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RESEARCH ARTICLE

PHYTOCHEMICAL ANALYSIS OF THE AERIAL PARTS OF SOME SELECTED MEDICINAL PLANTS

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ABSTRACT

Medicinal plants have bioactive compounds which are used for curing of various human diseases and also play an important role in healing. Phytochemicals have two categories i.e., primary and secondary constituents. Primary constituents have chlorophyll, proteins and amino acids. Secondary constituents contain terpenoids, flavonoid, glycoside and alkaloids. This paper deals with Phytochemical studies of *Trifolium pratense*, *Astragalus corrugates* and *Hypericum perforatum.* Phytochemical tests were carried out to know about the qualitative existence of secondary metabolites in them. For the current article screening of alkaloid, flavonoid, glycoside, saponin, tannin, terpenoid and have been carried out.

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INTRODUCTION

Phytochemicals (from the Greek word phyto , meaning plant) are biologically active, naturally occurring chemical compounds found in plants, which provide health benefits for humans further than those attributed to macronutrients and micronutrients (Hasler *et al*., 1999). They protect plants from disease and damage and contribute to the plant's color, aroma and flavor. In general, the plant chemicals that protect plant cells from environmental hazards such as pollution, stress, drought, UV exposure and pathogenic attack are called as phytochemicals (Gibson and Mathai et al., 1998). Recently, it is clearly known that they have roles in the protection of human health, when their dietary intake is significant. More than 4,000 phytochemicals have been cataloged [4] and are classified by protective function, physical characteristics and chemical characteristics and About 150 phytochemicals have been studied in detail (Meagher *et al*.,1999). *Trifolium pretense* L. (Leguminosae), also known as red clover, is a perennial plant with trifoliate leaves, obovate to broadly elliptic, inflorescence globose to ovoid, and corolla reddish-purple to pink, rarely whitish. *T. pretense* is a very variable species. It has three varieties in Turkey, namely *Trifolium pretense* L. var. *pratense*, *Trifolium pratense*L. var. *sativum* Schreb., and *Trifolium pretense* L. var. *americanum* Harz. All varieties are widely cultivated as a fodder crop throughout the North temperate region (Zohary *et al*., 1970). Red clover is traditionally used in the treatment of chronic skin diseases such eczema and psoriasis and whooping cough (Gruenwald et al., 2000). Recently, it has been used for many human health benefits due to phytoestrogen isoflavones (Cos *et al*., 2003). Species of *Astragalus* genus are valued in the folk medicine throughout the world and utilized as medicinal herbs against stomach ulcer, cough, chronic bronchitis, hypertension, gynaecological disorders, diabetes and venomous bites of scorpion (Bellakhdar *et al*., 1997). Some plants of the same genus have been reported as having immunostimulant, cardiovascular and antiviral activities (Yalcin *et al*.,2012). The biologically active constituents of *Astragalus* species are saponin, phenolic and polysaccharide compounds, while the toxic components consist of nitro-toxins, imidazoline alkaloids and selenium derivatives (Pistelli *et al*., 2003).

Hypericum perforatum is a yellow flowering plant naturally found in various locations around the world including West Asia, Europe, and North Africa. *Hypericum perforatum* has been studied for its effects in treating depression and attention deficit hyperactivity disorder (Weber *et al*., 2008). Cancer prevention research is one of the new areas that *Hypericum perforatum* and its main chemical constituents are being applied to. Research has shown that the most significant

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compounds in *Hypericum perforatum* for cancer prevention are hypercerin and hyperforin (Linde *et al*., 2009).

MATERIALS AND METHODS

The stem and leaf parts of *Trifolium pretense*, *Astragalus corrugates* and *Hypericum perforatum* .were collected from the region of Rostov-on don in the Russia .The samples were dried at room temperature and further ground in a mortar. About 10 grams of each plant powder was extracted in 100 ml of two solvents ethanol by maceration (48 h) and water by soxhelated with distilled water for about 10-12 hrs. The extracted was concentrated at temperature below 40°C by rotary evaporator and the resulting extracts were used for determination of active compounds.

Identification Tests

The tests were done to find the presence of the active chemical constituents such as alkaloids, glycosides, terpenoids, flavonoids, saponin and tannin by the following procedure:

Alkaloids

2ml of each extract was taken separately with 5ml of 1.5%V/V aqueous hydrochloric acid and filtered. The resulting acidic solution was divided into four parts. Three parts were tested with Mayer's, Wagner and Dragendroff's reagent and the fourth served as blank. If a brown flocculent precipitate was observed on addition of Wagner's reagent, indicated the presence of alkaloids. And if yellowish white precipitate on addition of Mayer's reagent was the Solvent Compounds/part positive test of alkaloids . And if development of orange precipitation on addition of Dragendroff's reagent is the positive test for alkaloid.

Cardiac glycosides

1ml of glacial acetic acid was added to 2ml of extract in a test tube. In this mixture few ml of ferric chloride followed by2drops of concentrated H2SO4 were added. Green blue colour indicated the presence of cardiac glycosides (Killer-Kiliani tests).

Flavonoids

A few drops of 1 % NH3 solution is added to the aqueous extract of each plant sample in a test tube. A yellow colouration is observed if flavonoid compounds are present.

Saponins

2 ml of the water extract was shaken vigorously for 10 seconds and allowed to stand. The formation of persistent honeycomb like froth is the positive test for the presence of saponins (Cambie et al.,1961).

Tannins

0.5 ml of alcoholic and water extracts were diluted with 1.0 ml of water and 2-3 drops of dilute ferric chloride solution was added. Development of a blue black/green colour indicates the presence of tannin.

Triterpenoids

All the extracts were separately evaporated on water bath and residue was formed. A few mg of the residue was dissolved in chloroform. To this was added few ml of acetic anhydride and two drops of concentrated H2SO4 from the sides of the test tube. The red/ violet colour indicates the presence of triterpenoids (Libermann- Burchard reaction).

RESULTS AND DISCUSSION

After performing the analysis of bioactive compounds of the studied medicinal plants, the following results were obtained:

Table 1. Phytochemical constituents of Trifolium pratense, Astragalus corrugates and Hypericum perforatum

Phytochemical Screening							
Name of plant species	solvents	Chemical constituents					
		Alkaloid	Flavanoid	Saponin	Terpenoid	Cardiac glycoside	Tannin
Trifolium pretense(leaf)	Alcohol Extract	-ve	+ve	+ve	-ve	-ve	+ve
Trifolium pretense(stem)	Alcohol Extract	-ve	+ve	+ve	-ve	-ve	+ve
Astragaluscorrugatus(leaf)	Alcohol Extract	-ve	+ve	+ve	-ve	-ve	+ve
Astragaluscorrugatus(stem)	Alcohol Extract	-ve	+ve	+ve	-ve	-ve	+ve
Hypericumperforatum(stem)	Alcohol Extract	+ve	+ve	-ve	-ve	-ve	+ve
Hypericumperforatum(leaf)	Alcohol Extract	+ve	+ve	-ve	-ve	-ve	+ve

Table 2. Phytochemical constituents of Trifolium pratense, Astragalus corrugates and Hypericum perforatum

Phytochemical Screening							
Name of plant species	solvents	Chemical constituents					
		Alkaloid	Flavanoid	Saponin	Terpenoid	Cardiac glycoside	Tannin
Trifolium pretense(leaf)	Water Extract	-ve	+ve	+ve	-ve	-ve	+ve
Trifolium pretense(stem)	Water Extract	-ve	+ve	+ve	-ve	-ve	+ve
Astragaluscorrugatus(leaf)	Water Extract	-ve	+ve	+ve	-ve	-ve	+ve
Astragaluscorrugatus(stem)	Water Extract	-ve	+ve	+ve	-ve	-ve	+ve
Hypericumperforatum(stem)	Water Extract	+ve	+ve	-ve	-ve	-ve	+ve
Hypericumperforatum(leaf)	Water Extract	+ve	+ve	-ve	-ve	-ve	+ve

This study has revealed the presence of phytochemicals considered as active medicinal chemical constituents. Important medicinal phytochemicals such as flavonoids, saponin and tannin were present two medicinal plants. The result of the phytochemical analysis shows that the two plants

Trifolium pratense and *Astragalus corrugatus* are rich in the compounds as flavonoids, saponin and tannin. Table 1 and Table 2. The phytochemical characteristics of three medicinal plants tested were summarized in the table-1 and table 2. The results revealed the presence of medically active compounds in the all plants studied. From the table 1 and table 2, it could be seen that tannins, flavonoids, and saponins were present in two medicinal plants. Alkaloid was present in *Hypericum perforatum* only and the Saponins have been found to be present in all species except *Hypericum perforatum*. While the Glycosides and Terpenoids were absent in all the plants.

Conclusion

The results revealed the presence of medicinally important constituents in the plants studied. Many evidences gathered in earlier studies which confirmed the identified phytochemicals to be bioactive. Several studies confirmed the presence of thesephytochemicals contribute medicinal as well as physiological properties to the plants studied in the treatment of different ailments. Therefore, extracts from these plants could be seen as a good source for useful drugs. The traditional medicine practice is recommended strongly for these plants as well as it is suggested that further work should be carried out to isolate, purify, and characterize the active constituents responsible for the activity of these plants. Also additional work is encouraged to elucidate the possible mechanism of action of these extracts.

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