SUMMARY AND CONCLUSION

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Demand for medicinal plants is increasing in both developing and developed countries. Many medicinal plants are fast disappearing and some are in extinction. There is a great need to conserve medicinal plants because they contain highly bioactive phytochemical components which can be developed into pharmacological and other beneficial effects. Nowadays, natural antioxidants have become one of the major areas of scientific research. Therefore, the importance of searching for and exploiting natural antioxidants, especially of plant origin, has increased greatly in recent years. Accumulated evidence suggests that the free radicals can be scavenged through chemoprevention utilizing natural antioxidant compounds present in foods and medicinal plants. Cytotoxic effect of medicinal plants must be carried out in order to assess the toxic potential of the plant so as to determine their safe level of consumption. Plant based antibacterials have enormous therapeutic potential as they can serve the purpose with lesser side effects that are often associated with synthetic drugs.

The study has been focused on the antioxidant potential, free radical scavenging efficacy, cytotoxic effect and antibacterial activity of various parts of the plant *Denolix elata*. The samples namely leaf, flower and bark were air dried in shade and powdered for extraction. Powdered samples were subjected to extraction with different solvents such as petroleum ether, chloroform, methanol and water. Soxhlet and Shaker method were adapted for extraction and yield was calculated in percentage. Phytochemical analysis was carried out qualitatively and quantitatively for the plant samples. Nutritive content of the plant were assessed in terms of carbohydrates and proteins. The leaves, flowers and bark were extracted with various buffers and analysed for enzymic antioxidants (catalase, glutathione peroxidase, glutathione s-transferase, peroxidase, polyphenol oxidase and superoxide dismutase) and nonenzymic antioxidants

(carotenoids, ascorbic acid, α-tocopherol, flavonoids, polyphenols and reduced glutathione). The samples extracted by using orbital shaker was screened for free radical scavenging efficacy. Methanolic extracts obtained from soxhlet extraction were tested for their cytotoxic effect. Antibacterial activity of the plant samples against five bacterial isolates namely *Bacillus subtilis, Escherichia coli, Klebsiella pneumoniae, Staphylococus aureus* and *Shigella flexneri* were dermined by agar well diffusion method.

The findings of the present study are summaried below:

The percentage yield was found to be higher in shaker extraction than soxhlet extraction method. Highest yield was registered by the methanol extracts of all the three samples namely leaf, flower and bark. Both aqueous and petroleum ether extraction produced the lowest yield. The percentage yield of methanolic flower extract was higher than leaf and bark and the least percentage was recorded by the bark in both extraction procedures.

Qualitative analysis of the plant samples revealed the presence of phytochemicals namely alkaloids, anthraquinones, flavonoids, glycosides, phenols, reducing sugars and tannins in all parts. Saponin was not detected in all parts of the plants whereas phytosterols and terpenoids were detected only in leaf and flower and not in bark. Quantitative estimation indicated that the content of phenols, reducing sugars and tannins was found to be increased in flower and the chlorophyll and alkaloids in leaf. Bark recorded the least amount of all the phytochemicals analysed. The phytochemical analysis suggests the presence of major phytocompounds which may be responsible for observed antioxidant activity. Nutrient analysis of all the samples showed that protein was highly concentrated in the leaf and carbohydrate in the flower. Bark was found to be the poorest source of both carbohydrate and protein.

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Determination of antioxidant status of the plant revealed that maximum activity of all the enzymes was observed in the flower extract. Bark registered the lowest activity of all the enzymic antixoidants except glutathione peroxidase. The content of all nonenzymic antioxidants except carotenoids was also found to be in the highest concentration in the flower. Bark registered the least value of all the nonenzymic antioxidants.

The four different solvent extracts of leaf, flower and bark of *Denolix elata* were effective in scavenging all the free radicals determined in the present study but the methanolic extracts registered the maximum scavenging activity. The scavenging effect of different extracts of various parts of the plant revealed that the methanolic extract of flower had greater scavenging effect followed by leaf and bark.

Brine shrimp lethality assay indicated that the percentage mortality increased with increase in concentration of leaves, flowers and bark samples and 100% mortality was observed at 1000µg/ml. Bark exhibited greater cytotoxic effect when compared to leaf and flower.

The findings of antibacterial activity showed that among the various solvents used for extraction of leaf, flower and bark, the prominent activity was conferred by the extracts of methanol with the highest zone of inhibition against the tested bacterial isolates, whereas chloroform was able to educe zone to moderate extent. There was only a meek inhibition produced by the extract of petroleum ether for all the plant samples. But aqueous extracts of *Denolix elata* tested against organism elicit only trace inhibition. However in general, the extracts obtained from methanol was able to tremendously inhibit the growth of bacterial isolates tested. The antibacterial activity of the different parts of *Denolix elata* revealed that flowers were more effective in inhibiting the bacterial growth than leaf and bark. Thus the results suggest that the potential use of the plant for developing new antibacterial compounds against bacterial isolates.

Thus the present dissertation ascertains the presence of various secondary metabolities as a source of natural antioxidants which might be preventive against oxidative stress. It further reflects a hope for the development of novel chemotherapeutic agents. Antibacterial efficacy shown by the plant provides a scientific basis and thus validates their traditional uses as safe alternative to treat infectious diseases.

Future recommendation

- Further study is warranted to isolate, characterize and screen the active principles from *Denolix elata.*
- *Invitro* studies using mammalian cell lines can be performed.
- Secondary metabolities can be isolated and their antibacterial activities can be determined.