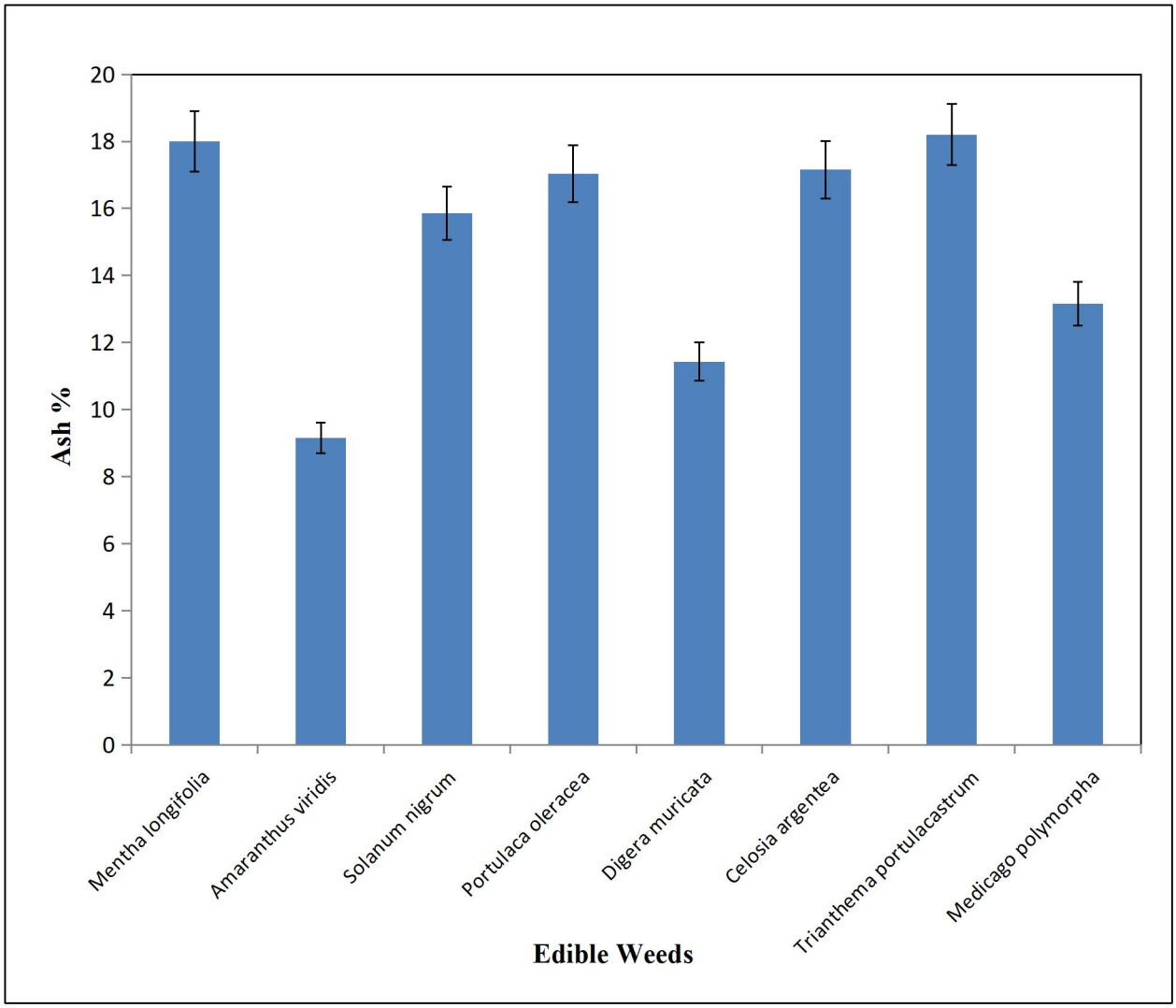
Figure 1: Moisture % of edible weeds



Ash percentage

Ash percentage would be find out by taken sample in oven at 550C^0 all water contents completely remove only organic matter are present in it in the form of ash.(lal bacha., 2011). The present data show that *Mentha longifolia* has 18±1.27, *Amaranthus viridis* has 9.16±0.351 , *Solanum nigrum* has 15.86±0.05 , *Portulaca oleracea* has 17.033±0.901 , *Digera muricata* has 11.43±0.503 , *Celosia argentea* has 17.16±0.351 *Trianthema portulacastrum* has 18.2±0.608 and *Medicago polymorpha* has 13.16±0.351. The results show that Trianthema *portulacastrum* and *Mentha longifolia* contain higher percent of ash. According to the studies of ghani *et al*., 2014 *Mentha longifolia* showed higher percentage of ash as compare to other plants they selected and Amaranthus *viridis* have lower percent of ash in present observation.

Figure 2: Ash % of edible weeds

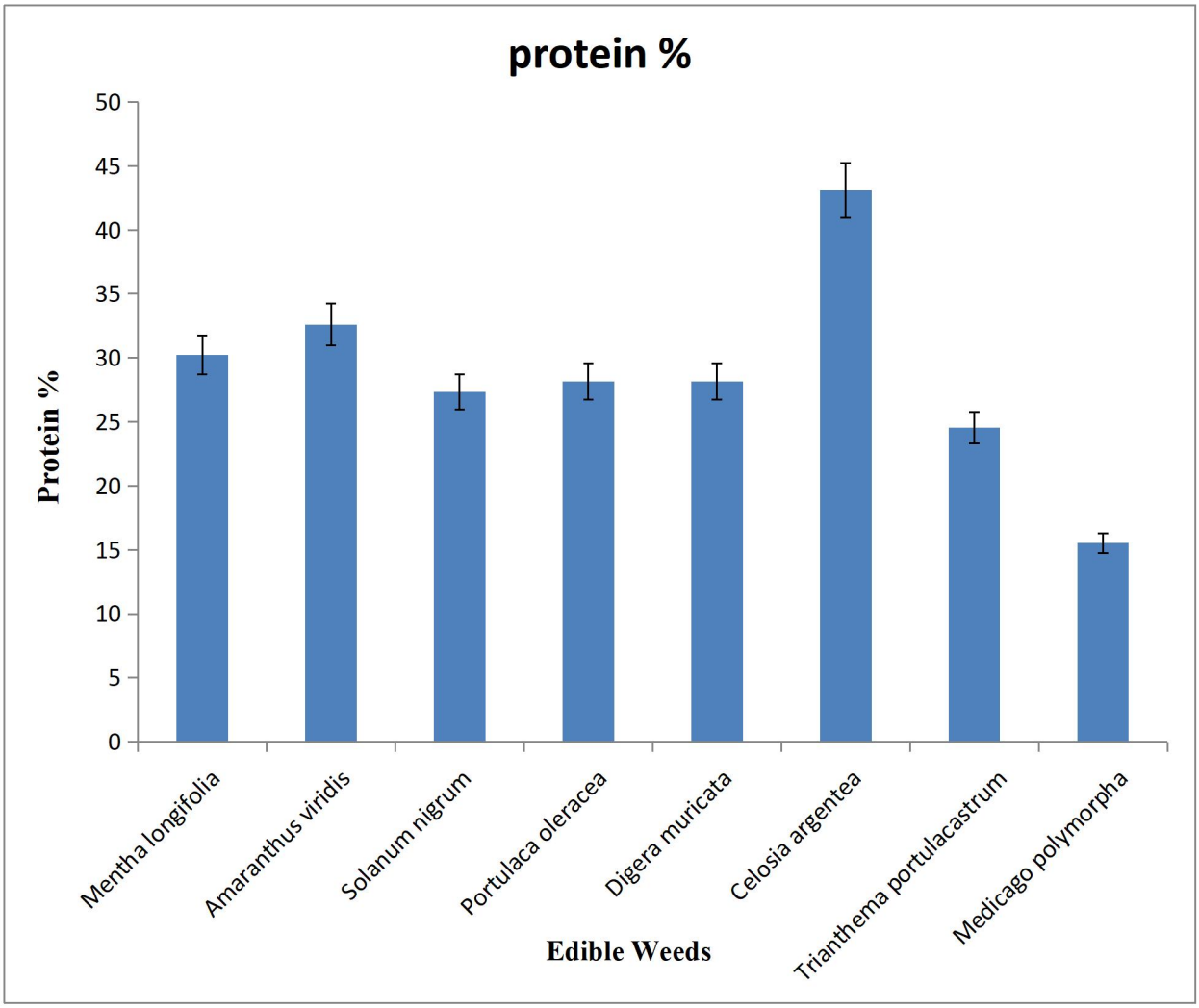


Protein

The present data show that *Mentha longifolia* has 30.233±0.15, *Amaranthus viridis* has 32.6±0.3, *Solanum nigrum* has 27.36±0.25, *Portulaca oleracea* has 28.16±0.351, *Digera muricata* has 28.16±0.351, *Celosia argentea* has 43.1±0.721. *Trianthema portulacastrum* has 24.53±0.55 and *Medicago polymorpha* has 15.53±0.55. The results show that *Celosia argentea* contain higher percent protein and *Medicago polymorpha* have lower percent of protein. Protein is organic compound which play very important role in all living organism like plants, animals, and microbes. Protein are not only the important component of different structure but it also play very important role in different metabolic processes like an enzyme it catalyzed all bio chemical reactions, like a hormone for example insulin it play important role in maintain or

control sugar in blood, like a transporter for example hemoglobin help in transport of oxygen. Animals take protein from plants and that protein help animals to prepare its own protein

Figure 3: Protein % of edible weeds

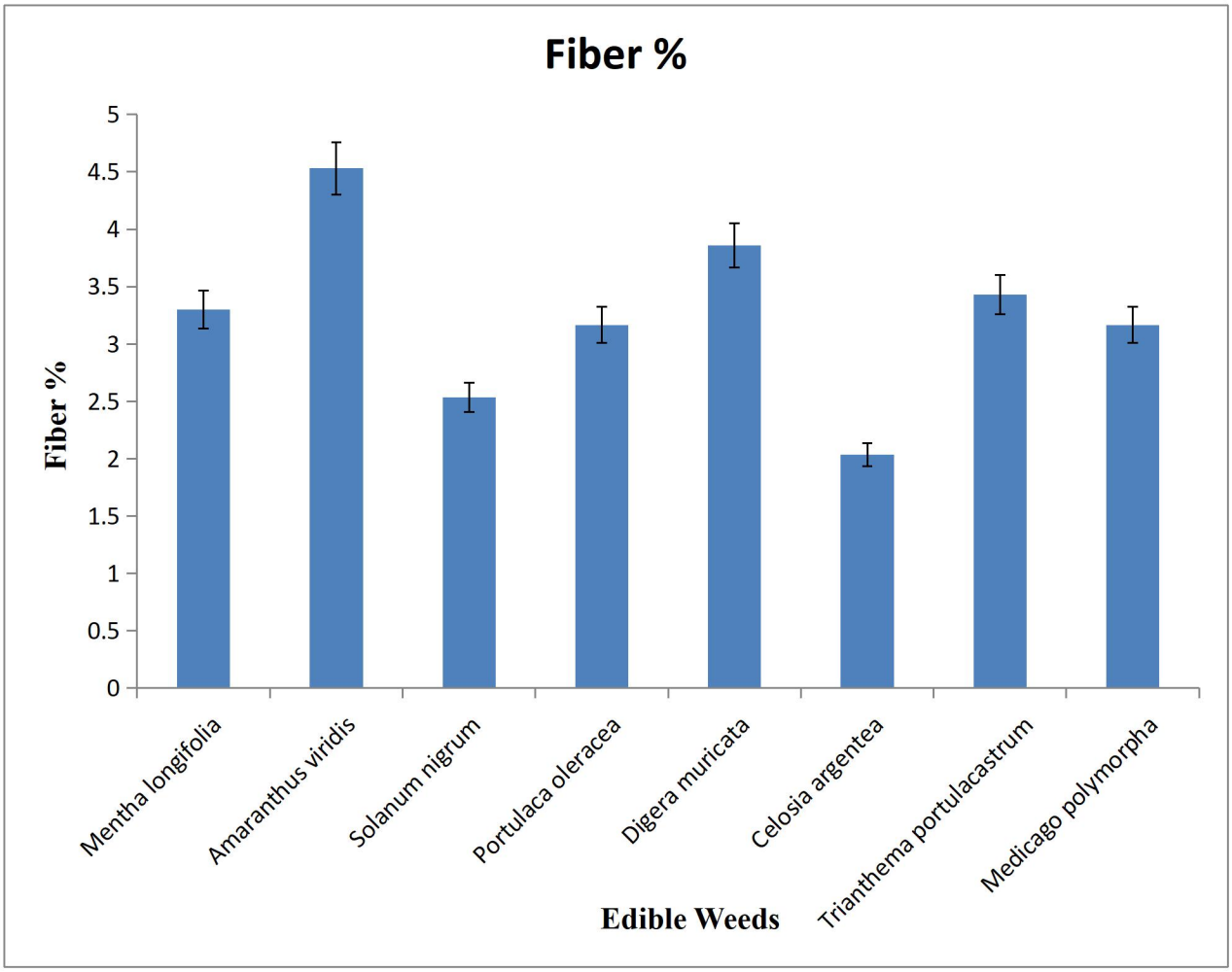


Fiber

The present data show that *Mentha longifolia* has 3.3±0.52, *Amaranthus viridis* has 4.53±0.55, *Solanum nigrum* has 2.533±0.55, *Portulaca oleracea* has 3.166±0.351, *Digera muricata* has3.86±0.057, *and Celosia argentea* has 2.033±0.901. *Trianthema portulacastrum* has 3.43±0.503 and *Medicago polymorpha* has 3.166±0.351. The results show that *Amaranthus viridis contain* higher percent fiber and *Celosia argentea* have lower percent of fiber. Fiber are also known as roughage or bulk. It is found only in plants animals take fiber from plants. It is indigestible therefore it help in excretion of waste material from body. Fiber prevent and relieves

constipation by stimulating intestinal muscles movement, it control weight by creating feeling of fullness.

Figure 6: Fiber % of edible weeds

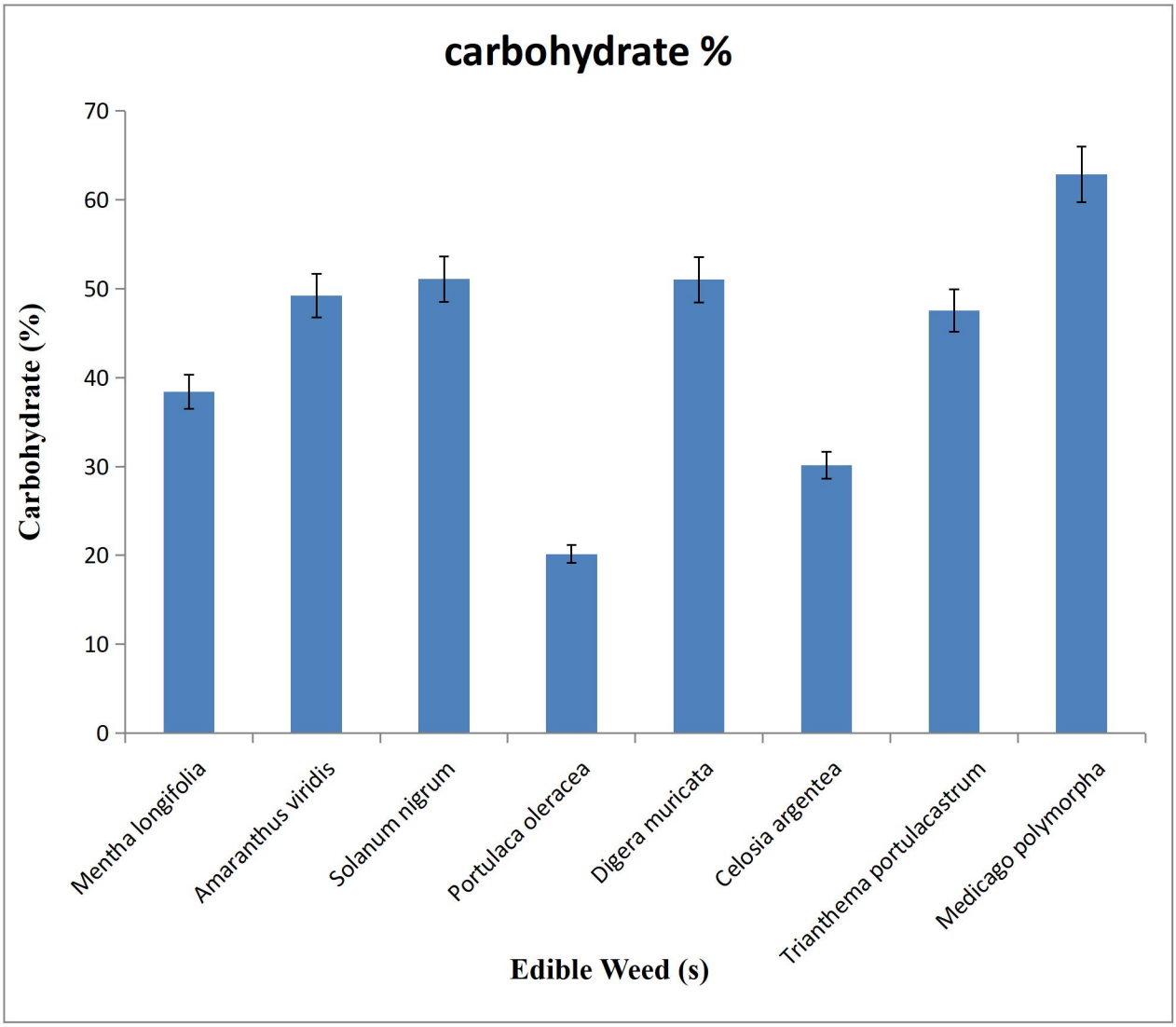


Carbohydrate

Carbohydrates are polyhydroxy aldehydes or ketones in which carbon, hydrogen and oxygen are main element. Carbohydrates are main source of energy in plants and animals. In plants carbohydrates are present in the form of sugar, starch and cellulose. Sugar are present in many fruits and vegetable in the form of glucose, fructose and sucrose etc. starch are storing food of plants store in roots, seeds and stems. Cellulose are part of cell wall it uses in many industries for the manufacture of many products. Carbohydrates also play important role in animal's source of energy and as vital biochemical compound like DNA and RNA. . The present data show that *Mentha longifolia* has 38.433±0.50, *Amaranthus viridis* has 49.23±0.152,

Solanum nigrum has 51.1±0.72, *Portulaca oleracea* has 20.166±0.35, *Digera muricata* has 51.033±0.901, *Celosia argentea* has 30.16±0.351, *Trianthema portulacastrum* has 47.53±0.55 and *Medicago polymorpha* has 62.86±0.057. The results shows that *Medicago polymorpha* contain higher percent carbohydrate and *Portulaca oleracea* have lower percent of carbohydrate.

Figure 5: Carbohydrate % of edible weeds

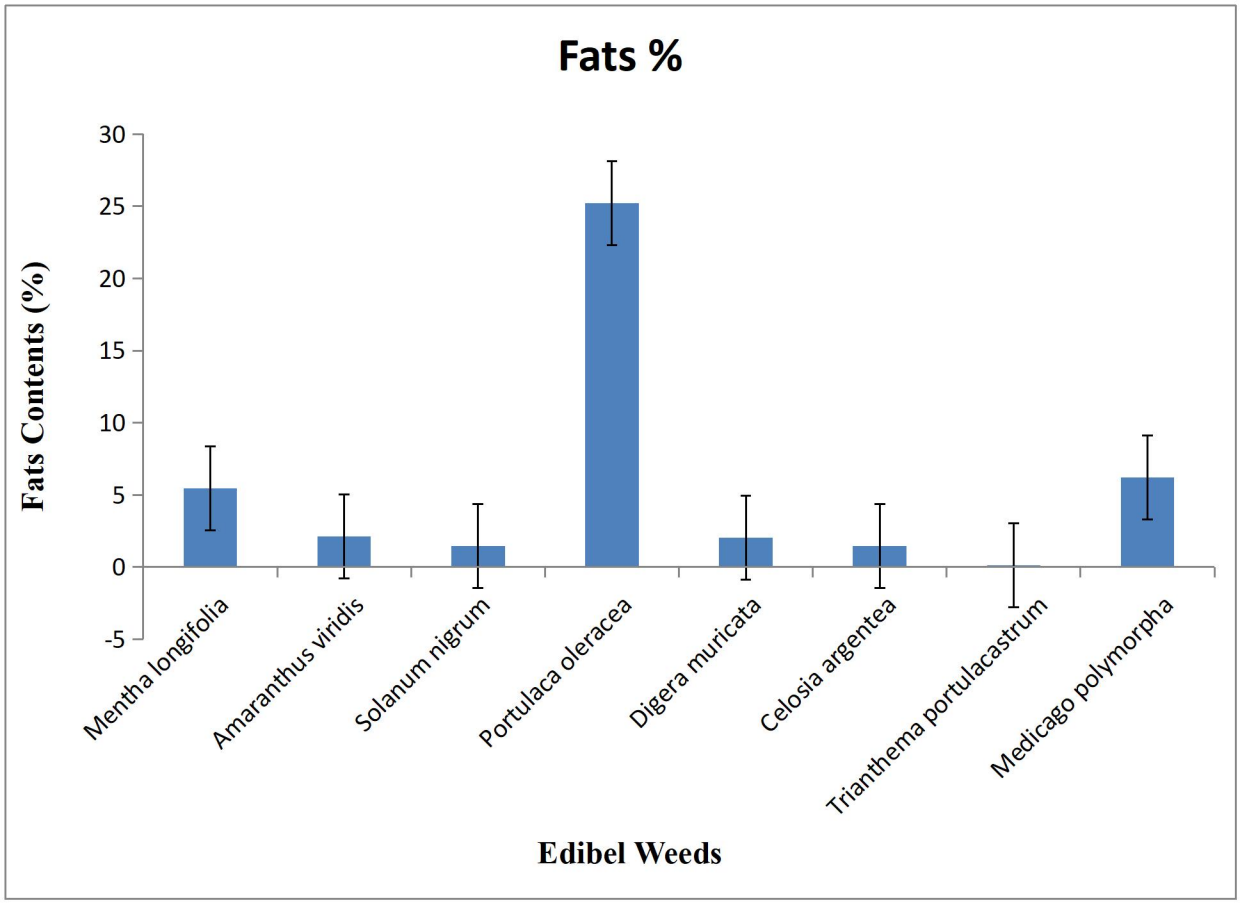


Fats (%)

Fats are non-polar and insoluble in polar solvent. Fats present in both plants and animals and play very important role. Fats give more energy than protein and carbohydrates. Fats are not only source of energy but it play very important role in transport of many materials for example

fat soluble vitamins. It serves as lubricant in animals and some hormones are lipid in nature and serve as chemical messenger. The present data show that *Mentha longifolia* has 5.433± 0.50, *Amaranthus viridis* has 2.13±0.351, *Solanum nigrum* has 1.43±0.50, *Portulaca oleracea* has 25.2±0.608, *Digera muricata* has 2.033±0.901, *Celosia argentea* has 1.43±0.503, *Trianthema portulacastrum* has 0.133±0.057 and *Medicago polymorpha* has 6.2±0.608. The results show that *Portulaca oleracea* contain higher percent fats and *Trianthema portulacastrum* have lower percent of fats.

Figure 4: Fats % of edible weeds



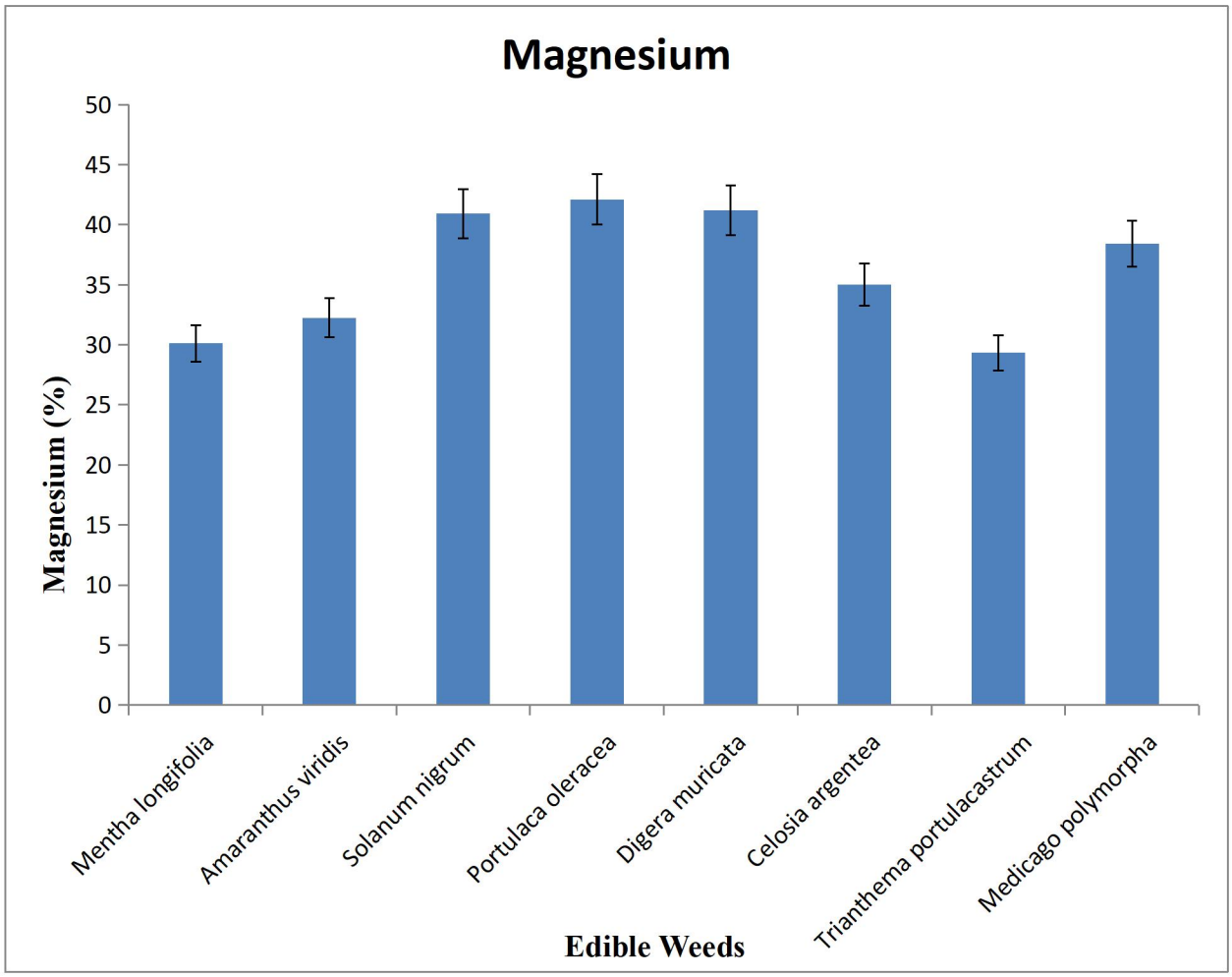
Mineral Analysis

Magnesium

In plants magnesium is a key element in chlorophyll, chlorophyll absorb light from sun and in photosynthesis it help in formation of energy in the light reaction and that energy used in the formation of carbohydrate in dark reaction of photosynthesis. Magnesium is also responsible

for joining of smaller sub unit and larger sub unit of ribosome in both plants and animals. Both smaller and larger sub unit of ribosome join together in the process of translation for formation of protein. The present data show that *Mentha longifolia* has 30.112±0.01, *Amaranthus viridis* has 32.244±0.057, *Solanum nigrum* has 40.922±0.001, *Portulaca oleracea* has 42.112±0.001, *Digera muricata* has 41.201±0.001, *Celosia argentea* has 35.021±0.001 *Trianthema portulacastrum* has 29.329±0.001 and *Medicago polymorpha* has 38.414±0.001. The results show that *Portulaca oleracea* contain higher percent magnesium and *Trianthema portulacastrum* have lower percent of magnesium.

Figure 13: Magnesium of edible weeds

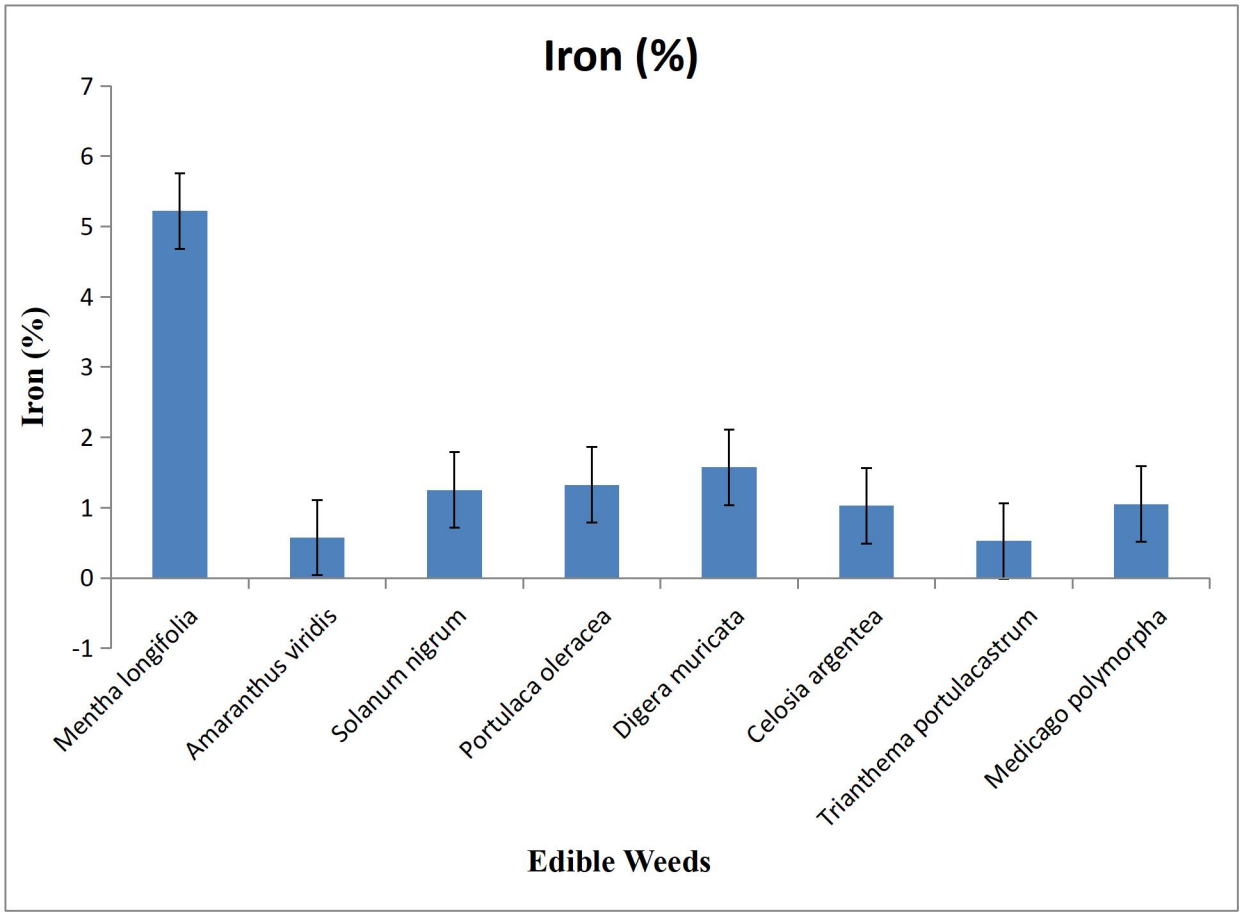


Iron

Iron play very important role in hemoglobin, hemoglobin is protein in nature it give red color to the blood and also responsible for the transport of oxygen in body these both process are

occur due to presence of iron in hemoglobin. The present data show that *Mentha longifolia* has 5.22±0.01, *Amaranthus viridis* has 0.575±0.0005, *Solanum nigrum* has 1.252±0.001, *Portulaca oleracea* has 1.325±0.001, *Digera muricata* has 1.575±0.001, *Celosia argentea* has 1.575±0.001, *Trianthema portulacastrum* has 0.527±0.001 and *Medicago polymorpha* has 1.052±0.001. The results show that *Mentha longifolia* contain higher percent iron and *Trianthema portulacastrum* have lower percent of iron.

Figure 11: Iron value of edible weeds

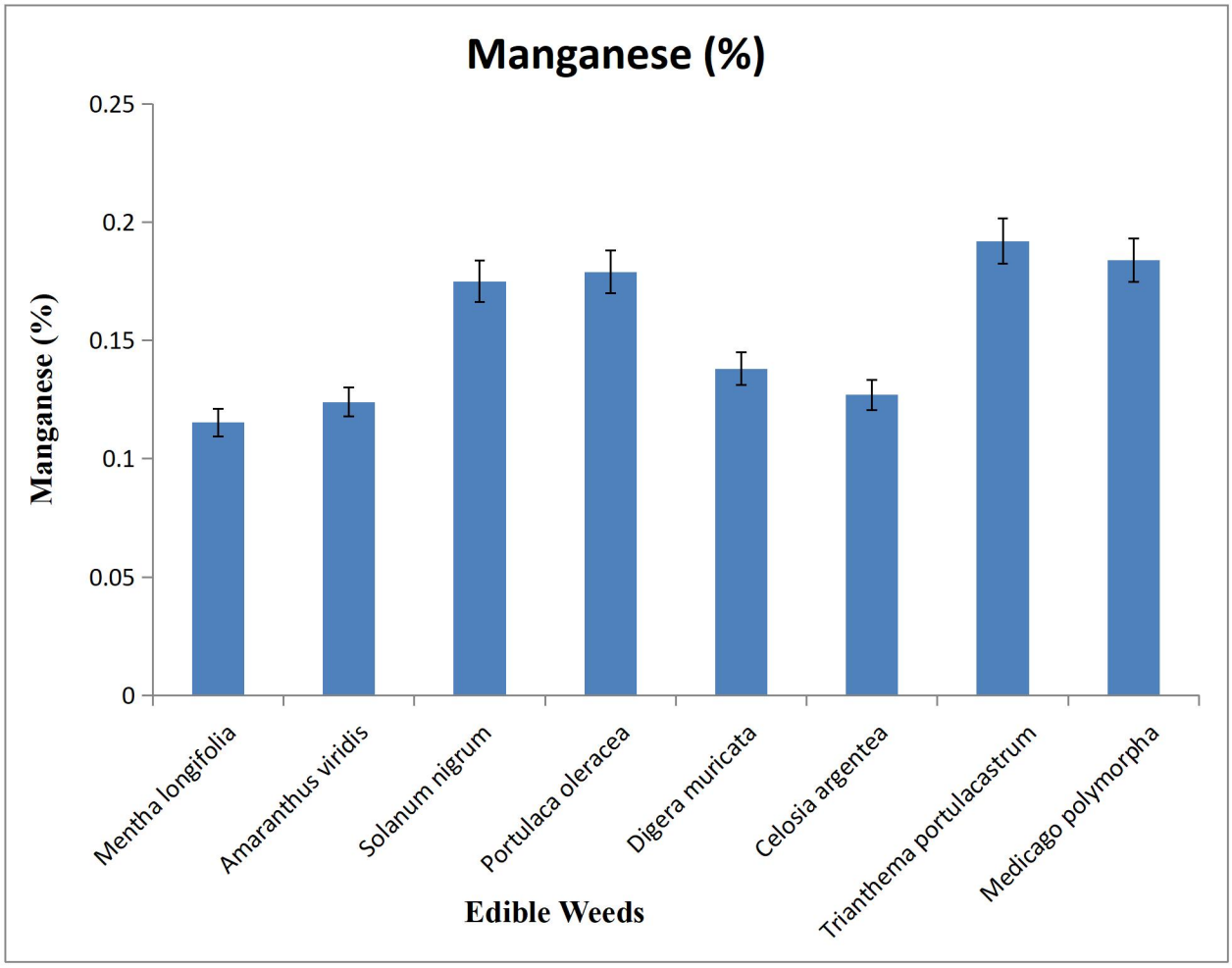


Manganese

Manganese is a micronutrient that is a important part of many mitochondrial enzyme. It play very important role in the reproduction, bones structure and normal functioning of nervous system. Due to deficiency of manganese epilepsy may be occur. Manganese is present in nuts, grains and vegetables and also in small amount in meat, poultry and fish. The present data show that *Mentha longifolia* has 0.1153±0.005 , *Amaranthus viridis* has 0.124±0.0005 , *Solanum*

nigrum has 0.175±0.0005 , *Portulaca oleracea* has 0.179±0.001 , *Digera muricata* has 0.138±0.001 , *Celosia argentea* has 0.127±0.001 *Trianthema portulacastrum* has 0.192±0.001 and *Medicago polymorpha* has 0.184±0.001 . The results show that *Trianthema portulacastrum contain* higher percent manganese and *Mentha longifolia have* lower percent of manganese.

Figure 10: Manganese of edible weeds

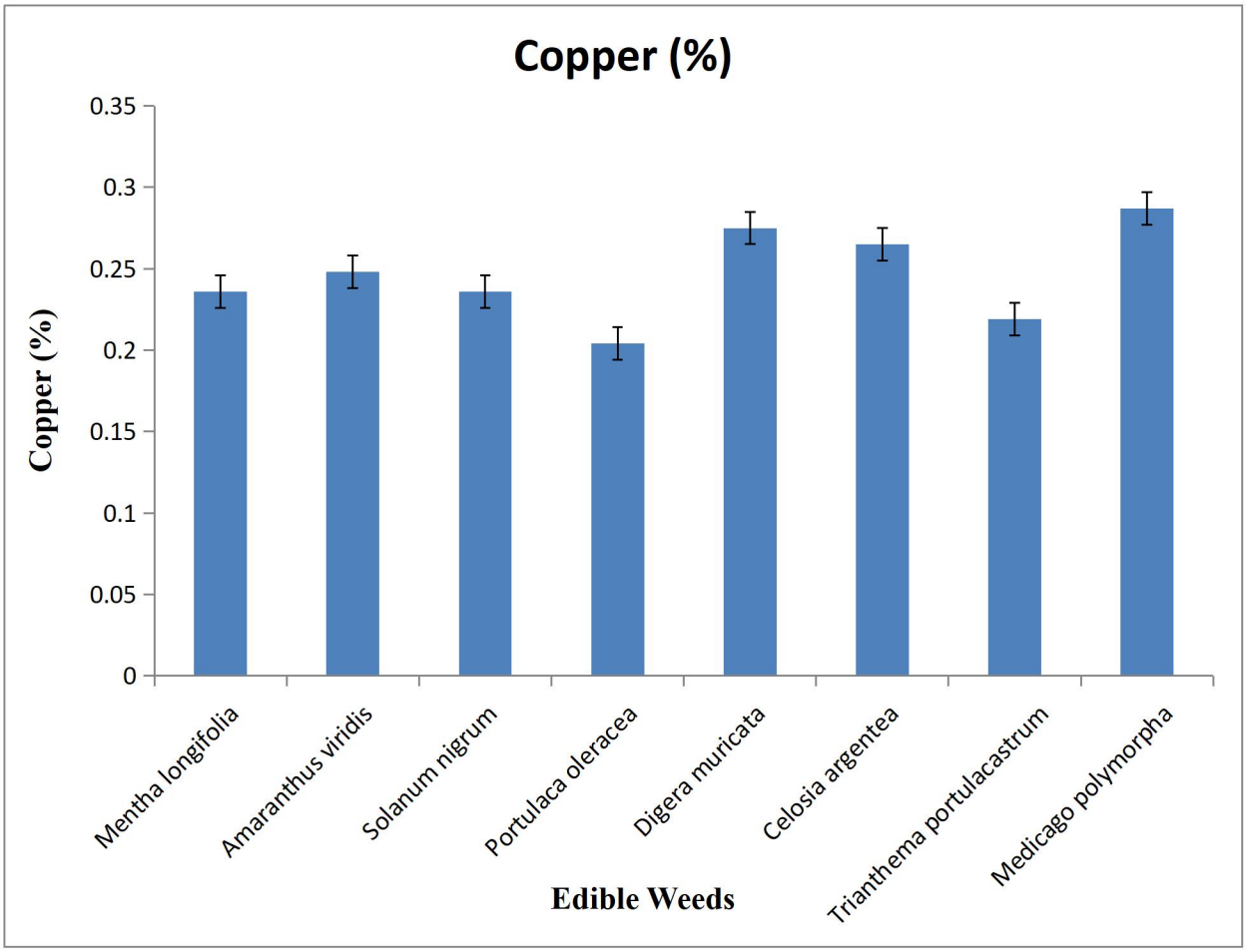


Copper

Copper take part synthesis of hemoglobin while in plants it play important role in the synthesis of chlorophyll. Copper is also important component in many oxidizing enzyme. Good source of copper are liver, nuts, kidney and dried fruits. . The present data show that *Mentha longifolia* has 0.236±0.005, *Amaranthus viridis* has 0.248±0.01, *Solanum nigrum* has 0.236±0.005, *Portulaca oleracea* has 0.204±0.001, *Digera muricata* has 0.275±0.001, *Celosia argentea* has 0.265±0.001, *Trianthema portulacastrum* has 0.219±0.001 and *Medicago*

polymorpha has 0.287±0.001. The results show that *Medicago polymorpha* contain higher percent copper and *Portulaca oleracea* have lower percent of copper.

Figure 8: Copper value of edible weeds



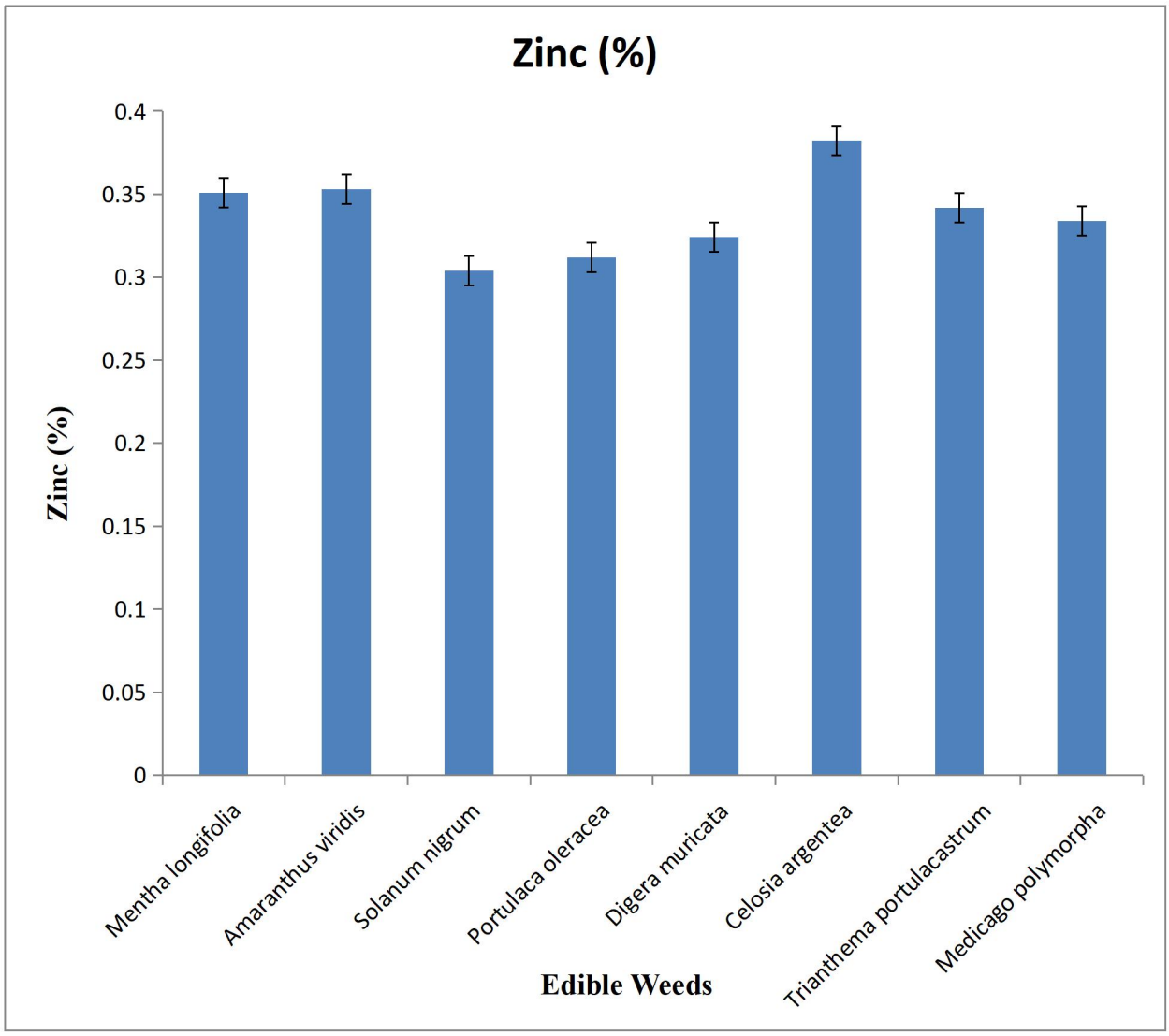
Zinc (%)

Zinc is necessary for growth and reproduction it help in repairing of tissue and wounds. Zinc also play an important role in the protein synthesis and also part of many enzyme as cofactor. Due to deficiency of zinc growth retardation, sexual immaturity and poor wound healing may be occur.

The present data show that *Mentha longifolia* has 0.351±0.0005, *Amaranthus viridis* has 0.353±0.01, *Solanum nigrum* has 0.304±0.0005, *Portulaca oleracea* has 0.312±0.001, *Digera muricata* has 0.324±0.001, *Celosia argentea* has 0.382±0.001, *Trianthema portulacastrum* has

0.342±0.001 and *Medicago polymorpha* has 0.334±0.001. The results show that *Celosia argentea* contain higher percent zinc and *Solanum nigrum* have lower percent of zinc.

Figure 9: zinc value of edible weeds



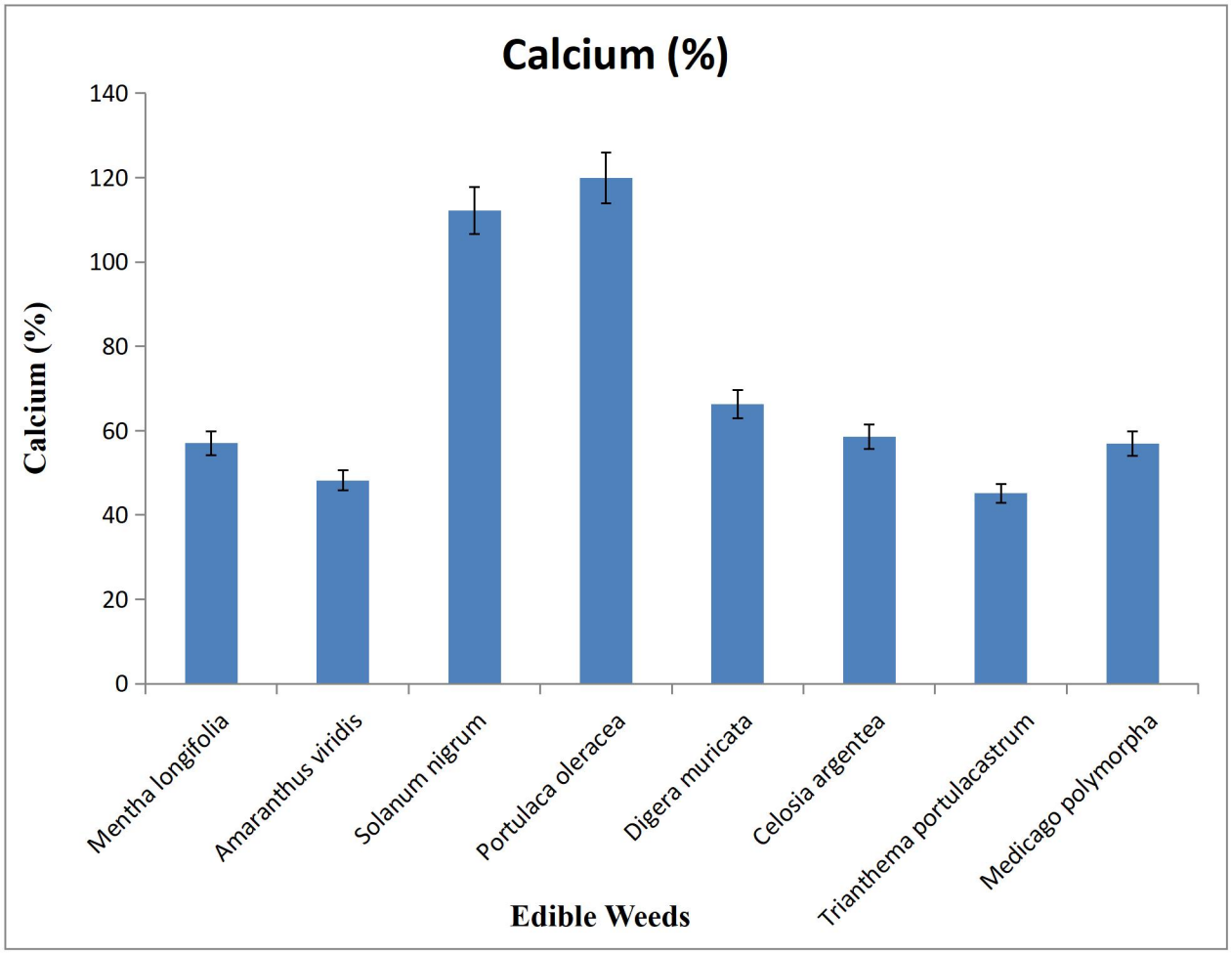
3.2.6. **Calcium**

Calcium is component of bones and teeth and also help in contraction of muscles. Calcium help in transmission of nerve impulses, blood clothing, enzyme activation and regulate the permeability of membrane. Calcium is obtained from both plants and animals sources like milk and milk product are the good source of calcium and in plants wheat, fruits and green vegetable

are good source of calcium. According to the present data obtain from different activity show that *Mentha longifolia* has 57.012±0.001,

Amaranthus viridis has 48.213±0.005, *Solanum nigrum* has 112.222±0.001, *Portulaca oleracea* has 119.921±0.001, *Digera muricata* has 66.295±0.001, *Celosia argentea* has 58.529±0.001, *Trianthema portulacastrum* has 45.102±0.001 and *Medicago polymorpha* has 56.925±0.001 percent of calcium. In which *Portulaca oleracea* show higher percent of calcium and *Trianthema portulacastrum* show lower percent of calcium.

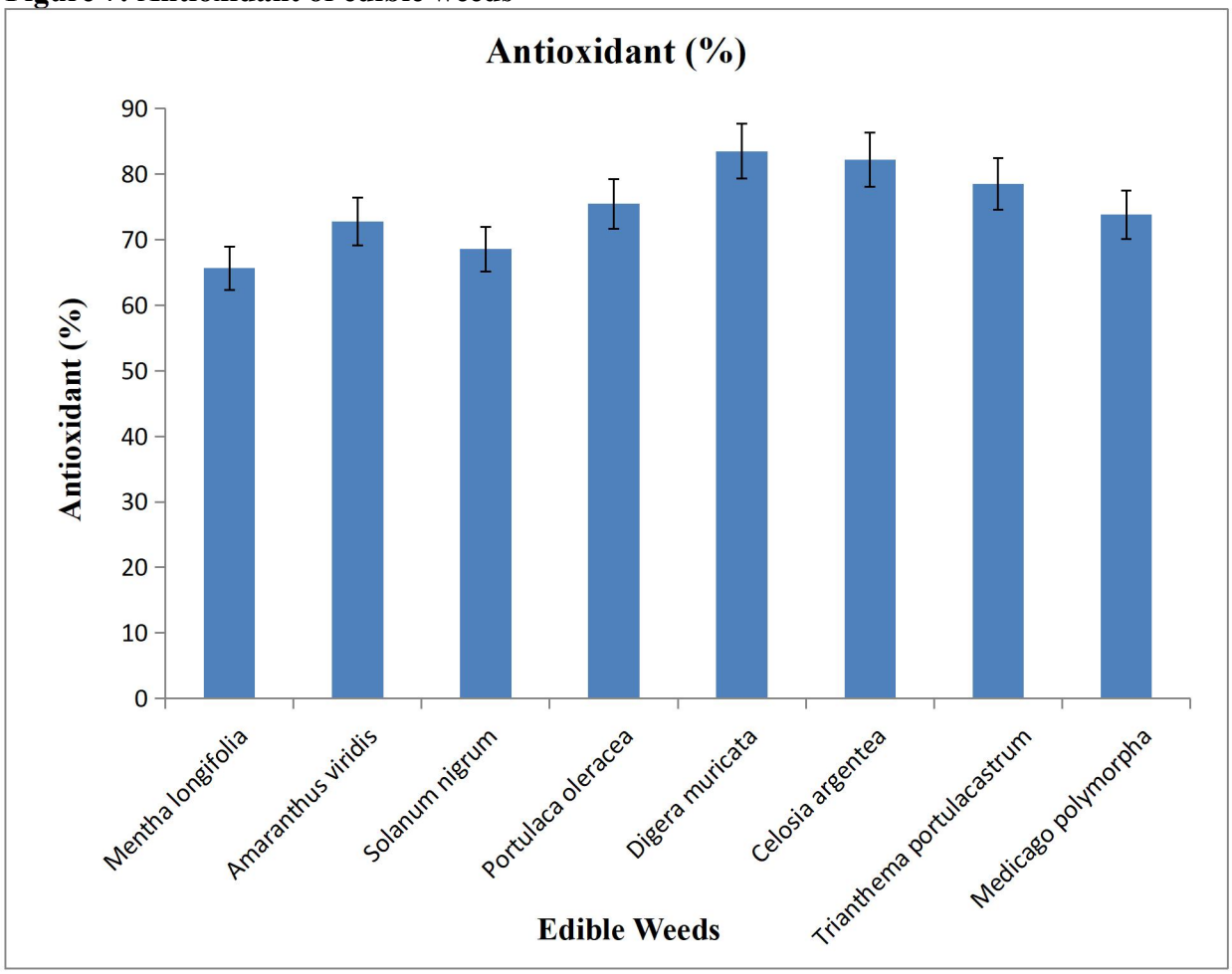
Figure 12: Calcium of edible weeds



Antioxidant activity

In living organism many metabolic process are occur due to that process many free radicals are produce which act as oxidant which damage living cells and cause abnormalities. Antioxidant are those compound which act against oxidant and save cells from harmful effects of free radicals. Animals obtain antioxidant through plants use as fruits and vegetable. The present data show that *Mentha longifolia* has 65.63±0.152, *Amaranthus viridis* has 72.8±0.1, *Solanum nigrum* has 68.56±0.208, *Portulaca oleracea* has 75.46±0.378, *Digera arvensis* has 83.5±0.1, *Celosia argentea* has 82.2±0.1, *Trianthema portulacastrum* has 78.5±0.1 and *Medicago denticulate* has 73.8±0.1. The results show that *Digera arvensis* contain higher percent of antioxidant and *Mentha longifolia* have lower percent of antioxidant.

Figure 7: Antioxidant of edible weeds



Antibacterial Activity

Ralstonia solanacearum is also called *Pseudomonas solanacearum. Ralstonia solanacearum* caused Bacterial wilt in many plants species like tomato, egg plant, ginger and capsicum etc. (Chandrashekara *et al* 2012) present studies are indicated that how these bacterial growth were control by plants species.

Antimicrobial activity of eight edible weeds i.e., *Celosia argentea*, *Trianthema portulacastrum, Amaranthus viridis, Solanum nigrum, Medicago denticulate, Portulaca oleracea, Digera arvensis* and *Mentha longifolia* were tested against *Rasltonia solanacearum* causing bacterial wilt of solanaceous crops. In the present study, mean percent zone of inhibition of concentration was significantly higher in control (12.79 mm) follow by 100% (7.39 mm), 50% (5.44 mm) and 33% (3.65 mm). Minimum zone of inhibition were recorded in 25% (1.87 mm). Streptomycin sulphate @ 200ppm was used in the control treatments showing the highest zone inhibition (12.79 mm) while 0% was moaked treatment using sterile distilled water (SDW).

Mean zone inhibition of extracts were which showed that *S. nigrum* has maximum inhabiting ability against *R. solanacearum* which was measured 7.71mm followed by *M. denticulate* (6.56 mm), *D. arvensis* (6.14 mm), *C. argentea* (5.93 mm), *P. oleracea* (5.79 mm), *T. portulacastrum* (4.67 mm). Minimum zone of inhibition were measured in *M. longifolia* (2.62 mm) and *A. viridis* (2.11 mm).

Water extracts of *D. arvensis* and *P. oleracea* gave the most promising control of the pathogen when 100% concentration was used, 10.42 mm and 10.41 mm respectively, but insignificant with 100% concentrated extract of *S. nigrum* gave 10.25 mm of inhibition zone. These were followed by 50% concentrated extract of *S. nigrum* with the formation of 9.52 mm inhibition zone which was significantly lower from 100% concentrated extracts of *D. arvensis* and *P. oleracea* but insignificant 100% concentrated extract of *S. nigrum* itself. *A. viridis* gave no result when used in all concentrations; similarly, *M. longifolia* gave 0% results when used at the concentration of 25, 33 and 50% concentrated extracts.

Table-1. This table shows the antibacterial activity of common weeds against the bacterial wilt pathogen, R. solanacearum**.**

S.No	Extracts	Concentrations						Means
		Control	0%	25%	33%	50%	100%	
1	*Medicago denticulate*	13.00 a	0.00 o	3.33 m	5.50 j	8.38 fg	9.17 ef	6.56 b
2	*Digera arvensis*	13.33 a	0.00 o	2.50 n	3.23 m	7.58 gh	10.42 c	6.14 c
3	*Solanum nigrum*	13.00 a	0.00 o	5.17 jk	8.33 fg	9.52 de	10.25 cd	7.71 a
4	*Celosia argentea*	11.67 b	0.00 o	3.22 m	4.47 kl	7.25 hi	8.98 ef	5.93 c
5	*Amaranthus viridis*	12.67 a	0.00 o	0.00 o	0.00 o	0.00 o	0.00 o	2.11 f
6	*Portulaca oleracea*	12.67 a	0.00 o	0.33 o	4.75 jkl	6.55 i	10.41 c	5.79 c
7	*Mentha longifolia*	13.00 a	0.00 o	0.00 o	0.00 o	0.00 o	2.75 mn	2.62 e
8	*Trianthema portulacastrum*	13.00 a	0.00 o	0.67 o	2.93 mn	4.28 l	7.13 hi	4.67 d
Means		12.79 a	0.00 f	1.87 e	3.65 d	5.44 c	7.39 b	……

$LSD_{0.05}$ for Extracts= 0.3538 $LSD_{0.05}$ for Concentration= 0.3064

$LSD_{0.05}$ for Extracts x Concentration= 0.8665

DATA AVAILABILITY

The data that support the findings of this study are listed in the article and are available from the corresponding authors upon reasonable request.

DECLARATION OF INTEREST

We declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere. The authors certified that there is no conflicts of interest associated with this publication, and there has been no significant

financialsupport for publishing this work that could have influenced its outcome. As corresponding Author, I conform that the manuscript has been read and approved for submission by all the named authors.

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