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EVALUATION OF FREE RADICAL SCAVENGING ACTIVITY OF *PRUNELLA VULGARIS*

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ABSTRACT

Nowadays considerable attention has been focused on exploring the potential antioxidant properties of plant extracts. *Prunella vulgaris* is widely distributed in Japan, Europe and China. Reports on the antioxidant activities of *P. vulgaris* var. *lilacina* are limited. In this study, we investigated the antioxidant activities of an ethanolic extract from *P. vulgaris* using DPPH method. The reaction mixture containing 1.9ml of DPPH solution with different concentrations of the substance (10,50,100,200,400,800, 1000µg/0.1ml) was shaken and incubated in dark for 20mins at room temperature. The resultant absorbance was recorded on 517nm in UV-VIS spectrophotometer and percentage inhibition was calculated. The plant extract showed dose dependant free radical scavenging activity as compared to standard Ascorbic acid at both higher and lower concentrations.

Keywords: *Prunella vulgaris*, Antioxidant, DPPH.

INTRODUCTION

To control human diseases antioxidant effects play an important role. Reactive oxygen species (ROS) related to lipid peroxidation is responsible for most of the pathogenesis (Mrudula *et al.*, 2010). Antioxidants provide resistance against the oxidative stress by scavenging free radicals. *Prunella vulgaris* known as self-heal or heart of the Earth, grows around ponds and lakes, in road side ditches. The isolated products of plant or their extracts possess potential antioxidant properties to treat headache, inflammation, dizziness, eye pain and headache. It has active compounds such as flavonoids, ursolic acid, rosmarinic acid and triterpenoids.

P. vulgaris var. *lilacina* has anti-oxidative, anti-viral and anti-microbial effects. Anti-allergic, anti-inflammatory studies of *P. vulgaris* var. *lilacina* are limited (Yu-jin Hwang and Eun-JuLee, 2013). To protect against oxidative damage, synthetic antioxidants were introduced due to demand. Various studies have shown synthetic antioxidants are carcinogenic and the toxic. To avoid these effects it is important to study inexpensive and safe antioxidants from natural origin. Natural antioxidants, especially plant phenolics, flavonoids are safe. Recently considerable attention has been focused on exploring the potential antioxidant properties of isolated products of plant origin (Fenq *et al.*, 2010). The aim of this study to identify new sources of antioxidants from *P. vulgaris* var. *lilacina* extract.

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Objective

To evaluate the free radical scavenging activity of *Prunella vulgaris* using DPPH assay.

Figure 1. Flowering tops of *Prunella vulgaris*

MATERIALS & METHODS

Preparation of extract

The plant material (flowering tops of *Prunella vulgaris*) was shade dried and powdered and the powder was extracted with ethanol using Soxhlet extractor and was concentrated by rotary vacuum evaporator.

Procedure

DPPH is a common abbreviation for 2,2-diphenyl-1-picrylhydrazyl. It is a stable free-radical molecule which is dark-colored crystalline powder. Its major application in laboratory research (Eugeniojose Garcia and Tatiane Luiza, 2012).

The radical nature of a substance with antioxidant property can be tested by reacting it with DPPH solution. The antioxidant property of the test product can be observed in proportion to the change in colour of the violet DPPH solution towards colourless spectrum. The change in colour is quantified by spectrophotometry absorbance reading. DPPH radical scavenging activity was done using the method of Yohozowa *et al.*, (1998).

The reaction mixture containing 1.9 ml of DPPH solution with different concentrations of the substance (10, 50, 100, 200, 400, 800, 1000µg/0.1ml) was shaken and incubated in dark for 20mins at room temperature. The resultant absorbance was recorded on 517nm using UV-VIS spectrophotometer and percentage inhibition was calculated

Percentage Inhibition =

(Abs control- Abs sample)/ Abs control×100

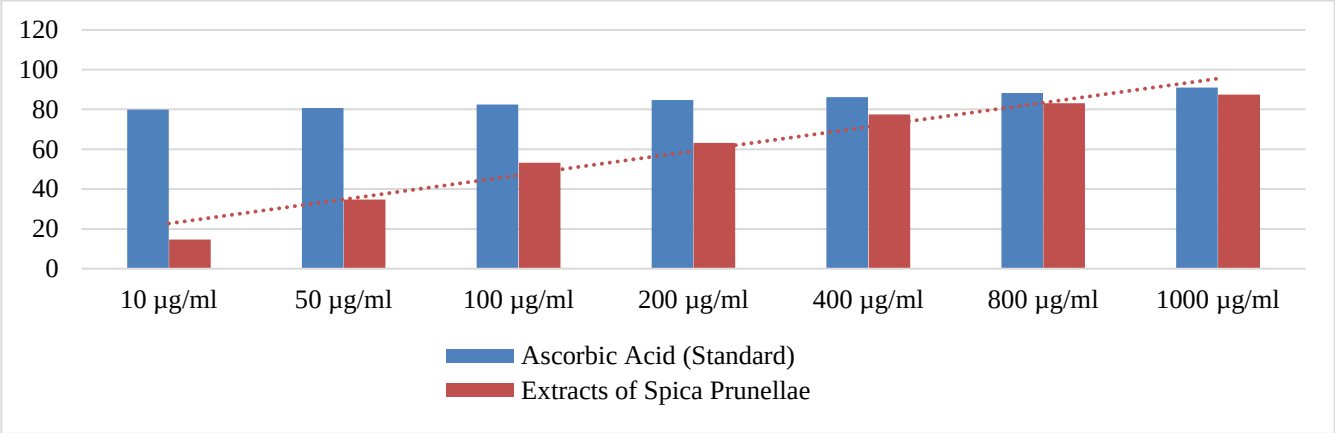
RESULTS

The plant extract showed dose dependant free radical scavenging activity as compared to standard Ascorbic acid. Free radical scavenging activity was seen even at lower concentrations. At the highest concentration of 1000µg/0.1ml significant free radical scavenging was 87.48% as compared to the standard ascorbic acid 91.02%.

Table 1. DPPH free radical scavenging activity of *P.vulgaris*.L. (Lamiaceae).

Concentration (µg/0.1ml)	% Inhibition of DPPH	
	STD (Ascorbic Acid)	Extracts of flowering tops (*P.vulgaris*)
10	79.98±0.42	1.57±0.40
50	80.76±0.43	34.70±1.12
100	82.42±0.56	53.15±0.08
200	84.76±0.24	63.25±0.01
400	86.16±0.28	77.52±3.15
800	88.20±0.32	83.10±2.64
1000	91.02±0.48	87.48±1.61

Figure 1. Anti-oxidant activity of flowering tops of Prunellae extracts



DISCUSSION

In the DPPH assay, the DPPH radical scavenging activity of all fractions from *P. vulgaris* extract increased as shown in the table. The IC_{50} values of radical scavenging activity for DPPH were found to be 93.45 µg/mL for ethanol extract. The DPPH scavenging activity of all fractions showed a similar trend to the content of total phenolic compounds. The present study highlights the free radical scavenging activity of *P.vulgaris* extract.

A linear correlation exists as shown in many research works, which is positive between total phenolic content of extracts and antioxidative capacities. Various scientific studies have shown that the antioxidant

properties in plants can be attributed to the phenolic content in them. In our research study, it is shown that the ethanolic extract of *P. vulgaris* var. *lilacina* had higher antioxidant content than other solvent fractions, which was proportional to the phenolic content (Hwang et al., 2014). Many studies shown anticancer activity was also tested using the HepG2, HT29 and HeLa cancer cell lines which demonstrated that the *P. vulgaris* var. *lilacina* ethanolic extracts induced significant cytotoxic effects on the various cancer cell lines and these effects were stronger than those induced by the *P. vulgaris*. Studies were also done to evaluate its antiviral and immunomodulatory effect (Au *et al.,* 2001).

CONCLUSION

The above study which can be concluded by further studies and this can be attributed to phyto-chemicals like flavonoid. The protective effects of antioxidants on cell membrane lipid bi-layers attacked by free radicals are attracting more interest in future and also to investigate the expression of genes associated with apoptotic cell death.

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