



Research Paper

PRELIMINARY PHYTOCHEMICAL SCREENING OF DIFFERENT SOLVENT EXTRACTS OF LEAVES OF *Echeveria elegans* ROSE, AN ENDANGERED MEXICAN SUCCULENT HERB

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Abstract

Medicinal plants are chief antidote for numerous diseases and have been used since time immemorial. *Echeveria elegans* is a very fashionable succulent that cultivate in gorgeous rosettes with stunning leaves in a variety of colours and sometimes striking flowers. The aim of the present study was to screen the various phytochemicals from the benzene, acetone, hexane, chloroform, and ethanolic extracts of leaves of *E. elegans*. The extracts were subjected to qualitative phytochemical screening using standard procedures. Five different extracts of leaves of *E. elegans* were found to contain various secondary metabolites like Triterpenoids, Steroids, Glycosides, Saponins, Alkaloids, Flavonoids and Tannins. The phytochemicals generated data from the five different extracts of *E. elegans* may be used as tools for quality control of drugs in the future, for the healing of a diversity of disease conditions.

Key words: Phytochemical screening, *Echeveria elegans*, Secondary metabolites.

INTRODUCTION

The beneficial efficacy of many indigenous plants for a variety of diseases has been depicted by traditional herbal medicinal practitioners since ancient time. Natural products are the source of synthetic and conservative herbal medicine. These medicines are highly secure as well as environment friendly. According to WHO, 80% of the population from developing and developed countries relies on conventional medicine for their chief health care [1]. They are bioactive chemicals of plant origin, which are considering as secondary metabolites. Naturally, these bioactive chemicals are manufactured in all parts of the plant body i.e., bark, leaves, stem, root, flower, fruits and seeds [2]. The quantity and quality of bioactive chemicals present in plant parts may vary from one part to another. In fact, the biological activity of plants are highly depends on the distribution of bioactive chemicals (or active principles) which are more frequent in some parts of the plants [3]. The successful determination of active principles isolated from plant material is predominantly dependent on the variety of solvent used in the

extraction methods [2]. Hence it emphasizes that numerous solvent attempts are required to screen the plant parts for phytochemicals.

Echeveria elegans is an evergreen semi desert ornamental species of Angiosperms in the Saxifragales order and Crassulaceae family. It is a fascinating succulent perennial herb, containing tight rosettes pale green fleshy leaves, and long slender pink stalks flowers. It propagates several offsets which can be detached from the parents, and grown independently - hence the common name "hen and chicks" [4]. It grows in rock gardens or as potted plant. It flourishes in subtropical climates such as Ethiopia and other countries. Human being activities such as soil erosion, commercial exploitation and environmental calamity, are the main reason that have made *E. elegans* as endangered [5, 6]. In the present study, various solvent extracts of leaves of *E. elegans* were qualitatively screened for phytochemicals using standard tests.

MATERIALS AND METHODS

Collection of Plant Materials

Leaves of *E. elegans* were collected from Rock garden, Department of Biomedical science, Jimma University, Jimma Ethiopia. The plant materials were washed with tap water, clean with distilled water and blotted smoothly between the folds of filter paper.

Processing of Plant Materials

Leaves of *E. elegans* were dried for 12hrs in a hot air oven at 60^o C. The dried leaves materials were ground using an electric blender to obtain a fine powder. The powder was additionally passed through a 2mm filter to get fine particles. The powdered samples were stored in a fresh glassware container until required for analysis.

Preparation of extracts

Benzene, acetone, hexane, chloroform, and ethanolic extracts of leaves of *E. elegans* were prepared in 10g/ 100 ml. The solvents of organic extracts were dried at 60^o C protected from light. The residue was weighed and solubilised in 50ml of dimethyl sulphoxide (DMSO). These extracts were used for the screening of preliminary phytochemical analysis.

Screening procedure

1. Test for alkaloids

About two ml of the leaves extract was added to 2 ml of hydrochloric acid. To this acidic medium, 1 ml of Dragendorff's reagent was added. An orange or red precipitate produced immediately indicates the presence of alkaloids.

2. Test for amino acids

About one ml of the extract was treated with few drops of Ninhydrin reagent. Appearance of purple colour shows the presence of amino acids.

3. Test for anthraquinones

About five ml of the extract solution was hydrolysed with diluted Conc. H₂SO₄ extracted with benzene. 1 ml of dilute ammonia was added to it. Rose pink coloration suggested the positive response for anthraquinones.

4. Test for flavonoids

About one ml of the extract, a few drops of dilute sodium hydroxide was added. An intense yellow colour was produced in the plant extract, which become colourless on addition of a few drops of dilute acid indicates the presence of flavonoids.

5. Test for glycosides

The extract was hydrolysed with hydrochloric acid for few hours on a water bath. To the hydrolysate, 1ml of pyridine was added and a few drops of sodium nitroprusside solutions were added and then it was made alkaline with sodium hydroxide solution. Appearance of pink to red colour shows the presence of glycosides.

6. Test for saponins

The extract was diluted with 20 ml of distilled water and it was agitated in a graduated cylinder for 15 minutes. The formation of 1cm layer of foam showed the presence of saponins.

7. Test for steroids

About one ml of the extracts was dissolved in 10 ml of chloroform and equal volume of concentrated sulphuric acid was added by sides of the test tube. The upper layer turns red and

sulphuric acid layer showed yellow with green fluorescence. This indicated the presence of steroids.

8. Test for tannins

About two ml of the extract and a few drops of 1% lead acetate were added. A yellow precipitate was formed, indicates the presence of tannins.

9. Test for triterpenoids

About two ml of the extract was dissolved in 1 ml of chloroform; 1 ml of acetic anhydride was added following the addition of 2 ml of Conc.H₂SO₄. Formation of reddish violet colour indicates the presence of triterpenoids.

RESULTS AND DISCUSSION

In the present investigation, preliminary phytochemical investigation has been done in the different extracts of *E.elegans* leaves showed the presence of phytochemical constituents namely alkaloids, anthraquinones, flavonoids, glycosides, saponins, steroids, tannins, triterpenoid, and absence of aminoacids, shown in Table I.

The initial phytochemical screening tests may be helpful in the screening of the bioactive compounds and eventually may help to detection and development of new drugs. Further, these tests make easy their qualitative separation and quantitative estimation of pharmacologically active chemical compounds [7]. The phytochemical screening in the present study has publicized the presence of alkaloids, anthraquinones, flavonoids, glycosides, saponins, steroids, tannins, and triterpenoids in the leaves extract. Further the presence of different phytochemicals in the five different organic solvent extracts may be responsible for the therapeutic properties of *E.elegans*.

Tannins and Flavonoids are phenolic compounds that are acting as principal antioxidants or free radical scavengers. Since these phenolic compounds were originated to be present in the extracts, it might be accountable for the potent antioxidant capacity of *E.elegans*. These phytochemicals of medicinal plants have primarily reported for their medicinal value, which can be valuable for therapeutic index. For instance, saponins and glycosides proved as hypotensive and cardiodepressant properties [8], which are helpful for the treatment of congestive heart failure and cardiac myopathy [9]. The occurrence of saponins in benzene and acetone extracts and glycosides in all the extracts of leaves of *E.elegans* might play a role in the cardioprotective potential. Tannins and alkaloids have the potential of anti-hyperglycaemic and anti-inflammatory activities [10]. Moreover, the terpenoids have also been revealed to decrease blood sugar level in animal studies [11]. In addition, the steroids and triterpenoids demonstrated the analgesic properties and central nervous system activities [11-13]. Hence the initial phytochemical studies are helpful in finding chemical constituents in the plant material that may help to their quantitative assessment and also in locating the source of pharmacologically active chemical compound.

CONCLUSION

The results of phytochemical analysis showed the leaves extracts of *E.elegans* indicates their potential as a source of bioactive principles that may supply drugs for modern medicines. Further studies are therefore required to validate their antimicrobial, antihyperglycemic, anti-inflammatory, and antihelminthic activities. In addition, isolation purification and characterization of the active principles are necessary to make the plant has novel interesting studies.

ACKNOWLEDGMENT

We sincerely acknowledge to the Staff of the Biomedical Sciences, who really gave support and cooperation in the study.

Table I: The analysis of phytochemicals in the different organic extracts of *E. elegans* leaves

	Benzene	Acetone	Hexane	Chloroform	Ethanol
Wagner's Test	+	-	-	-	-
Ninhydrin	-	-	-	-	-
<i>anthraquinones</i>	+	-	-	-	-
<i>Flavonoids</i>	+	-	+	-	+
<i>Glycosides</i>	+	+	+	+	+
<i>Saponins</i>	+	+	-	-	+
<i>Steroids</i>	-	+	+	+	+
<i>Tannins</i>	+	+	-	-	+
<i>Triterpenoids</i>	-	-	+	+	-

+ = Presence; - = Absence

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