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## Research Article



### Determination of total phenolic contents and antioxidant activities in fruits of *Solanum melongena* L. (green) and *Solanum melongena* L. (purple)

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#### Abstract

Brinjal is one of most common vegetables consumed all around the world. The objective was to evaluate the total phenolic content and antioxidant activity in fruits of *Solanum melongena* L.(green) and *Solanum melongena* L. (purple) colored moderate size fruits. The study evaluated the total phenolic contents and antioxidant activity of extracts from purple colored and green fruit. The amount of total phenols, were analyzed using a colorimetric technique, based on Folin-ciocalteau reagent. Gallic acid was used as standard compound and the total phenols were expressed as mg equivalents. The *in vitro* antioxidant activity was done by 1,1diphenyl-2picryl hydrazyl (DPPH) free radical scavenging activity. The results demonstrated that green colored medium size fruit demonstrated the highest total phenolic content and antioxidant activity of 320ug/500ul of the sample. The results of this study would provide an understanding of the total phenol content of the two vegetables and its antioxidant activity. The maximum phenolic content was found *Solanum melongena* L. (green).

**Keywords:** Brinjal, Total phenolic content, Antioxidant,

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#### Introduction

Phenolic compounds are the most widely distributed secondary metabolites, ubiquitous in the plant kingdom. The great majority of active phenolic compounds isolated from higher plants are flavonoids and phenolic acids. Studies on phenolic compounds have shown a wide range of biological activities such as anti-inflammatory, antioxidant, (R R Kulkarni and *et al.*, 2008). Wild *Solanum melongena* is found in the area of Myanmar–Yunnan where it developed from the *Solanum incanum* complex, which had previously migrated into Asia from the Middle East and East Africa. Domestication took place in the area between India, Myanmar and China, where many primitive or weedy eggplant types are still found (G. J. H. Grubben 2004). Eggplant fruit contains saponin steroids, in particular glycoalkaloids; the main eggplant

glycoalkaloids are solasonine and solamargine (Renata Fabiane J T and *et al.*, 2012) and (Surveswaran .S and *et al.*, 2007). It is being used as vegetable for thousand years. The green vegetables are potential source of antioxidants and it has correlating relationship between of total antioxidant activity, free radical scavenging activity.(Sheetal Gupta, and *et al.*, 2009). The purpose of this study is to compare the total phenols and antioxidant activity between two very commonly found commercial cultivar and very commonly consumed vegetable found in Karnataka market *i.e.*, moderate sized green and purple colored brinjal. The results of this study would provide an understanding of the total phenol content of the two vegetables and its antioxidant activity.

## Materials and Methods

### Plant material

The fresh fruits of *Solanum melongena L (green)* and *Solanum melongena L (purple)* of moderate size were collected from market near to Government Science College Salagame Road Hassan. Karnataka.

### Extraction

5 grams of each sample was grinded with pestle and mortar in 50ml of 80% ethanol the homogenate was centrifuged at 10,000 rpm for 20 minutes supernatant was used as sample, residue was again homogenate to pool the supernatant. The supernatant was evaporated to dryness the residue was dissolved in 10 ml of distilled water. (Malick, C P and *et al.*, 1980)

### Preparation of standard stock solution

Gallic acid was used as standard for the study and its stock solution was prepared in the concentration of 1000µg/ml in water. It was prepared freshly and used immediately for the study. From the stock solution, different concentration viz, 200, 400, 600, 800, & 1000µg/ml were prepared in water. The total volume of test tube was made up to 3ml by adding 0.5 ml of Folin-Ciocalteu reagent and 2ml 20% Na<sub>2</sub>CO<sub>3</sub>, the test tubes were boiled for exactly 1 minute cooled absorbance was measured at 650nm.

### Evaluation of Antioxidant activity by *in vitro* Techniques

In this method antioxidant activity was assayed by DPPH photometric assay. In this method methanolic

solution of 0.5ml of DPPH (0.4mM) was added to 1 ml of the different concentrations of fruit extract and allowed to react at room temperature for 30 minutes. Methanol served as the blank and DPPH in methanol without the extracts served as the positive control. After 30min, the absorbance was measured at 517 nm in spectrophotometer (Pharmatech, Model ELiCO SL 150 UV-VIS- Spectrophotometer) and converted into percentage radical scavenging activity. (Molyneux, P 2004), (Blois, 1958) and (Mensor, L.L *et al.*, 2001).

### DPPH Method

DPPH Free radical scavenging activity: In free radical scavenging activity, DPPH is a stable free radical at room temperature and accepts an electron or hydrogen radical to become stable diamagnetic molecule. The reduction capability of DPPH radical was determined by the decrease in its absorbance at 517 nm, which is induced by different antioxidants. The percentage of inhibition is measured

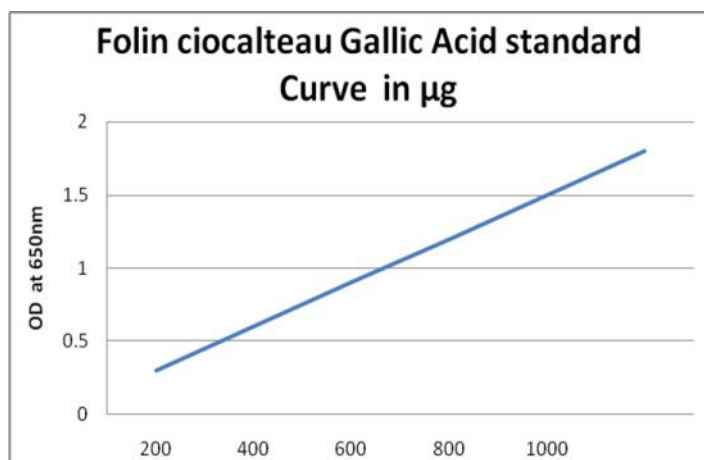
$$\text{Scavenging Activity (\%)} = \frac{(A_{\text{Control}_{517}} - A_{\text{Sample}_{517}})}{A_{\text{Control}_{517}}} \times 100$$

Where A<sub>517</sub> control is, the absorbance of DPPH radical+methanol. A<sub>517</sub> sample is the absorbance of DPPH radical+sample extract. Converted into percentage radical scavenging activity as follows. The IC<sub>50</sub> value represented the concentration of the extract that caused 50% inhibition. The percentage inhibition of DPPH radical scavenging activity is given the table.

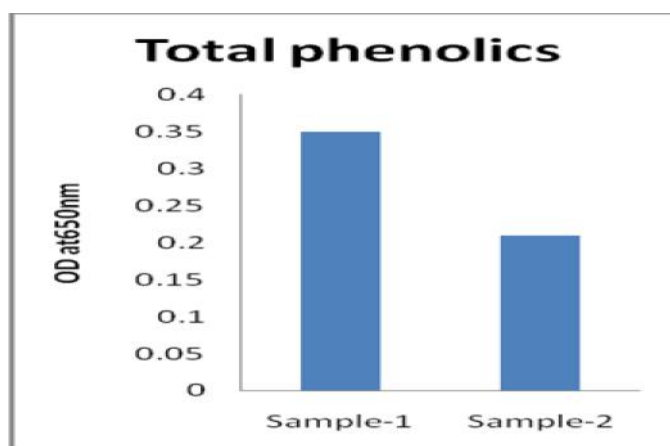
## Results

**Table-1** Total Phenolic contents

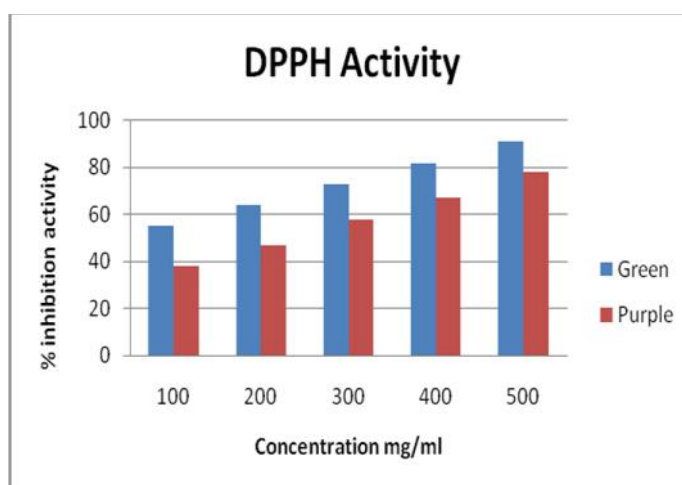
SI N	Sample	OD at 650nm	Total phenolics in ug/ml
01	Green brinjal(pulp)	0.35	350
02	Purple brinjal(pulp)	0.21	210



**Fig-1** Gallic Acid Standard Curve



**Fig-2:** Total Phenolics  
Antioxidant activity



**Fig-3** Antioxidant activity

## Discussion

The amounts of phenols were calculated as equivalents of gallic acid. Total phenolic compounds contents in each investigated sample were expressed as ug of phenols/mg grams of material. The total polyphenols content brinjal fruits (green and purple) calculated as equivalents of gallic acid. The results demonstrated that green colored medium size fruit demonstrated the highest total phenolic content of 320ug/250mg of the sample and purple coloured medium sized fruit has 210ug/250mg of the sample [Fig-1] and 90mg of green brinjal pulp causes 50% DPPH inhibition and 212mg of purple colored brinjal causes 50% DPPH inhibition. [Fig-3].The phenolic content and total antioxidant activity of selected vegetables were reported that phenolic content is directly related antioxidant activity. (Kale, spinach, cabbage, swamp cabbage and shallots) thermal treatment decreases the total phenolic content of all vegetables and also antioxidant activity. (Amin Ismail and *et al.*, 2004).French database was created on the polyphenol content of fruit and vegetables. The study showed that fruits like, strawberries, lychees, and grapes has highest polyphenol content and among vegetables artichokes, parsley, and brussels sprouts has highest poly phenol contest.The study reported that fruits are the highest source of polyphenols.( Pierre Brat and *et al.*, 2006). The total phenolic content, DPPH, total reducing power, superoxide radical scavenging activity was studied in four different varieties of eggplant the results showed that purple colour small size eggplant fruit demonstrated better antioxidant activities than the other samples (P. Nisha and *et al.*,2009). In our study green colored medium size fruit demonstrated the highest total phenolic content and antioxidant activity.Kuskoski *et al.* (2005, 2006) reported that samples rich in anthocyanins present the highest antioxidant activity. It is important to bear in mind that this correlation does not depend solely on concentration and antioxidant quality but also on its interaction with other compounds and the method used to determine the antioxidant activity. The total polyphenol content and of dietary fiber was studied in other fruits like, lichi, guava, and ripe mango (Shela Gorinstein and *et al.*, 1999). The antioxidant properties of apple juices were studied by EPR. The result showed that clear and cloudy apple juices are a rich source of natural antioxidants. (Jan Oszmianski and *et al.*, 2007).The results of this study would provide an understanding of the total phenol content of

the two vegetables and its antioxidant activity. The maximum phenolic content was found *Solanum melongena L. (green)*.The antioxidant activities of the eggplant were correlated with the total amounts of phenolics.

## Conclusion

The results of our study indicated that ethanol extract of two brinjal varieties showed antioxidant activity.Among these two green colored medium size fruit demonstrated the highest total phenolic and strong antioxidant activity than purple color medium sized fruit..So it can be concluded that active constituents of poly phenols are involved in the antioxidant activity of brinjal. The maximum phenolic content was found *Solanum melongena L. (green)*.The antioxidant activities of the eggplant were correlated with the total amounts of phenolics. Further studies are in progress for the isolation of active constituents responsible for antioxidant activity.

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