

Phytochemical analysis of medicinal plants *Ranunculus arvensis*

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Abstract: Medicinal plant *Ranunculus arvensis*, was used for this study. This is important medicinal plant. Keeping in view their importance, this work was carried out to investigate the quantitative determination of their crude phytochemicals in *n*-hexene, chloroform, ethyle acetate and water fractions. The quantitative determination of crude phytochemicals (alkaloids, total phenols, flavonoids and saponins) were determined in the aforementioned plant using literature methods. The plant showed variable amounts of phytochemicals. The study is very important, in that it intended to show the contents of the studied medicinal plant and also provide a scientific data base line which is of particular important for the local practioners as well as for the local people using this plant for a variety of body disorders.

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Introduction

Many herbaceous plants are used as food and medicine. These herbaceous plants have been traditionally used for medicinal properties since a long time ago. Fruits and vegetables values have been greatly known for their numerous healthful properties. Among the various evidence revealing that medicinal and culinary herbs have some endemic species, a diet rich in fruits and vegetables and phytochemicals which decrease the risk of cardiovascular diseases and some forms of cancer are of particular interest. Extracts of fruits, herbs, vegetables and other plants' part rich in flavonoids, phenolic acid, vitamins and other phytochemicals, are used in the preparation of traditional medicine in the treatment of liver cirrhosis, hepatitis and are also used to improve the quality of nutritional foods. The active constituents of these plants and herbs suggest the presence of phytochemicals, vitamins, minerals and anti-microbial constituents in their tissues. Many herbaceous and medicinal plants contain important phytochemicals and vitamins such as alkaloids, flavonoids, tannins, cyanogenic glycosides, phenolic compounds, saponins, lignins and lignans and vitamin C, vitamin E and carotenoid which are utilized both by humans and animals as important components of diets. The potential of the phytochemicals have large scale pharmacological and biological activities such as antioxidant constituents (hydrolysable tannins, phenolic acid and flavonoids) of the plant materials for the care of health and protection from coronary heart diseases, cancer, anti-carcinogenic and anti-mutagenic effects. Varieties of herbaceous vegetables are protective against various diseases, particularly cardiovascular diseases. These herbaceous plants and species are harmless sources

for obtaining natural antioxidants. Antioxidant constituents can delay or inhibit the oxidation of lipids and other compounds by inhibiting the propagation of oxidation chain reaction. Primarily, antioxidant effect is due to phenolic compounds such as phenolic acid, flavonoids and phenolic diterpenes and their mode of action for antioxidant compounds is due to its redox reaction properties which can absorb and neutralize free radicals by quenching singlet and triplet oxygen (Iqbal H et al 2011).

Materials and Methods

Plant material

Medicinal plant *Ranunculus arvensis*, was collected from Peshawar (Pakistan). The plant sample was rinsed with tap water and then with de-ionized water. It was dried, chopped, crushed and powdered with electrical grinder and then the dried powdered sample was stored in polyethylene bottles for further processes.

Phytochemical determination

Determination of alkaloids

For alkaloids determination, 5 g of each sample was weighed into a 250 ml beaker, and 200 ml of 20% acetic acid in ethanol was added and was covered to stand for 4 h. This was filtered and the extract was concentrated using a water bath to evaporate one-quarter of the original volume. The concentrated ammonium solution was added dropwise to the extract until the precipitation was completed. The entire solution was allowed to settle and the precipitate was collected by filtration, after which it was weighed (Obadoni et al., 2001).

Determination of total phenols

To determine the total phenols, 5 g of the plant sample was weighed into a 250 ml titration flask and 100 ml n-hexane was added twice for 4 h each; the filtrates were discarded for fat free sample preparation. Then, 50 ml diethyl ether was added twice, was heated for 15 min each, was cooled up to room temperature and was filtered into a separating funnel. About 50 ml of the 10%

NaOH solution was added twice and shook well each time to separate the aqueous layer from the organic layer. It was washed three times with 25 ml de-ionized water. The total aqueous layer was acidified up to pH 4.0 by adding 10% HCl solution and 50 ml dichloro methane (DCM) twice to acidify the aqueous layer in the separating flask. Consequently, the organic layer was collected, dried and then weighed (Iqbal H et al 2011).

Determination of flavonoids

To determine flavonoids, 5 g of each plant sample was weighed in a 250 ml titration flask, and 100 ml of the 80% aqueous methanol was added at room temperature and shaken for 4 h in an electric shaker. The entire solution was filtered through Whatman filter paper no. 42 (125 mm) and again, this process was repeated. The filtrate as a whole was later transferred into a crucible and evaporated to dryness over a water bath and weighed (Boham et al., 1994).

Determination of saponins

For the saponins determination, 5 g of each plant samples was weighed and was dispersed in 100 ml of 20% ethanol. The suspension was heated over a hot water bath for 4 h with continuous stirring at about 55°C. The filtrate and the residue were re-extracted with another 100 ml of 20% ethanol. The combined extracts were reduced to 40 ml over water bath at about 90°C. The concentrate was transferred into a 250 ml separating funnel and 20 ml of diethyl ether was added and shaken vigorously. The aqueous layer was recovered while the ether layer was

discarded. The purification process was repeated and about 30 ml of n-butanol was added. The combined n-butanol extracts were washed twice with 10 ml of 5% aqueous sodium chloride. The remaining solution was heated in a water bath. After evaporation, the samples were dried in the oven to a constant weight. The saponin content was calculated in percentage (Obadoni et al., 2001).

Results and Disussion

The phytochemical quantitative composition of *R. arvensis*, is shown in Table 1. Saponin was observed in higher quantity in ethyl acetate 2.414 ± 0.014 than the other crude fractions, followed by chloroform 1.405 ± 0.01 . similarly the highest quantity of flavanoid recorded in ethyl acetate fraction 1.3415 ± 0.0011 followed by chloroform 1.032 ± 0.002 . Phenolic constituents were found to be higher in concentration in water fractions followed by chloroform. The highest concentration of alkaloid noted in chloroform and then ethyl acetate. Alkaloids and its derivatives played important role in analgesic, antispasmodic and bactericidal activities. However, alkaloids are mainly observed in large amount in flowering plants and they have an important physiological effect on mankind. Morphine, quinine, ephedrine, nicotine and strychnine are the major types of alkaloids. In these types, morphine and codeine are narcotic analgesics as well as are anti-tussive agent (Stary et al., 1998). Flavonoids are water soluble phytochemical and an important plant phenolic. They show antioxidant activities and they have the property of preventing oxidative cell damage and carcinogenesis. They have anti cancer, anti inflammatory activities and a large effect in lower intestinal tract and heart disease. Flavonoids as antioxidants from *R. arvensis* provide anti-inflammatory action (Farquar et al., 1996). This is the reason why these plants are being used for skin diseases. Phenols and phenolic compounds are greatly used in skin infections and other wounds treatment and also for healing, when compared to other bactericides (Okwu et al., 2001).

Table 1. Phytochemicals composition of the *R. arvensis* samples on dry weight basis expressed as mg/100 g dry weight

Crude fractions	Alkaloid	Phenol	Flavonoid	Saponin
n-hexane	0.012 ± 0.001	0.001 ± 0.0002	0.1000 ± 0.022	0.002 ± 0.001
Chloroform	0.1762 ± 0.011	1.046 ± 0.016	1.032 ± 0.002	1.405 ± 0.01
Ethyl acetate	0.154 ± 0.0011	1.031 ± 0.015	1.3415 ± 0.0011	2.414 ± 0.014
Water	0.004 ± 0.0011	1.216 ± 0.011	0.7641 ± 0.0024	0.621 ± 0.002

Conclusion

Result showed that ethyl acetate and chloroform fraction are the important fraction and can be used for isolation of important phytochemical including saponin, flavonoid and phenolic compounds.

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