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Preliminary phytochemical analysis of different solvent extracts of *Scopariadulcis* L.

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Abstract- Medicinal plants contain bioactive compounds which are used for treatment of various human diseases.Phytochemicals have two categories i.e., primary and secondary constituents.Secondary metabolites are responsible for medicinal activity of plants. The phytochemical analysis of total extracts in water, ethanol, methanol, chloroform, hexane and ether extracts of *Scopariadulcis* L.were investigated. The phytochemical analysis revealed the presence of flavonoids, steroids, quinone, starch, cellulose, terpenoids, phenols, carbohydrates, fixed oil and fat, and saponins in varying solvents. This research seeks to investigate the presence phytochemical constituents as the possible agent responsible for the medicinal activities of the plant ScopariadulcisL.. This plant belongs to family Scrophulariaceae. The present study provides evidence that different solvents can extract different phytochemical constituents of Scopariadulcis L. The diversity of phytochemicals found suggests that *Scopariadulcis* L. could serve as a natural source of traditional medicine for treatment of various diseases.

Index Terms- *Scopariadulcis*L., phytochemical analysis, solvents, medicinal plant

I. INTRODUCTION

The medicinal plants are useful for healing as well as curing of human diseases because of the presence of phytochemical constituents [1]. These include compounds that are utilized as food by man and other animals and also other com-pounds that exert physiological effects on them. This second group of chemical substances often referred to as secondary metabolites, give plants their therapeutic properties [2].

*Scopariadulcis*L. is a widely distributed tropical and subtropical plant. It is a medicinal plant used to treat various human disorders.The fresh or dried plant has traditionally been used as one of remedies for stomach troubles, hypertension, diabetes, inflammation, bronchitis, hemorrhoids and hepatosis and as an analgesic and antipyretic [3].

Successful determination of biologically active compounds from plant material is largely dependent on the type of solvent used in the extraction procedure [4]. The main objective of our research work is to analyze the presence of secondary metabolites as the promising agent responsible for the medicinal and pharmaceutical activities of the plant *Scopariadulcis*L. by carrying out the phytochemical screening of the plant in different solvents.

II. MATERIAL AND METHODS

1) Collection of plant materials

The plant species were collected wildly from the of Long Thanh district, Dong Nai province, Viet Nam in August 2014 with the help of local people. The plant material was identified at the field using standard keys and descriptions.

2) Preparation of plant extracts

The selected plants were washed under running tap water to remove dust. The plant samples were then dried for 48hrs in a hot air oven at 60^0C and then were ground using an electric blender to obtain a fine powder and stored in polythene bags until needed for analysis. 50g portions of powdered plant materials were each separately dispersed in 500ml of each water, ethanol, methanol, chloroform, hexane and ether. The solutions were vigorously shaken at room temperature for 48hrs and were filtered with Whatman No.1 filter paper. The filtrate was used for the phytochemical analysis.

3) Phytochemical analysis

Chemical tests for the screening and identification of bioactive chemical constituents in the medicinal plants under study were carried out in extracts as well as powder specimens using the standard procedures as described by [5, 6, and 7].

III. RESULT AND DISCUSSION

Table 1: Phytochemical analysis of *Scopariadulcis*L.

Constituent	Aqueous extract	Ethanol extract	Methanol extract	Chloroform extract	Hexane extract	Ether extract
Flavonoids	+	+	+	+	-	-
Steroids	-	-	-	-	+	+
Quinone	+	+	-	-	-	-
Starch	+	+	-	-	+	+
Anthocyanin	-	-	-	-	-	-
Cellulose	-	-	-	+	+	-
Terpenoids	+	+	-	-	+	-
Phenols	+	+	+	-	-	-
Carbohydrates	+	+	+	-	-	-
Fixed oil and Fat	+	-	-	+	-	-
Saponins	+	-	+	-	-	+

The study has revealed the presence of phytochemicals considered as active medicinal chemical constituents. Of the eleven phytochemicals screened for, ten were found present in various solvent extracts. They are of flavonoids, steroids, quinone, starch, cellulose, terpenoids, phenols, carbohydrates, fixed oil and fat, and Saponins. Anthocyanin was not detected in six different solvents.

The extraction of phytochemicals is dependent on the dissolution of each compound in the plant material matrix and their diffusion into the external solvent [8], therefore the choice of extraction solvent is one of the most important matters to consider for solid-liquid extraction. The factors that need to be considered when choosing the solvent or solvent system for extraction of phytochemicals are safety of the solvent and potential for formation or extraction of undesirable compounds and finally solubility of the target compound [9, 10].

The result indicates that*Scopariadulcis* L. is a promising herbal of pharmaceutically important phytochemicals.Terpenoids can have medicinal properties such as anticarcinogenic (e.g. perilla alcohol), antimalarial (e.g. artemisinin), anti-ulcer, hepaticidal, antimicrobial or diuretic (e.g. glycyrrhizin) activity and the sesquiterpenoid antimalarial drug artimisinin and the diterpenoid anticancer drug taxol [11,12]. Flavonoids have been stated to possess many useful properties, containing anti-inflammatory activity, enzyme inhibition, antimicrobial activity, oestrogenic activity, anti-allergic activity, antioxidant activity, vascular activity and cytotoxic antitumor activity [13].

IV. CONCLUSION

Those phytochemicals were revealed differently in different solvents.The study concluded that the choosing of solvent could have produced diversely number of secondary metabolites which are responsible for many medicinal and pharmaceutical properties. The plant Scopariadulcis L. should be investigated under more researches to utilize its potential activities. Furthermore, isolation, purification, and characterization of the phytochemicals found present should also be considered for future investigation.

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REFERENCES

[1] Nostro A, Germanò MP, D'angelo V, Marino A, Cannatelli MA (2000). Extraction methods and bioautography for evaluation of medicinal plant antimicrobial activity. Lett Appl Microbiol 30: 379-384.

[2] Evans WC (2002). Trease and Evans Pharmacognosy, 15th edition. W.B Sauders Company Ltd, London. pp 137-139,230-240.

[3] Latha, M., Pari, L., Ramkumar , K. M., Rajaguru, P., Suresh, T., Dhanabal, T., Sitasawad, S. and Bhonde R. (2009). Antidiabetic effects of scoparic acid D isolated from Scoparia dulcis in rats with streptozotocininduced diabetes. Nat. Prod. Res. 23(16): 1528–1540

[4] P. Tiwari, B. Kumar, M. Kaur, G. Kaur, H. Kaur, Int. Pharm. Sciencia, 2011, 1, 98-106

[5] Harborne JB . Methods of plant analysis. In: Phytochemical Methods (Chapman and Hall, London. 1973)

[6] Sofowora A (1993). Medicinal Plants and Traditional Medicine in Africa. John Wiley and Sons Limited, 2: 96-106

[7] Trease GE, Evans WC Pharmacognosy (15th Edn. Saunders, pp. 214-393. 2002)

[8] Shi, J., Nawaz, H., Pohorly, J., Mittal, G., Kakuda, Y. and Jiang, Y. (2005). Extraction of Polyphenolics from Plant Material for Functional Foods—Engineering and Technology. *Food Reviews International*, 21(1), pp.139-166.

[9] Seidel, V. (2012). Initial and Bulk Extraction of Natural Products Isolation. *Methods in Molecular Biology*, pp.27-41.

[10] Tiwari, B., Brunton, N. and Brennan, C. (2013). *Handbook of plant food phytochemicals*. Chichester: Wiley-Blackwell.

[11] Langenheim JH. Higher plant terpenoids: A phytocentric overview of their ecological roles. Journal of Chemical Ecology, 1994; 20: 1223- 1280

[12] Dudareva N, Pichersky E, Gershenzon J. Biochemistry of plant volatiles. Plant Physiology, 2004; 135: 1893–1902

[13] Tapas AR, Sakarkar DM, Kakde RB. Flavonoids as Nutraceuticals: A Review.Tropical Journal of Pharmaceutical Research, 2008; 7: 1089-1099

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