Detection of Sitosterol in *Chenopodium album* of Iraq by GC/MS Analysis

Anwar M. Abdulkareem*, Widad M K Al-Ani**, Ayad M R Raauf**

1Department of Pharmacognosy and Medicinal Plants, College of Pharmacy, Al-Mustansirya University, Baghdad, Iraq.
2Department of pharmaceutical Chemistry, College of Pharmacy, Al-Mustansirya University, Baghdad, Iraq.

*Corresponding author’s-mail: wmkalani@gmail.com

Accepted on: 10-09-2016; Finalized on: 30-11-2016.

**ABSTRACT**

*Chenopodium album* Linn the Greek name *Chenopodium* means goose foot. The plant is native to Asia and Europe. Nutritional analysis proved it to be a potential source of energy, proteins, carbohydrates; ascorbic acid and beta carotene and minerals. From the phytochemical point of view, the plant was reported to contain: flavonoids, glycosides, alkaloids, terpenes, sterols and saponins. β-sitosterol was isolated as white amorphous powder from the leaves of *Chenopodium album*. The sterols in the Iraqi plant were detected by TLC using spray reagent. It’s presence was confirmed by GC/MS analysis.

Keywords: *Chenopodium album*, β-sitosterol, GC/MS, analysis.

**INTRODUCTION**

*Chenopodium album* is an annual, 20-200 cm mealy white, erect, many-branched herb (Figure 1).

![Figure 1: Chenopodium album herb](image)

Stems are rarely slender, angled, usually striped green, red or purple. Young stems are coated with a fine mealy pubescence, while older stems become more glabrous. (Figure 2).

![Figure 2: Stems of Chenopodium album](image)

Nutritional analysis proved it to be a potential source of energy, proteins, carbohydrates; ascorbic acid and beta carotene and minerals (potassium, sodium, calcium, phosphorous, magnesium, iron and zinc).

From the phytochemical point of view, the plant was reported to contain: flavonoids, glycosides, alkaloids, terpenes, sterols and saponins.

β-Sitosterol

Sitosterol is a Phytosterols (plant sterols and stanols) which are naturally occurring C28 and C29 carbon compounds. The most well-known, and scientifically proven, benefit of phytosterols is their cholesterol – lowering action, they actually compete for absorption with cholesterol in the digestive tract. A variety of phytosterols exist in the plants, campesterol, stigmasterol and β-sitosterol are the most abundant in the diet, with the prevalence of β-sitosterol being particularly noteworthy. β-sitosterol was isolated as white amorphous powder with m.p.: 139-142°C from the leaves of *Chenopodium album*. The aim of this study is to investigate the presence of this compound in the Iraqi *chenopodium album* since it is an important compound in therapy.

**MATERIALS AND METHODS**

**Plant material**

The aerial parts (stems and leaves) of *Chenopodium album* were collected from area Al-Yousifiya in Baghdad and was authenticated by the National herbarium in Abu-Graib Baghdad. The plant material was collected during March and dried at room temperature in the shade, then grinded as powder and weighed.

**Extraction of terpene**

Powdered plant aerial part (200 g) was extracted by soxhlet apparatus with hexane (1400ml). The extract was concentrated using rotary evaporator. Hexane extract
was analyzed for the presence of terpenes using TLC with spray reagent and then analyze by GC-MS analysis.

**Gas Chromatography-Mass Spectrometry (GC-MS)**

GC-MS conditions for investigation of terpenes were: the carrier gas was helium, the injection volume was 1 µL, and split ratio was 2:0. Injection temperature: 250°C. Column temperatures: from 80°C and rose up to 310°C at a rate of 10°C/min.

**RESULTS AND DISCUSSION**

Hexane extract of the plant was investigated by TLC which revealed the presence of terpene, as indicated by the development of violet spot after spraying by vanillin sulphuric acid spray reagent as shown in Figure 3.

**GC/MS analysis**

The chromatogram showed peak with retention time 30.317 min, corresponding to the molecular ion peak at m/z 414 identified in comparison with NIST08 database as β-sitosterol. The mass spectrum of β-sitosterol can be seen in Figure 4.

![Figure 3: TLC plate sprayed with vaniiline-sulphuric acid reagent](image1)

![Figure 4: GC MS chromatogram of β-sitosterol](image2)

**Figure 3:** TLC plate sprayed with vaniiline-sulphuric acid reagent

**Figure 4:** GC MS chromatogram of β-sitosterol

**CONCLUSION AND RECOMMENDATION**

Iraqi *chenopodium album* contains a significant amount of the important phytosterol sitostreols. Further studies need to calculate the percentage of this compound in the plant.
REFERENCES


5. Trautwein E.A., Demonty I. Phytosterols: natural compounds with established and emerging health benefits. OCL, 14, 259-266.


Source of Support: Nil, Conflict of Interest: None.