ABSTRACT

The proposed method was successfully applied for quantitative determination of phytomelin in leaves, fruits, and flowers of Ecballium elaterium treatment of this disease Turkey and a fresh juice applied directly into the nostrils for Rich (exploding cucumber) are for treatment of hemorrhoids, parts were quantified using reversed phase liquid chromatographic method. Isocratic elution was employed using a mixture of methanol, acetonitrile and a 0.28% (v/v) of acetic acid (5:10:35). The flow rate was 1 ml/min.

INTRODUCTION

Accordingly this plant may contain phytochemical compound called phytomelin. Recently, the increase in the residential and agricultural areas and the decrease in medical plants have triggered the interest in ethno-botanical studies around the world. From that we know that there are no previous studies about the phytomelin in this plant.

Ecballium elaterium (L.) A. Rich. also called the squirting cucumber or exploding cucumber, is a plant in the Cucurbitaceae family with the following classification which is reported in table 1.

It gets its unusual name from the fact that, when ripe, it squirts a stream of mucilaginous liquid containing its seeds, which can be seen with the naked eye. It is thus considered to have rapid plant movement. It is native to Europe, northern Africa, and temperate areas of Asia. It is grown as an ornamental plant elsewhere, and in some places it has naturalized.

It is suspected to provide food for the caterpillars of the tortrix moth Phtheochroa rugosana.

This plant, and especially its fruit, is poisonous. In the ancient world it was used as an abortifacient.

In Turkey, the fresh fruit juice of this plant is directly applied into the nostrils for treatment of sinusitis as a herbal/folk remedy. Clinical tests on voluntary patients revealed that the healing rate of double-high dosage application is higher than that of the single-low dosage (71.0 and 56.6%, respectively). In addition, total relief from the main symptoms is observed in 20% of the patients, although the sinuses are not completely drained off on x-ray examination.

Chemical Constituents of Ecballium elaterium

The fruit juice of Ecballium elaterium contains proteins, lipids, sugars, and minerals. For many centuries dried sediment from the juice of the fruit of Ecballium elaterium, known as elaterium, was used in orthodox medicine. The chief component of elateria was known as elaterin. In good quality elaterium there would be about 30% elaterin but if the quality is poor only 20% of this active ingredient. Elaterin was available in its pure form and was recommended in place of the crude extract in the 1911 edition of the British Pharmaceutical Codex.

From that we know that there are no previous studies about the phytomelin in this plant.

Elaterins are now known as cucurbitacins but were commonly referred to in many older articles as elaterin and occasionally as also momordicin. (Alpha-elaterin is synonymous with Cucurbitacin C & B; cucurbitacin D is synonymous with elaterin A; cucurbitacin I is synonymous with elaterin B & elaterin B.

Cucurbitacins are extremely bitter tasting plant sterols. They can be both abortifacient and anti-inflammatory in effect.

The active compounds of Ecballium elaterium liquid extract include cucurbitacins B, D, E, L, R and other cucurbitacin types as well as several phenolics and glycosylated compounds.

From all that we know, there was never a mention that this plant contains phytomelin.

Phytomelin, also called rutin, rutoside, quercetin-3- rutin oxide and sophorin, with anti-oxidant effect is a citrus flavonoid glycoside found in buckwheat, the leaves and petioles of rhum species, and asparagus. Phytomelin is also found in the fruit rinds (especially citrus Brazil, fruits (orange, grapefruit, limes) and berries such as mulberry and cranberries. Its name comes from the name of Ruta graveolens, a plant that also contains phytomelin. Phytomelin is the glycoside between the flavonol quercetin and the disaccharide rutinose. Quercetin is a flavonoid with a wide range of biological activities. It mainly occurs in plants as glycosides, such as phytomelin (quercetin rutinoside) in tea.
Phytomelin is a solid substance, pale yellow in appearance and only slightly soluble in water. It is, however, much more soluble in water than its aglycone quercetin. Phytomelin’s molecular formula is C_{12}H_{16}O_{10}·H_2O with molecular weight of 664.6 Daltons.

Phytomelin may have antioxidant, anti-inflammatory, anticarcinogenic, anti-thrombotic, cytoprotective and vasoprotective activities. Different extraction and determination methods have been used for the quantification of phytomelin in variety of plants and pharmaceutical preparations. But none of the above methods reported a validated and economic analytical HPLC method for the phytomelin analysis and quantitative evaluation of phytomelin extract.

The aim of this study is to approve the folk use of Ecballium elaterium (L.) A. Rich for its effect for treatment of nose bleeding and sinusitis.

The purpose of this study was to use a simple, low cost and fast method of separation and determination of phytomelin from different parts of Exploding cucumber plant.

The HPLC conditions described in the experimental section allowed good separations for the main flavonoid, phytomelin of the plant.

In Figure 1, a calibration curve was made for different concentrations of the phytomelin standard in the range of 0.1 to 0.6 mg/mL. As we see from the figure all the peaks were eluted at about 2.7 min. There was a small variation in retention time < ±0.2 min due to variation in the concentrations and the instrument resolution.

The detection limits, based on three times the noise level of the dilute solutions. The LOD signal was considered as mean lack of signal plus three times its standard deviation. So the limit of detection was 9.64 × 10^{-3} µg/ml.

### RESULT AND DISCUSSION

This study aims to approve the folk uses of Ecballium elaterium (L.) A. Rich for its effect for treatment of nose bleeding and sinusitis.

Other purpose of this study was to use a simple, low cost and fast method of separation and determination of phytomelin from different parts of Exploding cucumber plant.

The HPLC conditions described in the experimental section allowed good separations for the main flavonoid, phytomelin of the plant.

In Figure 1, a calibration curve was made for different concentrations of the phytomelin standard in the range of 0.1 to 0.6 mg/mL. As we see from the figure all the peaks were eluted at about 2.7 min. There was a small variation in retention time < ±0.2 min due to variation in the concentrations and the instrument resolution.

The detection limits, based on three times the noise level of the dilute solutions. The LOD signal was considered as mean lack of signal plus three times its standard deviation. So the limit of detection was 9.64 × 10^{-3} µg/ml.
Fig. 1: HPLC Chromatograms for different concentrations of Rutin (a) = 0.1, (b) = 0.2, (c) = 0.4 and (d) = 0.6 mg/mL.

Fig. 2: HPLC chromatogram for rutin extracts of flowers, leaves and fruits of Exploding cucumber.

Fig. 3: HPLC chromatogram of 0.4% standard and the rutin from different parts in Exploding cucumber.
CONCLUSION
The developed stability indicating HPLC method provides a simple, accurate and reproducible method for the determination of phytomelin in leaves, fruits and flowers of Exploding cucumber and to approve that this plant can be used for treatment sinusitis and nose bleeding.

ACKNOWLEDGMENT
The authors acknowledge the quality control group at Jerusalem Pharmaceutical Company for helping us using their HPLC instrument for checking our results.

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