

Comparative phytochemical analysis of *Diospyros chloroxylon* leaves in various extracts

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Abstract- A comparative preliminary study on the phytochemistry of acetone, methanol ethanol and aqueous extracts of the leaves of *Diospyros chloroxylon* of family Ebenaceae was carried out using specific chemical color reaction tests. The results obtained revealed that acetone was the best extractive solvent with the phytochemical properties of the *D.chloroxylon* leaves. Phytochemical studies indicated that the leaf contain a broad spectrum of secondary metabolites. Different extracts of leaf powders have been screened for qualitative determination of different secondary metabolites like carbohydrates,cardioglycosides, alkaloids, flavonoids, tannins, amino acids and proteins, saponins etc.

Index Terms- *Diospyros chloroxylon*, Phytochemistry, secondary metabolites, soxhlet extraction

I. INTRODUCTION

The medicinal value of plants lies in some chemical substances that produce a definite physiologic action on the human body. The most important of these bioactive compounds of plants are alkaloids, flavonoids, tannins and phenolic compounds. The phytochemical research based on ethnopharmacological information is generally considered an effective approach in the discovery of new anti-infective agents from higher plants (Duraipandiyan et al, 2006). Phytochemicals are not considered to be essential to the human diet, but are believed to be beneficial to human health. According to phytochemicals info, there are more than a thousand known preventive chemicals in many plants that ward off diseases.

Phytochemical studies have attracted the attention of plant scientist due to development of new and sophisticated techniques. These techniques played a significant role in giving the solution to systematic problems on the one hand and in the search for additional resources of raw material for pharmaceutical industry on the other hand. Plant synthesizes a

wide variety of chemical compounds, which can be sorted by their chemical class, biosynthetic origin and functional groups into primary and secondary metabolites. With the development of natural product chemistry, the potential of chemotaxonomy is now becoming increasingly obvious. The application of chemical data to systematic has received serious attention of a large number of biochemists and botanists during the last three decades (Santosh MK et al 2007).

The present study was to investigate the phytochemical properties of the plant *Diospyros chloroxylon Roxb. which has medicinal properties*.The leaves are used to cure many types of ailments includes boils, body pains, swellings, skin diseases etc. (K N Reddy et al., 2008).

II. MATERIAL AND METHODS

Fresh leaves of plant *Diospyros chloroxylon* free from diseases were collected from Madras Christian College, Tambaram, Chennai. They were washed thoroughly 2-3 times with running tap water and once with sterile water, air-dried, powdered and used for soxhlet extraction. 3 g of the powder was filled in the thimble and extracted successively with various extracts like acetone(90%), methanol(90%), aqueous and ethanol(90%). Phytochemical screening procedures carried out were adapted from the previous work on plant analysis (Thenmozhi. M . et al, 2010.) .This analysis determines the biologically active non nutritive compounds such as alkaloids,tannins,cardiac glycosides ,quinones, saponin etc.

II. RESULTS

The preliminary phytochemical screening carried out on methanolic,ehanolic,aqueous and aceone extracts of *D. chloroxylon* leaves revealed the presence of phytoconstituents such as carbohydrates, cardioglycosides, terpenoids, alkaloids,

flavonoids, phenols, tannins, amino acids and proteins, quinones and saponins. (Table-1). The results obtained revealed that acetone was the best extractive solvent. The acetone extracts of the leaf of have shown positive results for carbohydrates, cardioglycosides, terpenoids, alkaloids, phenols, tannins, and saponins. But flavonoids, quinones and fixed oils and fats are absent in *all the four extracts*. Carbohydrates, tannins, saponins and cardioglycosides are present in all the four extracts.

IV. DISCUSSION AND CONCLUSION

Successful prediction of botanical compounds from plant material is largely dependent on the type of solvent used in the extraction procedure. The traditional healers or practitioners make use of water primarily as a solvent, but our studies showed that ethanol, methanol extracts of these plants were certainly much better than water. This may be due to the better solubility of the active components in organic solvent (Boer *et al.*, 2005). Thus results obtained in the present study suggest that the alcohol extracts of the leaves revealed a significant scope to develop a novel broad spectrum of antimicrobial drug formulation (Cragg, and Newman, 2001).

The observed activity may be due to the presence of some metabolites like alkaloid, saponins, and terpenes which have been implicated in various biological activities. The present study carried out in leaves of *D. chloroxylon* have showed that the plant is rich in carbohydrates and cardioglycosides. Acetone extract showed the presence of terpenoids, alkaloids, tannins, phenols and saponins. Both aqueous and ethanol extract showed the presence of quinines, amino acids and proteins and fixed oils and fats are completely absent in all the extracts. Methanol and acetone extract showed the presence of phenols.

Similar studies by previous workers showed the presence of steroids and anthocyanin in the seeds of *Boerhavia orellana* and alkaloids and steroids in *Cardiospermum officinalis* (Adeniyi *et al.*, 2005); Terpenoids, tannins and guaabins from *Psidium guajava* and polygalacturonases in *Mangifera indica* (Akinpelu *et al.*, 2006); alkaloids, tannins, steroids, flavonoids from the

ethanolic and aqueous extracts of stem and bark of *Picralima nitida* (Nkere *et al.*, 2005); lenolinic acid in *Ocimum sanctum* (Singh, S *et al.*, 2005); phenolic compounds, flavonoids, cyclobutane in *Combretum alpopunctatum* (Kavitha *et al.*, 2004); diterpenes, flavonoids, andrographolates and polyphenols from *Andrographis paniculata* (Dua *et al.*, 2006; Rao *et al.*, 2004) and the presence of tannins, alkaloids, phenols and saponins in twelve Indian medicinal plants (Vimal Kumar *et al.*, 2009).

The presence of these metabolites suggests great potential for the plant as a source of useful phytochemicals (Kunle *et al.*, 2003). For instance, the presence of tannins could also show that it is an astringent, help in wound healing and anti-parasitic. Tannins bind to proline rich proteins and interfere with the protein synthesis (Shimada T, 2006).

It may be concluded that the awareness of local community should be enhanced by incorporating the traditional knowledge with scientific findings. The results of the present study support the folkloric usage of the studied plant, *D. chloroxylon* as a medicine. Hence it is necessary to explore the maximum potential of the plant in medicinal field and pharmaceutical sciences for further application. And also further studies are required about the appropriate characterisation of the compounds present in the plant.

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Table-1: Phytochemical analysis of leaves of some selected plant species

Phyto Constituents	Various Extracts			
	Acet one	Metha nol	Etha nol	Aqueous
Carbohydrates	+	+	+	+
Cardioglycosi des	+	+	+	+
Terpenoids	+	-	+	-
Alkaloids	+	-	-	-
Flavanoids	-	-	-	-
Tannins	+	+	+	+
Phenols	+	+	-	+
Aminoacids and Proteins	-	-	-	-
Quinones	-	-	+	+
Fixed oils and Fats	-	-	-	-
Saponins	+	+	+	+

+ - Postive

- - Negative



Figure 1: Diospyros chloroxylon Roxb.