International Journal of Applied Research 2017; 3(6): 1098-1101

ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2017; 3(6): 1098-1101
www.allresearchjournal.com
Received: 12-04-2017
Accepted: 13-05-2017

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Analysis of antioxidant properties of *Moringa oleifera* Lam in urban and coastal area

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Abstract
Moringa oleifera is a plant which has high amount of Antioxidant properties and have greater ability to reduce the oxidative stress and maintain the cell functioning. This study compared total phenol, total flavonoid, total Alkaloid, total Terpenoid, Total Saponins, Total Tannin, content and antioxidant properties between urban and coastal *Moringa oleifera* The total phenol content in Urban *Moringa oleifera* is 0.67 mg/L and coastal area is 0.4mg/L. The total flavonoid content in Urban *Moringa oleifera* is 1.3 mg/L and coastal area is 1.1 mg/L. The total Tannin content in Urban *Moringa oleifera* is 0.02 mg/L and coastal area is 0.01 mg/L. The Total Saponin content in Urban *Moringa oleifera* is 2.3 mg/L and Coastal area is 2.6 mg/L. The Total Terpenoid content in Urban *Moringa oleifera* is 0.05 mg/L and Coastal area is 0.16 mg/l. The Total Alkaloid content in Urban *Moringa oleifera* is 0.5% and Coastal area is 0.3%.

Keywords: *Moringa oleifera*, coastal area, Antioxidant properties, oxidative stress

Introduction
Moringa oleifera is a plant (shrub) which belongs to the Moringaceae family. It contributes several immensive Antioxidant properties. Plant parts are widely used for many Medicinal purposes. The plant leaf is used for forage for animals, manure, and also used as a domestic cleansing agent. The non-sticking Moringa seed oil is used as a lubricant in the field of industrial products such as perfumes, cosmetics, and medicines. Several anti-microbial, anti-bacterial, anti-inflammatory, anti-ulcer, anti-diabetic properties have been reported in the *Moringa oleifera* plants. It is widely used as a good source of food preparation. Plant leaves has immensible amount of amino acids, carotenoids, vitamin C, and calcium.

When Human body undergoes oxidative stress. Which may induce the production of free radicals in the body and which cause imbalance in the cell metabolism. In order to stabilise the cell metabolism antioxidants are much more needed to resist against the oxidative stress and the production of free radicals. Phenols are aromatic compounds which has strong antioxidant activity. phenols are cancer resistant. The determination of phenols are done by the method by using spectrophotometer by using Folin- ciocalteau reagent. Flavonoids are compounds which is secondary metabolites shows greater antioxidant activity. Around 6000 Flavonoids has been identified through out the plant kingdom. Phenolics and Flavonoids contains polyphenols, cinnamic acid, and other organic acids. These may reduce the production of free radicals in the body. Tannins are compounds which is an astringent and widely distributed in the plant species which act as a production from predation and pesticide. Alkaloids are compounds which are produced by microbes, fungi, flora and fauna, which helps in the protection of plant species. It posses a bitter taste and harmful to other organisms when ingested. It posses several properties such as anti-microbial, anti-asthmatic, and anti-cancerous. Saponins are compounds which protect the plant species from the attack of microbes and fungi. They are amphipathic glycosides and they form soap like froth in the solvents and found in most of the plant species. Terpenoids gives aromatic properties to the plants. Which include scent, flavours, colours, etc. All these antioxidants are essential to the plant for the extensive growth of that plant species.

Materials and methods

The present study is based on the comparison between urban and coastal *Moringa oleifera*. *Moringa oleifera* is a most widely cultivated species of the genus Moringa which is the only genus in the family.

Sample collection

Fresh samples of leaves of *Moringa oleifera* Lam belonging to family Moringaceae were collected from Urban and Coastal area.

Estimation of antioxidants

Estimation of phenols

1gm of sample is collected in a beaker and add 80% methanol and kept it for 20 minutes and grind the mixture and filter it to the centrifuge tube. Centrifuge the samples at 5000rpm for 12 minutes. Collect the supernant make it as a known volume by using methanol. 0.1 ml sample is taken in the aliquot and make it to 3ml using methanol. Pour 0.5 ml FC reagent in to it and add 2ml 20%Na2Co3 kept the sample in to a water bath till the white precipitate occurs. When the precipitate is formed. Centrifuge it for 7000 rpm for 5 minutes. Take the absorbance at 650nm against the blank.

Estimation of flavonoids

Take 0.5 ml of plant extract and add 0.5 ml of distilled water to it then pour 0.3 ml if 5% NaNo2 solution and then incubate it for 5 minutes at 25*c and after incubation add 0.3 ml of 10% Aluminum chloride and 2 ml of 1M sodium Hydroxide was added and absorbance was calculated as 510 nm with quercetin as a standard

Estimation of tannins

1gm of plant extract was kept in 50% methanol. Keep it for 20-28 hrs. Centrifuge the extract and supernant was collected. Add 5 ml of Vanillin Hydrochloride reagent in to it and absorbance was measured at 500 nm. After 20 minutes A standard graph was prepared with 20-100 ug solution

Estimation of alkaloids

In a 250 ml beaker add 5g of *Moringa oleifera* leaf powder and add 20% acetic acid and keep it for 5 hrs. The solution was filtered and the volume is refuced to one quarter by using water bath. Then Ammonium Hydroxide solution was added to the extract drop by drop until the precipitate is formed and the sample is kept for some time to settle out. Then the precipitate was separated out and weighted. The percentage of Alkaloid was identified.

Estimation of saponins

50 ml of plant extract is taken in a beaker add add 250 ml of distilled water in to it and Then 250 ml of Vanillin reagent (800 mg of Vanillin in 100 ml of 99.5% ethanol) was added to the beaker and 2.5 ml of 75% sulphuric acid is poured and the solution is kept in the water bath for 60*c for 10 minutes it was cooled by using cooled water and the absorbance was measured at 544 nm. Diosgenin was used as a standard.

Estimation of terpenoids

0.8 gm of plant leaf extract was taken in a test tube. 10 ml of methanol was poured in the extract. The extract was shaken well and then 5 ml solution was filtered then 2 ml of chloroform and 3 ml of sulphuric acid was poured in the leaf sample solution. The reddish precipitate is formed and then read the absorbance at 538 nm against linalool in methanol as blank.

Results and discussion

High amount of Antioxidant Activities are found in the compounds like Flavonoids, Phenols, Tannins, Saponins, Alkaloids, Terpenoids, which induce resistriction to the oxidative stress by scavenging the free radicals by producing electrons. Antioxidant activity and phenolic content are interlinked. The total phenol content in urban *Moringa oleifera* is 0.6 ±1099 0.03 mg/g and coastal area is 0.4±10990.01 mg/g which is less than urban area. The total Flavonoid content in urban area is 1.3±10990.006 mg/g and coastal area is 1.1±10990.003 mg/g which is less than urban area. The determination of Flavonoid content is described in the Goyal *et al*; 2007 [9]. The Tannin content in urban *Moringa oleifera* is 0.02±10990.003 mg/g and coastal area is 0.01±10990.007 mg/g which is less than urban area. The determination of Tannin content in *Moringa oleifera* is discussed in perixoto *et al;* 2011 [24]. The total saponin content of *Moringa oleifera* in urban area is 2.3±10990.03 mg/g and coastal area is 2.6±10990.06 mg/g which is greater than urban area. The Terpenoid content in urban *Moringa oleifera* is 0.05±10990.005 mg/g and coastal area is 0.16±10990.009 mg/g which is greater than urban area. The Alkaloid content of urban area is 0.5% and coastal area is 0.3%. The determination of antioxidant properties in *Moringa oleifera* is discussed in sankhalkal *et al*; 2014 [28].

Conclusion

From the present study, conclusion is that the leaf extract of *M. oleifera* Lam exhibit high antioxidant properties. The plant extracts contains large amounts of flavonoids, phenolics, tannins, saponins, and alkaloids. The study showed that both the urban and coastal *Moringa oleifera* plants are a source of significant natural antioxidants and may be useful in protection against oxidative stresses. Urban *Moringa oleifera* shows more antioxidant activity in comparison to coastal *Moringa oleifera Lam.* Thus, there exist a strong correlation between the increased antioxidant enzyme activity in both the urban and coastal *Moringa oleifera* plants.

Acknowledgment

We would like to place on record my deep sense of gratitude to Dr. Reshma J.k, Head of the Department, Post Graduate Department of Environmental sciences, all saint's college, Thiruvananthapuram for her able guidance, encouragement and cooperation in under taking the research work. I also extend my sincere gratitude to the other faculty members of the college. The teaching and non-teaching staffs of the college are also deeply acknowledged.

Table 1: Antioxidant content in urban and coastal *Moringa oleifera* Lam

Experiment	Urban Mean ±1100 Stadard dev.	Coastal Mean± Standard dev
Total phenols (mg/ml)	0.67±11000.03	0.42±11000.01
Flavonoids (mg/ml)	1.3±11000.006	1.1±11000.003
Tannins (mg/ml)	0.02±11000.003	0.01±11000.007
Saponins (mg/ml)	2.3±11000.03	2.6±11000.06
Terpenoids (mg/ml)	0.05±0.005	0.16±0.009
Alkaloids (%)	0.5	0.3

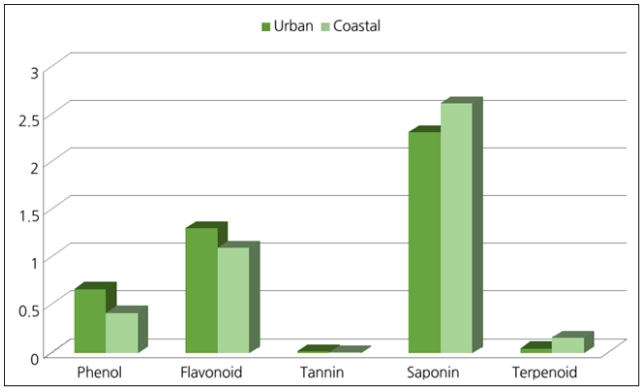

Fig 1: Total Phenol, Flavonoid, Tannin, Saponin and Terpenoid Content in Urban and Coastal *Moringa oleifera*

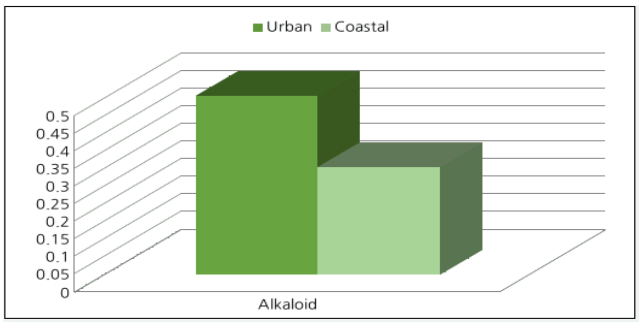

Fig 2: Total Alkaloid content (%) in Urban and coastal *Moringa oleifera*

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