

Search for novel therapeutics for gout: a preliminary screening for xanthine oxidase inhibitors from some medicinal plants

M.T. Napagoda^{1*}, M.M. Qader² and L. Jayasinghe²

¹Department of Biochemistry, Faculty of Medicine, University of Ruhuna, Sri Lanka,

²National Institute of Fundamental Studies, Kandy, Sri Lanka

*mayurinapagoda@yahoo.com

Gout is a metabolic disorder associated with the accumulation of uric acid in the joints, tendons and surrounding tissues. The enzyme xanthine oxidase catalyses the oxidation of hypoxanthine to xanthine and then to uric acid which is the final product of the catabolism of purine nucleotides. Thus one of the therapeutic approaches to treat gout involves the use of xanthine oxidase inhibitors. Allopurinol and febuxostat are the only xanthine oxidase inhibitors currently employed under clinical applications, although several side effects are associated with their use. Thus the search for novel xanthine oxidase inhibitors with high therapeutic potency and lesser side effects from nature is desired for the treatment of gout and other diseases associated with the xanthine oxidase activity. So far no study has been reported on the xanthine oxidase inhibitory potential in medicinal plants in Sri Lanka. Thus the present investigation has been undertaken to screen several medicinal plants that have been widely employed in traditional medicine to treat gout and related inflammatory disorders.

Hexane, dichloromethane, ethyl acetate and methanol extracts of whole plants of *Apium graveolens* (asamodagam) and *Leucas zeylanica* (gatathumba), rind of *Citrus sinensis* (panidodam) were tested *in vitro*, at 50 µg/mL concentrations initially for their xanthine oxidase inhibitory potential. Out of the tested plant extracts only dichloromethane extract of *L. zeylanica* was active at 50 µg/mL. Therefore, the dose-dependent inhibition profile of dichloromethane extract of *L. zeylanica* was further evaluated by estimating the IC₅₀ value. The IC₅₀ value of the above extract was found to be 47.47 µg/mL which is quite comparable with that of the positive control, allopurinol (IC₅₀ = 16.77 µg/mL). In addition, the antioxidant activity of this promising extract was determined by 1, 1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging assay. However, the antioxidant activity of this extract was low (EC₅₀ = 208.4 µg/mL) when compared with the positive control, ascorbic acid (EC₅₀ = 14.31 µg/mL).

The study has revealed the xanthine oxidase inhibitory activity in *L. zeylanica* and this is the first time that Sri Lankan plant species was reported as a potential source of natural xanthine oxidase inhibitor. Further investigations are in progress to develop it into a successful herbal drug to treat gout and other xanthine oxidase related disorders.