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Antimicrobial, antioxidant activity and Biochemical, analysis of Water, Ethanol and Acetone Extract of different parts of *Solanum Nigrum l.* (Black Night Shade)

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Abstract

In this study 20% ethanol, acetone and water extract of different part root, stem, leaf and fruit of Solanum nigrum were used to identify Antioxidant activity the highest observed in leaves of acetone extract and the highest phenolic content were analyzed from water extract of Solanum nigrum. Some biomolecules total sugar, reducing sugar and total protein were identify from different extracts of different parts of Solanum nigrum and also used against harmful pathogenic fungal species, the high influence of antifungal activity was measured 19.67mm by the water extract of fruit of Solanum nigrum to Trichophyton tonsurans (fungal specie) inhibition zones were noted when different parts of water, acetone and ethanol extract of Solanum nigrum were used respectively.

Keywords: Solanum nigrum, extract, antioxidant, phenol, antifungal.

Introduction

The Solanum nigrum belongs to Solanaceae family[1]. It is a small dicot herb of size of 10 to 60 cm in height[2]. It has been widely used as a folk medicine to treat various diseases such aspirin, inflammation and fever[3]. The growth of Solanum nigrum is fast[4]. This plant grows in different types of habitats, such as weeds among crops and also cultivated in various countries[5].

Many compounds have been isolated from whole plant preparations in different extractions of *S.nigrum* which have shown pharmacological effects[6]. The six new steroidal spooning collectively called as solanigrosides as well as a known saponin such as degalactotigonin also observed[7]. Besides above, five non- saponin compounds[8], one spirostanol glycoside and two furostanolglycolsides[9], two quercetin glycosides, were also identified[10]. Plants usually are rich in antioxidants and flavonoids which prevent oxidation in cells. Flavonoids encompass a very large and widespread array of water soluble phenolic derivatives[11]. It has (69.74%) carbohydrate and (30.26%), protein[12]. This plant is also known as antitumor agent and use for decrease the serum in the blood[13].

Material and Methods

The present study was carried out at Medical and Environment Research Laboratory, Institute of Biotechnology and Genetic Engineering, University of Sindh, Jamshoro. The plant *S. nigrum* (Black night shade Linn) was collected from the area of Jamshoro, Hyderabad; Sindh Pakistan dried at room temperature under the shade and it was homogenized to a fine powder. The 5gram of powder sample was dissolved in distilled water, ethanol and acetone, separately and centrifuged at 6,000 rpm for 20 minutes; the supernatant was filtered through a What-man No.1 filter paper. The final volume was made up to 25ml using distilled water, ethanol and acetone respectively.

Analysis of biochemical, antioxidant and antimicrobial activity: The antioxidant activity of different parts of *S. nigrum* from acetone, ethanol and water extractions was determined[14]. The total phenolic contents were determined by Follin Ciocalteu method[15]. Total protein contents were determined by Lowry et al., method[16]. Total sugar contents were determined by phenol sulphuric acid method as reported by Montgomery[17], The reducing sugars were determined by Dinitroslicyclic acid (DNS) method[18] and antifungal activity was checked by diffusion plate method[19].

Results and Discussion

Different extractions (20% water, ethanol and acetone) of *S. nigrum* were analyzed for antioxidant activity, antifungal activity. The pH of different extractions of different parts of *S. nigrum* in water, acetone and ethanol was determined. The pH of all samples was acidic figure-1.

Among the antioxidant activity the highest antioxidant was determined from acetone, water and ethanol extraction of leaves of *S.nigrum* (5.788mg/ml, 5.354mg/ml and 3.593 mg/ml) as compared to other extractions of different parts of plant as shown in figure-2.

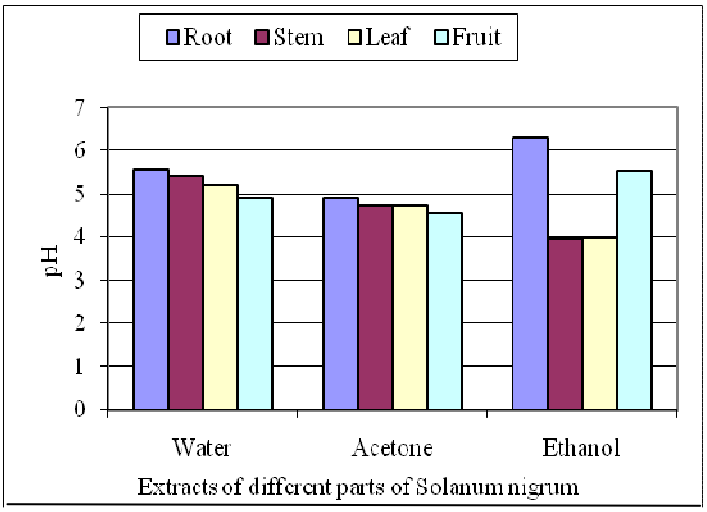

Figure-1
pH of extractions of *S. nigrum*

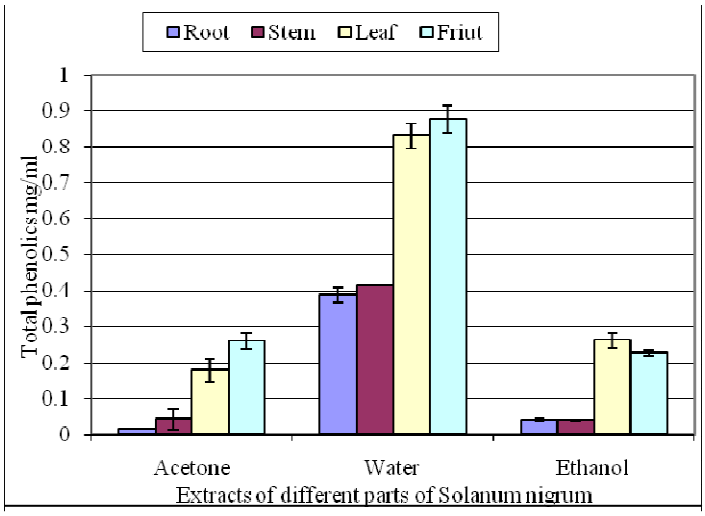

Figure-3
Total phenolic contents of *S.nigrum* extractions

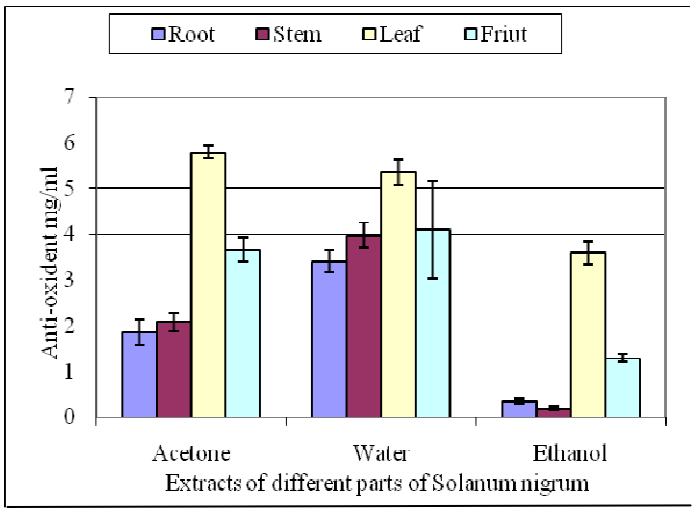

Figure-2
Antioxidant of *S. nigrum* extractions

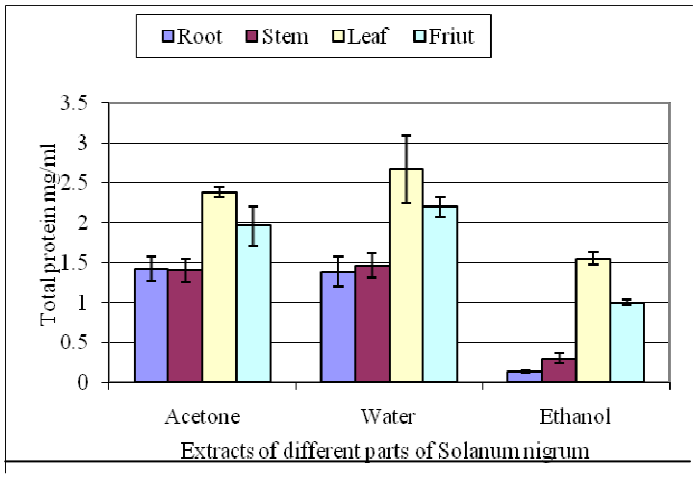

Figure-4
Total protein of *S. nigrum* extractions

The highest total phenolic content was determined from the water extraction of fruits (0.875 mg/ml), ethanol extraction of leaves (0.2614 mg/ml) and acetone extraction of fruits (0.259 mg/ml) as shown in figure-3.

The highest total protein (2.672mg/ml, 2.39mg/ml and 1.533mg/ml) were determined from water, acetone and ethanol extractions of leaves than other parts extractions as shown in figure-4.

The highest total sugars was determined from the ethanol extraction of fruits,(9.304mg/ml), acetone extraction of leaves (5.377mg/ml) and water extraction of fruits (1.627mg/ml) as shown in figure-5.

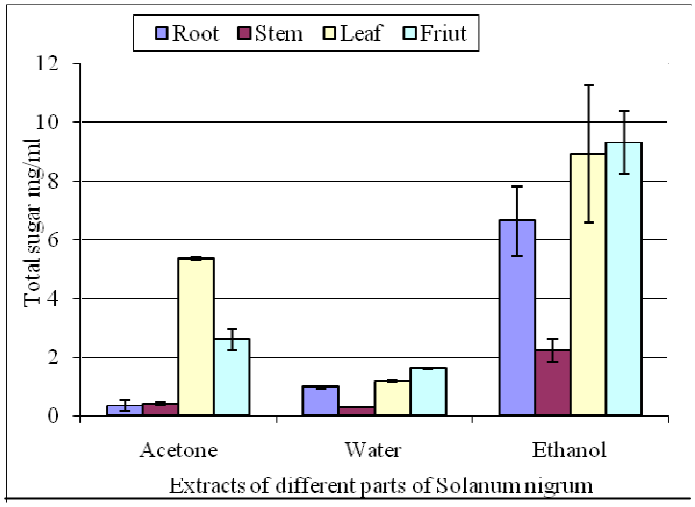

Figure-5
Total sugar of S.*nigrum* extractions

Reducing sugar were determined from 20% of water, acetone and ethanol extractions of different parts of *S. nigrum*, the highest reducing sugar was observed from the water extraction of leaves, followed by acetone extraction of leaves and ethanol extraction of fruits figure-6.

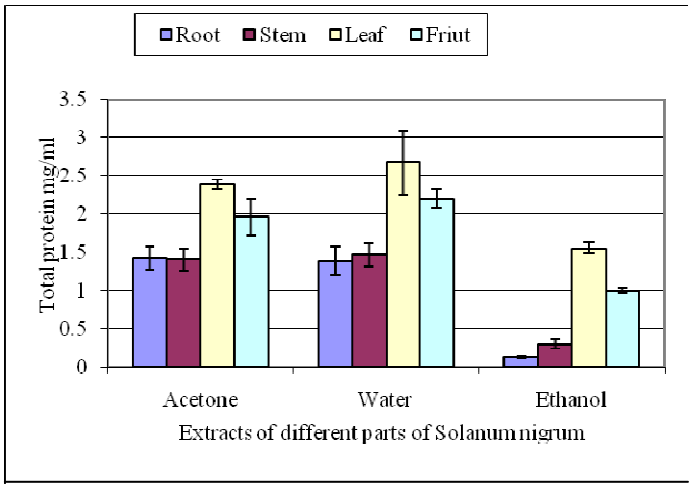

Figure-6
Reducing sugar of *S.nigrum* extractions

Plants produce secondary metabolites and these are important source of pesticides and many pharmaceutical drugs, which have antimicrobial activities[20, 21]. Using disc diffusion method, antifungal properties of 20% of water, acetone and ethanol extracts of different parts of root, stem, leaves and fruits of *S. nigrum* was tested against *Aspergillus niger*, *Aspergillus flavous* and *Trichophyton tonsurans* were checked. Maximum inhibition zone was noted from water extract of fruits against *Trichophyton tonsurans* (19.67mm), 16.67mm against *Aspergillus niger* and 6.67mm against *Aspergillus flavous* table-1.

Conclusion

The antioxidant activity from 20% acetone, ethanol and water extracts of different parts of *Solanum nigrum* were determined the highest activity observed in leaves, total phenolic contents were estimated from different extracts of different parts of *Solanum nigrum* and some biomolecules total protein, total sugar, reducing sugar from 20% extract of acetone, ethanol and water of different parts of *Solanum nigrum* were analyzed. The different extracts of different parts of *Solanum nigrum* Antifungal activity also checked by diffusion plate method the maximum inhibition were determined from fruit of *Solanum nigrum*.

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Table-1
Antifungal activities of acetone, ethanol and water extracts of different parts of *Solanum nigrum*

Name of parts and Extractions of *Solanum Nigrum*	***Aspergillus niger* (mm)**		***Aspergillus flavous* (mm)**	***Trichophyton tonsurans* (mm)**
Water Extract	Root	6.33	4.33	17.67
	Stem	6.67	5.67	17.67
	Leaf	7.33	6.33	18.33
	fruit	16.67	6.67	19.67
Ethanol Extract	Root	7	4.67	9.5
	Stem	7.67	5	6.67
	Leaf	6.67	6.67	14.33
	Fruit	16.67	5.65	17.33
Acetone Extract	Root	5.33	6.33	18
	Stem	6	6.67	19
	Leaf	6.33	5.33	17.67
	Fruit	Nil	5.67	18.33

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