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Screening the Metal Chelating Efficacy of *Trichodesma Indicum*.

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ABSTRACT

Synthetic chelators strongly bind to metal ions which used for iron excretion by binding to ions to produce metal chelator complex for the removal of metals from the body. Metals with normal concentration have essential roles in body metabolism however; in higher concentration they can induce sever toxicity. Treatment with chelating agent is an optimal method to reduce metals toxicity in organisms. Hence the present study was undertaken to evaluate the chelating property of *Trichodesma indicum* a common weed of India. The chelating effect of ferrous ions by the extracts was estimated by the method of Dinis et.in various concentrations of the extract of the selected plant by adding 0.05ml of 2mM FeCl and initiated Ferrozine(5mM). Absorbance of the solution was then measured spectrophotometrically at 562nm. The Metal Chelating Activity indicated that *Trichodesma indicum* has the ability for iron binding and could reduce the generation of hydroxyl radicals. From the result, it is clear that ethyl acetate extract of *Trichodesma indicum* has significant metal chelating activity. It is reported that chelating agents are effective as secondary antioxidants because they reduce the redox potential, thereby stabilizing the oxidized form of the metal ion. Since results are quite promising the present work can be further extended to screen toxicology to ascertain its safe administration as drug through animal studies.

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INTRODUCTION

Trichodesma indicum is an erect, spreading, branched, annual herb, about 50 centimeters in height, with hairs springing from tubercles. The leaves are stalk less, opposite, lanceolate, 2 to 8 centimeters long, pointed at the tip, and heart-shaped at the base. It is found throughout India, on roadsides and stony dry wastelands, upto 1,500 m. Chelation describes the process of removing heavy metal toxins, including lead and arsenic, from the bloodstream. A chelate is any substance that assists in this process. EDTA and DMSA are both chemically synthesized substances used as chelates. Heavy metals enter the body through a variety of means including eating non-organic foods and fish, and inhaling smoke. Natural herbs have shown the ability to act as chelates too. Garlic, also known as *Allium sativum*, not only has a culinary purpose but a medicinal one, too. In 1994, the National Institutes of Health published findings that garlic was an effective in chelation of lead. Metals ions such as calcium, iron, and zinc, copper and lead are very important role as a catalyst in the oxidation pathway. They are important source for free radical development such as hydroxyl and of hydro peroxide radicals[4]. According to, metal toxicity is increasing; treatment with chelators is an important tool for prevention of metal storage diseases. Treatment with chelating metals including iron and calcium reduces the complications of metals overload in the body, thus will increase of life and generally increase in quality of life in a lot of disease such as thalassemia major and cardiac disease. Plants with iron chelating activity are most effective for reduce of lipid peroxidation reaction and therefore play a key role in medicinal practice. The aim of present work is to screen the metal chelating property of the selected common weed *Trichodesma indicum*.

MATERIALS AND METHODS

The leaves of *Trichodesma indicum* were for the study. The collected leaves were cleaned and shade-dried for seven days and powdered. 10g of powdered sample was serially extracted in the ratio 1:10 using hexane, ethyl acetate and methanol based on the polarity (which are low polar, middle polar and high polar solvents respectively) under shaking condition for 24 hours. (Mokgotho 2013). Then the extract was filtered in filter paper and concentrated using condenser which is stored for further analysis. The chelating effect of ferrous ions by the extracts was estimated by the method of Dinis et al (1994). Varying concentration of the extract (50 to 250 µg/ml) was added to 0.05 ml of 2 mM FeCl_2 . The reaction was initiated by the addition of 0.2 ml of Ferrozine (5 mM) and the mixture was shaken vigorously and left at room temperature for 10 min. Absorbance of the solution was then measured spectrophotometrically at 562 nm. The chelating activity of the extract was evaluated using EDTA as standard. The results were expressed as % metal chelating activity. The ratio of inhibition of Ferrozine Fe^{2+} complex was calculated as %

$$\text{Inhibition} = (\text{Control OD} - \text{Sample OD} / \text{Control OD}) \times 100$$

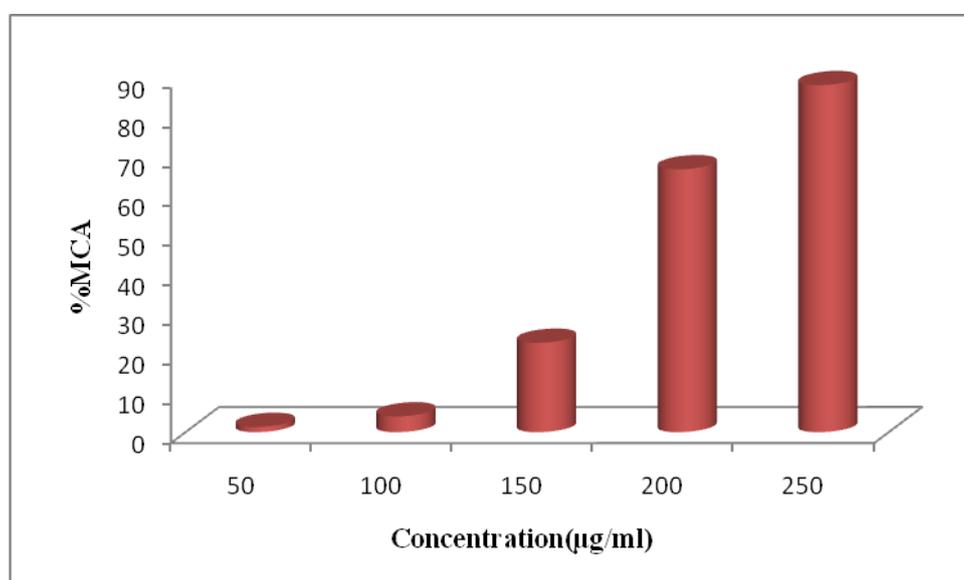
RESULTS

Presence of transition metal ions in a biological system could catalyze the Haber-Weiss and Fenton-type reactions, resulting in generation of hydroxyl radicals (OH). However, these transition metal ions could form chelates with the antioxidants, which result in the

suppression of OH generation, and inhibit ion of peroxidation processes of biological molecules. In this assay, the presence of chelating agents in the extract of *Trichodesma indicum* disrupts the Ferrozine Fe²⁺ complex formation, thus decreasing the red colour. It is reported that chelating agents are effective as secondary antioxidants because they reduce the redox potential, thereby stabilizing the oxidized form of the metal ion (Table 1 & Fig 1). Out of different concentration the extract sample 4 and 5 showed maximum % metal chelating activity.

Table No: 1

S.No	Concentration(µg/ml)	% MCA
1	50	1.33
2	100	4
3	150	22.66
4	200	66.66
5	250	88



DISCUSSION

Trichodesma indicum showed various pharmacological properties through earlier studies indicating its a potent medicinal plant. Although there are few synthetic chelating agents in practice and hence it is a high time to discover a herbal chelating agent. The present study indicated its remarkable chelating property through this study. This type of preliminary studies form a strong base for the further researchers to take up the animal studies on the pharmacological and toxicology to ascertain its safety for therapeutic administration as a potent and safe drug.

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