

Evaluation of Antioxidant Activity of Rhizome Extract of *Paris polyphylla* Smith

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ABSTRACT: The paper evaluates the antioxidant activity of extract of rhizomes of *Paris polyphylla* Smith. The present study was undertaken to appraise the non enzymatic antioxidant properties of *Paris polyphylla*. It is an important medicinal herb widely used in traditional medicines such as antihelmintic, antispasmodic, digestive, stomachic, expectorant, vermifuge and antidote against snake bite and also has the biological properties like anticancer, antimicrobial, anti-tumour, cytotoxicity and steroidal etc. The antioxidant activity of this plant was assessed by 2, 2-diphenyl picryl hydrazyl (DPPH), Total Phenolic content, SOD scavenging activity and total reducing power. The main objective of this study is, to evaluate the level of non enzymatic antioxidant properties of *P. polyphylla* that will be a potential source of natural antioxidant and a therapeutic agent in preventing the oxidative stress related diseases.

KEY WORDS: Reactive Oxygen Species, Antioxidant, DPPH, *Paris polyphylla*.

INTRODUCTION

Reactive Oxygen Species (ROS) are considered as the main source that damage the cell under biotic and abiotic stresses (Candan and Tarhan, 2003; Gara *et al.*, 2003; Mittler, 2002; Vaidyanathan *et al.*, 2003). ROS's are mainly produced in the processes of photorespiration, photosynthesis and respiration by partially reduced form of atmospheric oxygen (Mittler, 2002; Uchida *et al.*, 2002). The reactive oxygen species produced by plants are superoxide radical (O_2^-), singlet oxygen (1O_2), hydrogen peroxide (H_2O_2) and hydroxyl radicals (OH) at lower concentration. Higher concentration of ROS can react with lipids, proteins, chlorophyll and nucleic acid etc., and can cause the damage of it by denaturation, peroxidation and mutation, thus disrupting the cell (Rice-Evans *et al.*, 1991). Plants develop the protective mechanism against reactive oxygen species if these species are produced in higher concentration which include scavenging by natural antioxidants and enzymatic oxidant system (Bowler *et al.*, 1992; Scandalios, 1993; Foyer *et al.*, 1994). The term antioxidant refers to the activity of numerous molecules or compounds that provide protection against the damage caused by ROS (Khilfi *et al.*, 2006). Antioxidants produced from the plant materials cease the action of ROS thereby protecting the body from various diseases (Lai *et al.*, 2001). These ROS also play an important role in pathological processes such as carcinogenesis, diabetes, cataract and aging (Pavel *et al.*, 2006). Living organism have antioxidant defence system that protects against oxidative damage but under some

conditions this mechanism may be insufficient and dietary intake of antioxidant become important (Sun *et al.*, 1998; Terao *et al.*, 1994). The therapeutic effect of some medicinal plants is due to the presence of antioxidant photochemicals. At present natural antioxidants attract more attention of food manufacturers, nutritionists and consumers due to low side effect and high therapeutic value (Sreeramulu *et al.*, 2009). The natural antioxidant mainly found in plant parts are usually rich in phenolic compounds, such as flavonoids, phenolic acids, stilbenes, tannins, coumarins, lignans and lignins (Packer *et al.*, 1999). These facts inspired the authors to investigate the antioxidant and medicinal properties of plants. *Paris polyphylla* Smith (Melanthiaceae) is an endangered temperate species found in India, China, Nepal, Vietnam, and Germany. In India, the species grows in the wild state in Himachal Pradesh, Uttarakhand, Manipur, Lushai and Aka Hills of Mizoram and Tripura (Tiwari *et al.*, 2010). The main active components of *P. polyphylla* are the steroidal saponins such as polyphyllin D, dioscin, and balanitin 7 (Deng *et al.*, 1999; Li *et al.*, 2001; Cheung *et al.*, 2005; Gao *et al.*, 2011). It is an important medicinal herb widely used in traditional medicines such as antihelmintic, antispasmodic, digestive, stomachic, expectorant, vermifuge and antidote against snake bite (Dutta, 2007., Vassilopoulos 2009) and also has the biological properties like anticancerous, antimicrobial, anti-tumour, cytotoxicity and steroidal etc (Fu, 2007; Cheng *et al.*, 2008 and Guanglie *et al.*, 2013).

MATERIALS AND METHODS

Plant Sample Collection and Processing

Rhizomes of *Paris polyphylla* were collected from Pothibasha (2200 m asl), field Nursery of High Altitude Plant Physiology

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