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Analysis of antioxidant properties of *Murraya koenigii* (Linn) in urban and coastal area

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Abstract

Murraya koenigii (Linn) is the plant which posses strong antioxidant properties and enhance the metabolism of body by reducing human stress. The study is the comparison of antioxidant properties of *Murraya koenigii* such as Total phenol, Total flavonoid, Total saponins, Total terpenoid, Total tannin content in urban and coastal area. The total phenol content both in urban and coastal *Murraya koenigii* is 2.90mg/L. The flavonoid content in urban *Murraya koenigii* is 2.11 mg/L and coastal area is 2.00 mg/L.. The saponin content in urban and costal area is 2.33 mg/L and 2.71 mg/L respectively. The terpenoid content in urban *Murraya koenigii* is greater than urban area, is 0.12mg/L and in coastal area is 0.05mg/L. The tannins content in urban *Murraya koenigii* is 0.03 mg/L and coastal area is 0.06mg/L. The alkaloid content in urban *Murraya koenigii* is 0.24% and coastal area is 0.61%.

Keywords: *Murraya koenigii*, coastal area, urban area, antioxidant properties, oxidative stress

Introduction

Plant have a significant role in the health care mechanism of human population *Murraya koenigii* which belongs to the Rutaceae family has great antioxidant activities which is commonly called as "Curry patta " or "mitha neem" consisting of 150 genera and 1600 species [1]. It is widely used in the flavouring agent as well as ethanobotanical and pharmacognosy of medicine [2-9]. The leaves of *M.koenigii*, called curry leaves, are commonly used for flavouring the Indian dishes as well as Natural antioxidants. Studied plant origin are important in health, food and preventive medicine. *Murraya koenigii* has antioxidant, antimicrobial, anti-inflammatory. Antimicrobial, mosquitocidal and vitamins like vitamin C, vitamin A, vitamin B, vitamin E are the significant source in *Murraya koenigii* [10-17].

Antioxidants has efficiency to scavenge the free radicals and thereby decreasing the oxidative stress. Antioxidant activity of *Murraya koenigii* is due to the high phenol content. Phenols are widely used as a cancer resistant. Phenolic antioxidants have the capacity to reduce lipid peroxidation, prevent DNA oxidative damage and scavenge reactive oxygen species. Leaves of *Murraya koenigii* posses high amount of phenolic and flavonoid content. Flavonoids are very effective scavengers of peroxy radicals, active oxygen radicals and chelators of metals. It inhibit the Fenton and Haber-Weiss reactions. Plant leaf protection was chanced by the production of saponins. Which protect the plant against microbes and fungi. Saponin forms a soap like frothing to the plant species. *M. koenigii* also possess significant amount of alkaloids. It posses anticancerous effects and antimicrobial activity against gram positive and negative bacteria, and fungi. The terpenoids are aromatic flavouring agent to the leaves and rich in vitamins more over tannins are more effective than phenols. It posses more antioxidant properties than phenol. Many biological activities and antibacterial effects have been reported for *Murraya koenigii* plant of tannins and flavonoids [29-31].

Material and methods

The present study is based on the comparison between urban and coastal area of *Murraya koenigii* (Linn).

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Collection of plant materials

Murraya koenigii L. plants were collected from different locations of Thiruvananthapuram district. The sample was collected during the month of January from two different locale- Coastal and Urban areas, and the leaf samples were later estimated for different parameters.

Sample preparation

Leaves of *Murraya koenigii* was washed with distilled water and dried under 8 days and grinded with mortar and pestle and stored under incubation.

Estimation of Antioxidant

1. Estimation of phenols

The leaf extract was collected and dipped in 80% methanol in a 250ml beaker and stored the extract up to 30 minutes and grind the mixture and filtrate it and filtrate is centrifuged in 5000 rpm for 12 minutes and make the supernate in to know volume by using methanol and add 0.5ml Folin-Ciocalteu reagent and add 2ml 20% Na₂CO₃ keep in boiling water bath for 7 minutes. (until the white precipitate occurs) white precipitate is centrifuged at 6000 rpm for 6 minutes and optical density is observed at 650 nm against the blank (M c Donald *et al*; 2001) [20].

2. Estimation of Flavonoids

0.6ml of leaf extract is added to the 0.6ml of distilled water and also 0.2ml of 5% NaNO₂ was added along it and incubated for 5 minutes at 30°C. Then 0.3ml of 10% AlCl₃ and 2ml of 1M NaOH was added to the reaction mixture and absorbance was noted at 570 nm. Quercetin was used as blank.

3. Estimation of Tannins

The leaf extract was taken in a 250ml beaker and 50% methanol is added to the beaker keep it for 24 hours and then added 5ml of vanillin hydrochloride reagent after 20 minutes read the spectrophotometer to 500nm.

4. Estimation of alkaloids

5g of *Murraya koenigii* leaf powder was taken in a beaker and 20% acetic acid was added and kept it 4 hours. And the mixture was reduced to 1 quantity by water bath and concentrated Ammonium Hydroxide solution was added drop by drop until the precipitate occur and filtrate was weighted and 1% of alkaloid was noted and calculated.

5. Estimation of saponins

250 ml of vanillin reagent was added in to 50 ml of leaf extract of *Murraya koenigii* and 25 ml of 75% sulphuric acid was added to the sample and the sample was kept in water bath for 60°C for 10 minutes and cooled with a ice and absorbance was observed it 544nm.

6. Estimation of terpenoids

0.7g of leaf extract sample and 10 ml of methanol was taken in a test tube and filter the solution to 5 ml and add 2 ml of chloroform and mix well. A reddish brown precipitate will form and observe the absorbance of 238 nm. Against linalool in methanol as blank.

Result and discussion

The present study detected that *Murraya koenigii* is rich in antioxidants like phenol, tannins, saponins, terpenoids, flavonoids, alkaloids These antioxidants are reported by Rani *et al*; 1924 [21-24]. Antioxidants have great ability to reduce the oxidative stress and increase the metabolism of human body [25-26]. It damages the free radicals and protect the body from stress [27, 28]. The phenol content was same in coastal and urban area 2.90 ± 0.01mg/g. Antioxidant activity of *Murraya koenigii* was due to higher phenolic content is described in Ningappa *et al.*, 2008. The flavonoid content in urban and coastal area was 2.11 ± 0.06 mg/g and 2.00 ± 0.04mg/g respectively. flavonoid is greatly found in coastal area. The determination of flavonoid content is described in the Gerber *et al*; 2002. The total saponin content of the present study has found that the greater values in coastal area 2.71 ± 0.02mg/g in *Murraya koenigii* compare with respectively to urban area 2.33 ± 0.01mg/g. Terpenoid content in coastal *Murraya koenigii* is 0.05 ± 0.04mg/g and urban area is 0.12 ± 0.02mg/g greater than coastal area. The total Tannin content in coastal *Murraya koenigii* is 0.06 ± 0.001mg/g and urban area is 0.03 ± 0.007mg/g which is greater than coastal area. The antioxidant of alkaloids in coastal area is 0.61% and urban 0.24 %. The antimicrobial activity of alkaloid from *Murraya koenigii* reported by Chowdhary *et al.*, 2001 and antioxidant activity of alkaloid reported by Tachibana *et al.*, 2003. The *Murraya koenigii* is rich source for carbazole alkaloids [19]. A number of secondary metabolites is reported in *Murraya koenigii* including phenolic, tannins, terpenoids, saponins, flavonoids, alkaloids determined by Rani *et al*; 1924 [18]. *M. koenigii* leaf extracts possess activity against some bacteria and fungi, it can be effective antimicrobial agent to treat numerous diseases discussed in Ziyat *et al.*, 1997. The present study reveal that *Murraya koenigii* constitute significant amount of antioxidant properties.

Conclusion

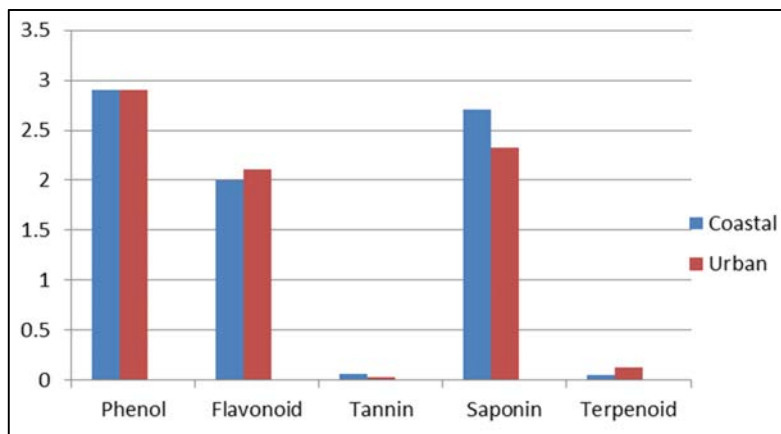
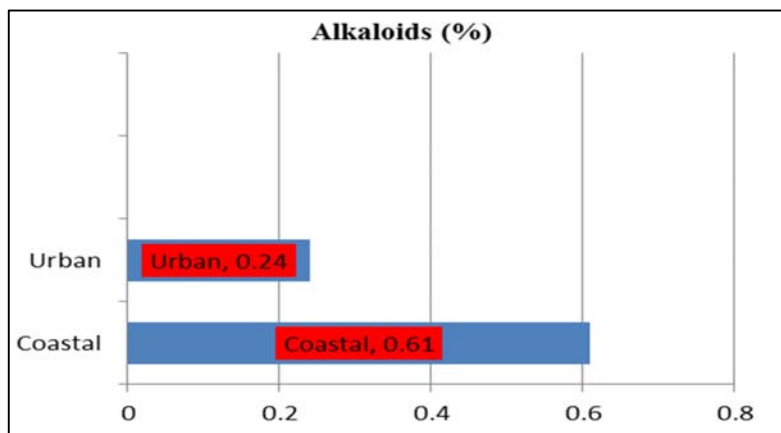
From the present study, conclusion is that the leaf extract of *Murraya koenigii* Linn exhibit high antioxidant properties, and its multipotential medicinal plant such as modern drugs can be developed. The *Murraya koenigii* leaf extract shows large amounts of Phenolics, flavonoid, saponins, terpenoids, tannins, and alkaloids. The urban and coastal *Murraya koenigii* plants of leaf extract is a source of significant natural antioxidants and useful protection against oxidative stresses. Coastal *Murraya koenigii* shows more antioxidant activity in comparison to urban *Murraya koenigii*. Thus, there exist a strong correlation between in increased antioxidant enzyme activity in both the coastal and urban *Murraya koenigii* plants.

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Table 1: Antioxidant content in urban and coastal *Murraya koenigii* Linn

Experiment	Coastal Mean \pm Standard dev.	Urban Mean \pm Standard dev.
Phenols (mg/ml)	2.90 \pm 0.01	2.90 \pm 0.01
Flavonoids (mg/ml)	2.00 \pm 0.04	2.11 \pm 0.06
Tannins (mg/ml)	0.06 \pm 0.01	0.03 \pm 0.007
Saponins (mg/ml)	2.71 \pm 0.02	2.33 \pm 0.01
Terpenoids (mg/ml)	0.05 \pm 0.04	0.12 \pm 0.02
Alkaloids (%)	0.61	0.24

**Fig 1:** Total Phenol, Flavonoid, Tannin, Saponin and terpenoid Content in Coastal and Urban *Murraya koenigii***Fig 2:** Total Alkaloid content (%) in Urban and Coastal *Murraya koenigii*

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