

Coumarin is Most Medical and Therapeutic Component of Iraqi Medicinal Plant *Atriplex nummularia*

Dear Editor,

Old man saltbush *Atriplex nummularia* Lindl. is a halophyte species and one of the most important forage shrubs suited to alkaline and saline lowlands *A. nummularia* Lindl. occurs spontaneously in areas and can be cultivated plants of the *Atriplex* genus are perennial.^[1] *A. nummularia* was evaluated for its secondary metabolite contents and its antibacterial activity.

Eleven compounds were isolated from this plant. Total extract and different plant fractions were screened for their antibacterial activity coumarins are the major constituent of *A. nummularia*. The pharmacological activity of this plant includes antihyperglycemic, antihyperlipidemic, antioxidant effect, antimicrobial activity, and antifungal activity.^[2]

Coumarins (2H-1-benzopyran-2-one) consist of a large class of phenolic substances found in plants.^[3] The coumarins are of great interest due to their pharmacological properties. Coumarins are an important class of compounds of both natural and synthetic origin. Many compounds which contain the coumarin moiety exhibit useful and diverse pharmaceutical and biological activities.

Some of these coumarin derivatives have been found useful in a photochemotherapy, antitumor, anti-HIV therapy, as central nervous system-stimulants, antibacterial, anticoagulants, antifungal, antioxidant agents, and as dyes. Natural, semi-synthetic, and synthetic coumarins are useful substances in drug research.^[4]

Thin layer chromatography (TLC), Gas chromatography–mass spectrometry (GC-MS) (Shimadzu), preparative thin layer chromatography, high-performance liquid chromatography (HPLC), and infrared. All chemicals and solvents are of analytical grade. Standard coumarin was obtained from Sigma Aldrich Company.

The aerial parts of *A. nummularia* were collected from Baghdad. The plant was identified and authenticated by Prof. Ibraheem Saleh (College of Pharmacy, Al-Mustansiriyah University). Dried for several days at room temperature and then grinded as powder.

Extraction aerial part of plant (1000 g) by Soxhlet apparatus with methanol (80%) (1000 mL) till exhaustion. The extract concentrated by evaporation under vacuum. Water (100 ml) was added, and the suspension was partitioned with petroleum ether (2 × 100 ml). The petroleum ether layer was discarded, and the aqueous layer was extracted with chloroform (3 × 100 ml). The combined chloroform layers were dried with anhydrous sodium sulfate, filtered, and evaporated under vacuum. The collected fractions were analyzed by TLC comparing with standard coumarin.

The R_f value of isolated coumarin was compared with standard coumarin. Preparative TLC was performed using 0.5 mm thickness silica gel. Elution of the isolated band was conducted with AR grade acetone.

Isolated coumarin was identified by melting point. 72°C which was identical with that reported in the literature. TLC of isolated coumarin was compared with standard in three solvent systems [Table 1].

Table 1: R_f of standard and isolated coumarin in three solvent system

Solvent system	R _f of standard coumarin	R _f of isolated coumarin
Toluene:acetone:water (4: 5:1)	0.75	0.76
Toluene:acetone:chloroform (45:55:5)	0.66	0.67
Dichloromethane	0.36	0.39

R_f: Retardation factor value

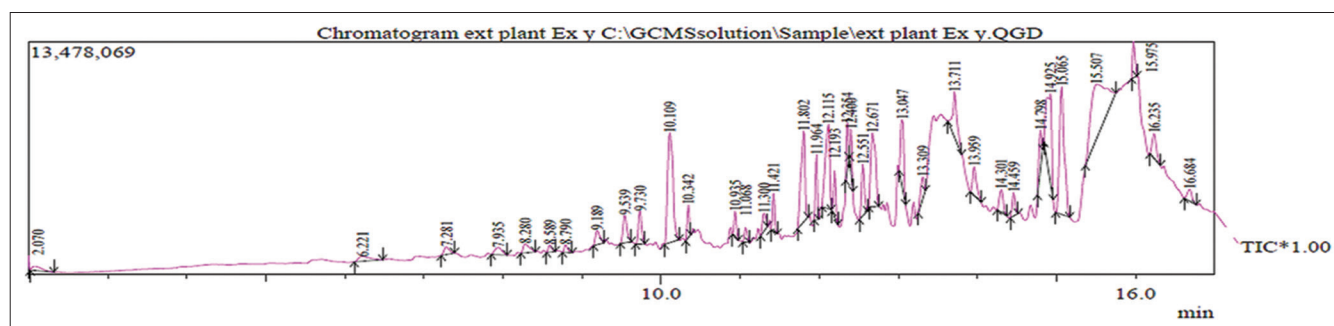


Figure 1: Gas chromatography–mass spectrometry analysis of *Atriplex nummularia*

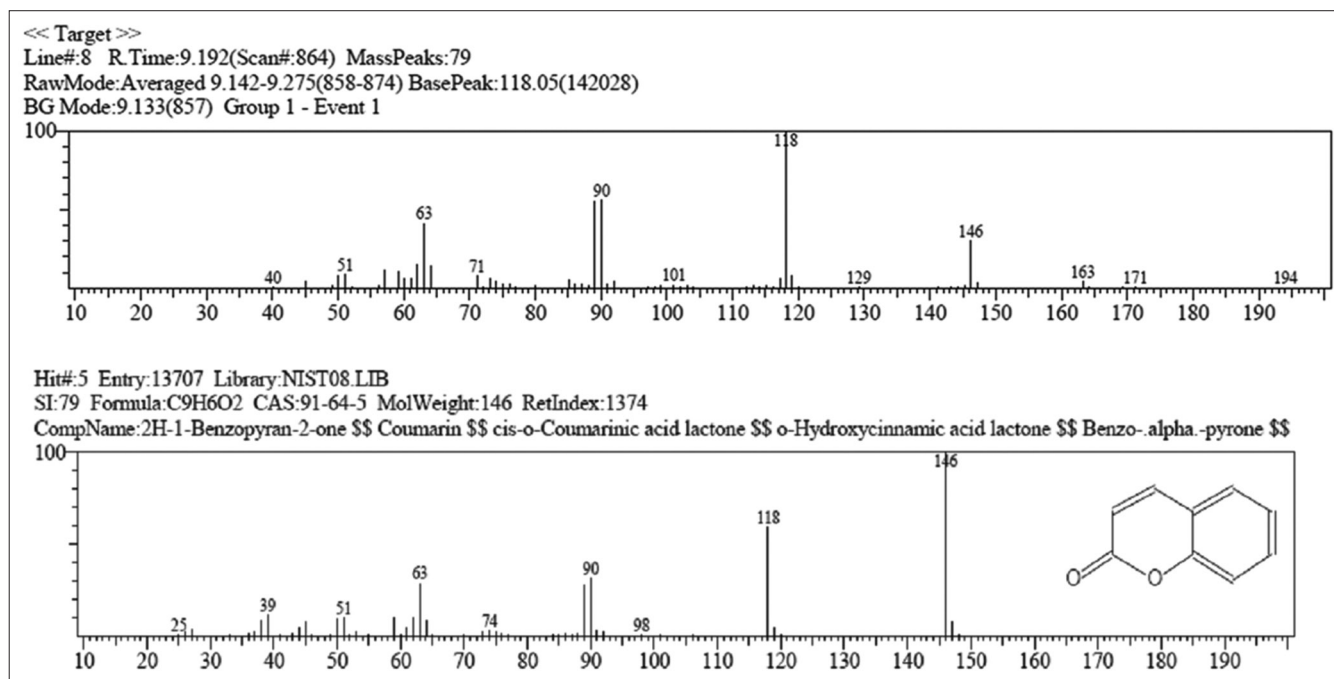


Figure 2: Fragmentation pattern of isolated coumarin

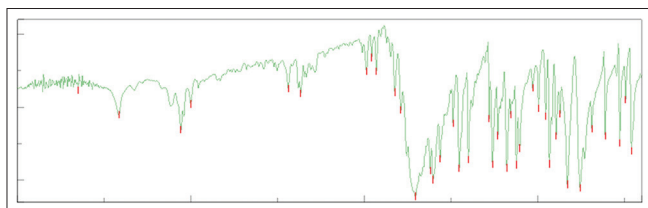


Figure 3: Infrared of isolated and standard coumarin

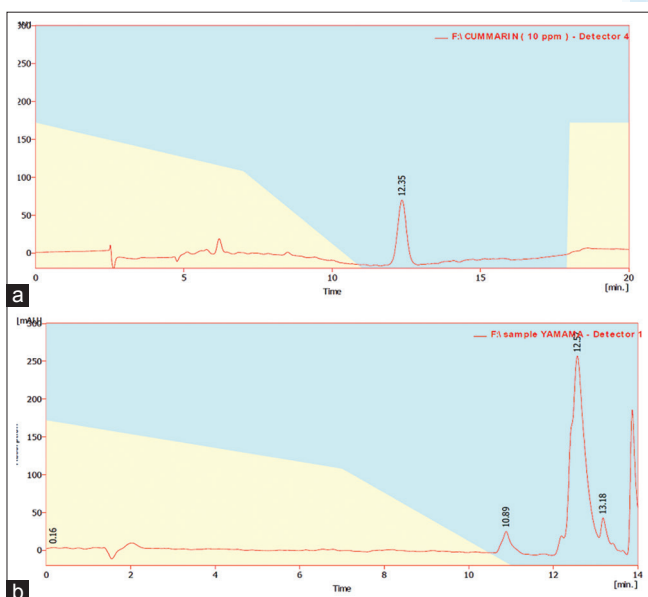


Figure 4: High-performance liquid chromatography of standard (a) and extracted (b) coumarin

The occurrence of coumarin in the plant was confirmed by GC/MS [Figure 1].

The retention time of coumarin was 14.7 min. The fragmentation pattern of isolated coumarin was identical with that reported in the literature [Figure 2].

Results of isolated coumarin are also compared with IR spectra of standard *coumarin* [Figure 3]. HPLC also support the occurrence of coumarin [Figure 4]. The valuable Iraqi medicinal plant *A. nummularia*, contains coumarin as a major active constituents. Coumarin is responsible for most medical and therapeutic function in this plant. The percentage of coumarin in *Atriplex* of Iraq was 0.62%. This percentage indicates that *A. nummularia* of Iraq is official herb (blood pressure) since the percentage is more than 0.3% and <0.9%.

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Conflicts of interest

There are no conflicts of interest.

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