Chemical Study of Fruits of *Rhus coriaria*

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Abstract

Chemical screening of fruits of *R. coriaria* was revealed the presence of alkaloids, glycosides, flavonoids, tannins, phenols, and saponins. The percentage of active constituents of terpenoids, methanol extract, alkaloids, glycosides and phenols were: (11.85 31.7, 2.3, 2.48 and 5.9) % respectively. Petroleum ether extract of *R. coriaria* was brown waxy at 8°C and 25 °C, oily at 70°C with density 0.965 g/ml³.

Introduction

Herbs have always been the principal form of medicine and presently they become popular throughout the world, as people strive to stay health in the face of chronic stress and pollution, and to treat illness with medicines that work in count with the body's own defense (1). There is a widespread belief that green medicines are healthier and more harmless or safer than synthetic ones. (2). Medicinal plants have been used to cure a number of diseases. Though the recovery is slow, the therapeutic use of medicinal plant becomes popular because of its inability to cause side effects and antibiotic resistant microorganisms (3). *Rhus coriaria* (dyeing and tanning sumac), which grows wild in the region from the Canary Islands over

the Mediterranean region to Iran and Afghanistan, is commonly used as a spice by grinding the dried fruits with salt, and is also widely used as a medicinal herb in the Mediterranean and Middle East, particularly for wound healing (4). The leaves and fruits of *Rhus coriaria* contain tannins, sugars, waxes and flavone derivatives (myricetine) which are yellow of color too. (5). Malic acid was detected to be responsible for the sour taste of sumach. β -caryophyllene (spicy, woody), cembrene (woody) and caryophyllene oxide (spicy) seem to have an important contribution to sumach flavour. Sensory flavour profile analysis revealed oil and acid aroma and dried lemon balm, cellulose/woody, spicy. (6).

Material and methods

1-Plant preparation

Fruits of Sumac brought from folk market. The plant was identified and authenticated in botany laboratory, department of Biology / College of science / Kufa University. Fruits of Sumac were ground well into a fine powder in a mixer grinder. The plant powder was stored in air sealed polythene bags at room temperature before extraction. (7).

2-Preliminary qualitative chemical tests

Methanol extracts of *R. coriaria* was tested chemically for the presence or absence of following constituents : alkaloids, glycosides, flavonoids, tannins and phenols by the following reagents: Mayer reagent, Benedict reagent, potassium hydroxide alcohol, 1% lead acetate and ferric chloride respectively.

Saponins test by shaken chloroform extract vigorously in test tube. If foam froth appeared and stayed for long time indicate the presence of saponins (8).

3-Preparation of extracts

Twenty five g. of dried plant powder was packed in a Whatmann filter paper No.1 and was extracted in a soxhlet apparatus using 250 ml of solvent until the last portion of the extract became colorless. Solvents of all extracts were removed under low vacuum by using rotary evaporation. Crude extracts were maintained at +4 °C until use. (9).

4-Extraction of terpenoids

Terpenoid were extracted with Petroleum ether (60–80)⁰C for 24 hrs. The solvent was dried and concentrated using rotary evaporator at 40°C. The dried

extracts were stored in a refrigerator at 4°C (10). The residue dried at room temperature for further extraction (methanol extraction).

5-Methanol extract

The dried residue after defatted with petroleum ether retains in a soxhlet and extracted with methanol 90% (62°C) and the extract was dried (11).

6-Extraction of Phenols

The methanol extract acidify with 2 M H₂SO₄ (pH < 3) and partition in a separating funnel with CHCl₃. (10).

7-Extraction of Glycosides

15 g of methanol extract was dissolved in (60 ml) of water and mixed with 200 ml of n-butanol and left to partition in a separating funnel overnight. The n-butanol phase was percolated through activated carbon bed (2 g). The n-butanol phase was concentrated in a rotary

evaporator into solid residue, tested for glycosides and stored until evaluated. (11).

8-Extraction of Alkaloids

A sample of (10 g) of powdered plant material was suspended in 400 ml of surfactant solution sodium dodecylsulfate (SDS) in a glass beaker (capacity 500ml) and sonicated for 2.5 hrs. in an ultrasonic bath at a constant temperature of 25 °C. The extract was separated by simple filtration and the residual material washed with (20 ml) of pure water. The solution of combined filtrates was acidified with sulfuric acid solution (2%, m/m) to pH 3-4 and the alkaloids were precipitated with 15 ml of Mayer reagent. The precipitate was dissolved in an alkaline solution of sodium carbonate (5%, m/m) and extracted with CHCl₃. The organic layer was washed with water to neutral pH, dried with Na₂SO₄ and concentrated to dryness under reduced pressure to obtain alkaloids (12).

Results and Discussion

A phytochemical screening of fruits of *R. coriaria* was revealed the presence of alkaloids, glycosides, flavonoids, tannins, phenol and saponins (Table 1). Presence of tannin and flavonoides were in agreement with those previously published (5,14).

Presence of glycosides and phenols are in agreement with results of (15). Presence of alkaloids aren't in agreement with all above published. However, (16) mentioned the presence of alkaloids in leaves of *Rhus retinorrhoea*.

Table 1: Phytochemical screening of fruits of *R. coriaria*

constituents	alkaloids	glycoside	flavonoid	tannins	phenols	saponins
Result	+	+	+	+	+	+

Table 2: Percentage of active constituents extracts of fruits of *R. coriaria*

Active constituents	terpenoid	methanol	alkaloids	glycoside	phenols
Percentage	11.85	31.7	2.3	2.48	5.9

Terpenoids were dominant of the constituents of *R. coriaria* 11.85 % this is in agreement with those previously published whose mentioned dominantly terpenoids were found in the n-hexane fraction. (17). These results close with those previously published (16) who mentioned the percentage of fixed oil was 11.37 -14.26 fixed oil g / 100g , while the percentage of other constituents were 5.9,

2.48 and 2.3% Of phenol , glycosides and alkaloid respectively. Oil of *R. coriaria* was brown waxy at 8°C and 25 °C, oily at 70°C with density 0.965 g/ml³. Phenols was most active constituents than alkaloids and glycosides, we know *R. coriaria* is contain phenolic compounds such as tannic acid, Gallic acid and other tannins compounds (14).

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دراسة كيمائية لثمار نبات السماق

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الخلاصة

الكشف الكيمائي لثمار نبات السماق قد كشف عن وجود القلوانيات وأشباه السكريات والفينولات والتربينات وكانت نسبة هذه المكونات الفعالة هي: (85, 11, 31.7, 2.3, 2.48, 5.9) % للتربينات ولمستخلص الميثانول والقلوانيات و أشباه السكريات والفينولات على التوالي. مستخلص الأيثر النفطي لثمار السماق اعطى ناتجا ذا لونا بنيا شمعي القوام عند 8 و 25 س⁰ و زيتيا القوام عند 70 س⁰ وبكثافة 0.965 غم / سم³.