



**ANTIOXIDANT ACTIVITY OF CHIRAITA (*SWERTIA CHIRAYITA*) AND ANAR
(*PUNICA GRANATUM*)**

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ABSTRACT

The present study was undertaken to assess the antioxidant properties of aqueous leaf extracts of *Swertia chirayita* and *Punica granatum*. The antioxidant activity of the aqueous leaf extracts were compared to BHA (Butylated hydroxyl anisole). The results revealed that the aqueous leaf extracts of *Swertia chirayita* and *Punica granatum* possesses strong antioxidant property. Thus the aqueous leaf extracts of *Swertia chirayita* and *Punica granatum* can be used as a source of antioxidants in diseases caused due failure of innate antioxidant system of the body.

KEY WORDS: *Swertia chirayita*, *Punica granatum*, antioxidants, BHA.

1. INTRODUCTION

The plant and plant products has been used throughout every culture in the world. Leaves, bark, fruits and other plant parts have been used by people around the world in treatment of various diseases.^[1] India is much kenneed for its variety of agro-climatic diversity as for its affluent heritage of traditional systems of medicines. The Indian System of Medicine comprises of Ayurveda, Siddha, Unani and Amchi system of medicine along with the other folk medicinal practices and age old home remedies. These all systems have placed India as leading nation, in natural medicinal therapeutic field, predicated on the cognizance of the utilization of medicinal plants. India possesses an affluent treasure of biodiversity which has been utilized for health care for more than four thousand years.^[2] Vlietnck *et al.*,^[3] reported that aqueous extracts from plant parts were used in allopathic medicines and were potentially used as antiviral, anti tumour and antimicrobial agents. Free radicals have been implicated in many diseases such as cancer, atherosclerosis, diabetes, neurodegenerative disorders and aging.^[4, 5] That is why, antioxidants along with free radical scavenging activities may have great pertinence in the obviation and therapeutics of diseases where oxidants or free radicals are implicated.^[6] Phenolic compounds are widely distributed in many fruits, vegetables, and tea. Antioxidants from our diet play an important role in helping endogenous antioxidants for the neutralization of oxidative stress. The nutrient antioxidant deficiency is one of the main causes of numerous chronic and degenerative pathologies.

Swertia chirayita (Roxb. ex Fleming) H. Karst (Family Gentianaceae,) is one of the consequential traditional

medicinal plant, an erect annual or perennial herb found in Himalaya and Meghalaya at an altitude of 1200-1300meters.^[7] The entire plant is utilized in medicine, however the root is mentioned to be the most puissant part. It have been reported to have anti-inflammatory^[8], anti-viral^[9], antihelmintic^[10], anticarcinogenic^[11], hepatoprotective^[12] etc.

Punica granatum L., commonly kenneed as pomegranate, is a fruit-bearing deciduous shrub or diminutive tree, native to Asia and belongs to the family Lythraceae.^[13] The leaves are shiny and about 7.6 cm long.^[14] Different components of the plant such as bark,leaves, immature fruits and fruit rind have medicinal significance.^[15] *P. granatum* has been extensively utilized as a traditional medicine in many countries for the treatment of dysentery, diarrhea, helminthiasis, acidosis, hemorrhage and respiratory pathologies.^[16]

2. MATERIALS AND METHODS

2.1. PLANT MATERIALS

The fresh tender leaves of *Swertia chirayita* and *Punica granatum* were amassed, washed with deionized water and disinfected with 0.1% HgCl₂ solution for 5 min and dried in shade for 15 days and ground to fine powder.^[17-19]

2.2. ANTIOXIDANT ACTIVITY

Antioxidant properties of plant leaf samples were determined by spectrophotometric quantiation method. Various concentrations of samples (5 µg, 50 µg, 100 µg) were taken in a series of test tubes. The 1.9 ml of reagent solution (0.6m sulphuric acid, 28 mm sodium sulphate and 4 mm ammonium molybdate) was added to the test

tubes. The tubes were incubated at 95°C for 90 min and allowed to cool down. The absorbance of aqueous solution of each tubes was measured at 695 nm against blank. Antioxidant capacities were expressed as equivalents of ascorbic acid. Butylated hydroxyl anisole (BHA) was used as reference standard [20, 21]

3. RESULTS AND DISCUSSION

The leaf samples of *Swertia chirayita* and *Punica granatum* were analyzed for their antioxidant activity. The results are presented as figure 1. The results clearly reveal that *Punica granatum* showed more antioxidant activity as compared to *Swertia chirayita*. For every concentration of extracts 5 µg, 50 µg, 100 µg, the antioxidant activity of *Punica granatum* was higher than that of *Swertia chirayita* (figure 1).

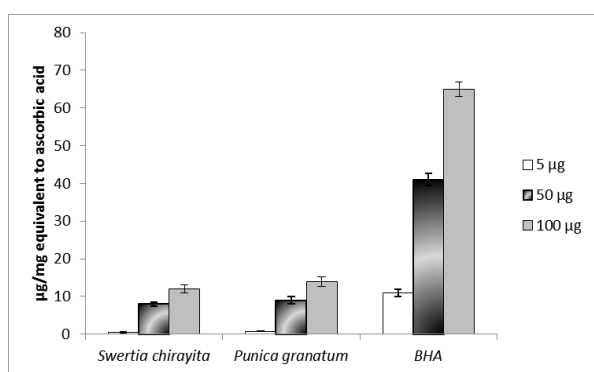


Figure 1: results of antioxidant screening

The antioxidant activity of *Swertia chirayita* and *Punica granatum* were compared with that of BHA. Both *Swertia chirayita* and *Punica granatum* have been [19] reported to possess phytochemicals such as Alkaloids, flavonoids, phenols, quinines, saponins, tannins, terpenoids. These phytochemicals are known to possess antioxidant properties and thus they impart antioxidant properties to the plants in which they are present.[22] Sarepoua [23] has reported that the antioxidant activity was significantly correlated with total phenolic and flavonoid content. Finally to conclude, the implicative insinuation of oxidative stress in the etiology of several chronic and degenerative diseases suggests that antioxidant therapy represents a promising avenue for treatment. In the future, a therapeutic strategy to increment the antioxidant capacity of cells may be habituated to fortify the long term efficacious treatment. However, many questions about antioxidant supplements in disease obviation remain unsolved.[24] Further research is needed afore this supplementation could be officially recommended as an adjuvant therapy. In the meantime, it is reminded that eschewing oxidant sources (cigarette, alcohol, lamentable aliment, stress, etc) must be considered as consequential as taking diet affluent in antioxidants. Indeed, our health additionally depends on our lifestyle cull.

4. REFERENCES

1. Kumar, M., Kumar, A., Dandapat, S. and Sinha, M. P.: Phytochemical screening and antioxidant activity

- of Adhatoda vasica and Vitex negundo. In The Bioscan, 2013; 8(2): 727 – 730.
2. Sharma, N., Varshney, V. K., Kala, R. P., Bisht, B. and Sharma M.: Antioxidant capacity and total phenolic content of Swertiachirayita (Roxb. ex Fleming) G. Karst. In Uttarakhand. In International Journal of Pharmaceutical Sciences Review and Research, 2013; 23(1): 259 – 261.
3. Vlietinck, A. J., Hoof, L. V., Totté, J., Lasure, A., Berghe, D. V., Rwangabo, P. C. and Mvukiyumwami, J.: Screening of hundred Rwandese medicinal plants for antimicrobial and antiviral properties. In J. Ethnopharmacol, 1995; 46(1): 31 – 47.
4. Scalbert, A., Manach, C., Remesy, C. and Morand, C.: Dietary polyphenols and prevention of diseases. In Critical reviews in food science and nutrition, 2005; 45: 287 – 306.
5. Halliwell, B. and Gutteridge, J.M.C.: Free Radicals in Biology and Medicine. 3rd edition In Oxford University Press, Oxford, U. K. (1999).
6. Kaur, C. and Kapoor, H. C.: Antioxidant activity and total phenolic content of some Asian vegetables. In International Journal of Food science and Technology, 2002; 37(2): 153 – 162.
7. Kirtikar K. R, Basu, B.D.: In Indian Medicinal Plants, 2nd Ed., vol. III, Allahabad, 2006; 1664–1666.
8. Islam, C. N., Banerjee, M. K. and Das, P. C.: Preliminary studies on the anti-inflammatory effects of Swertia chirata in albino rats. In Indian J.Pharmacol, 1995; 27: 37–39.
9. Verma H, Patil P. R., Kolhapure R. M.: Antiviral activity of the Indian medicinal plant extract Swerchiachirata against herpes simplex viruses, a study in vitro and molecular approach. In Ind J Med Microbiol, 2008; 26: 322-326.
10. Iqbal Z, Lateef M, Khan M. N.: Antihelminthic activity of Swertiachirata against gastrointestinal nematodes of sheep. In Fitoterapia, 2006; 77: 463-465.
11. Saha P., Mandal S., Das A., Das P. C. and Das S.: Evaluation of anticarcinogenic activity of Swertia chirata Buch. Ham, an Indian medicinal plant on DMBA-induced mouse skin carcinogenesis model. In Phytothe. Res., 2004; 18: 373-378.
12. Mukherjee S, Sur A, Maiti B. R.: Hepatoprotective effect of Swertia chirata on rat. In Indian Journal of Experimental Biology, 1997; 35(4): 384-388.
13. Altuner E.M.: Investigation of antimicrobial activity of Punicagranatum L. fruit peel ash used for protection against skin infections as folk remedies especially after male Circumcision. In Afr. J. Microbiol Res., 2011; 5(20): 3339- 3342.
14. Qnais E.Y., Elokda A.S., Abu Ghalyun Y.Y. and Abdulla F.A.: Antidiarrheal activity of the aqueous extract of Punica granatum (Pomegranate) peels. In Pharm. Biol., 2007; 45(9): 715–720.

15. Arun N. and Singh D.P.: *Punica granatum*, a review on pharmacological and therapeutic properties, In IJPSR, 2012; 3(5): 1240-1245.
16. Choi J.G., Kang O.H., Lee Y.S., Chae H.S., Oh Y.C., Brice O.O., Kim M.S., Sohn D.H., Kim H.S., Park H., Shin D.W., Rho J.R. and Kwon D.Y., In vitro and in vivo antibacterial activity of *Punica granatum* peel ethanol extract against *Salmonella*, *Evid. Based Complement, Alternat. Med.*, 1-8 (2011)
17. Kumar, M., Dandapat, S., Kumar, A. and Sinha, M. P.: Determination of nutritive value and mineral elements of Five-leaf chaste Tree (*Vitex negundo* L.) and Malabar nut (*Adhatoda vasica* Nees). In *Academic Journal of Plant Sciences* 2013; 6(3): 103 – 108.
18. Kumar, M., Dandapat, S. and Sinha, M. P.: Hepatoprotective activity of *Adhatoda vasica* and *Vitex negundo* leaf extracts against carbon tetrachloride induced hepatotoxicity in rats, In *Advances in Biological Research* 2015; 9(4): 242 – 246.
19. Kumar, M., Dandapat, S. and Sinha, M. P.: Phytochemical analysis and Growth inhibitory impact of *Swertia chirayita* aqueous leaf extract against some Human Pathogens. *World Journal of Zoology*, 2015; 10(3): 188-190.
20. Kumar, M., Kumar, A., Dandapat, S. and Sinha, M. P.: Phytochemical screening and antioxidant potency of *Adhatoda vasica* and *Vitex negundo*, In *The Bioscan* 2013; 8(2): 727 – 730.
21. Kumar, A., Kumar, M., Dandapat, S. and Sinha, M. P.: Antioxidant activity and pharmacological screening of *Tinospora cordifolia* (Thunb.). In *The Bioscan*, 2013; 8(2): 689 – 693.
22. Dandapat, S., Kumar, M., Kumar, A. and Sinha, M. P.: Therapeutic efficacy and nutritional potentiality of Indian bay leaf (*Cinnamomum tamala* Buch. – Hem.). In *International Journal of Pharmacy* 2013; 3(4): 779 – 785.
23. Sarepoua, E., Tangwongchai, R., Suriharn, B. and Lertrat, K.: Relationships between phytochemicals and antioxidant activity in corn silk. In *International Food Research Journal* 2013; 20(5): 2073 – 2079.
24. Huy, L. A. P., He, H. and Huy, C. P., Free Radicals, Antioxidants in disease and Health. In *International Journal of Biomedical sciences* 4(2): 89 – 96.