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Potent colon cancer cell line toxicity of the fruit extracts of *Heptaptera triquetra* (Vent.) Tutin

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ABSTRACT

Cytotoxic activities of the fruit extracts of *Heptaptera triquetra* (Vent.) Tutin were investigated on the colon cancer COLO205 and KM12 cell lines. The dichloromethane extract of the fruits of *H. triquetra* showed the highest cytotoxic activities with IC_{50} values of 9.3 and 5.3 ug/mL on the COLO205 and KM12 cell lines, respectively. Whereas, the ethyl acetate extract of the fruits showed moderate cytotoxic activity with IC_{50} values of 22.3 ug/mL against the KM12 cell lines.

Keywords: Cytotoxic activity, *Heptaptera triquetra*, Apiaceae.

INTRODUCTION

Cancer is a major public health problem worldwide and is the second leading cause of death. Cancers of the colon and rectum are the third estimated new cancer cases and deaths among adult Americans in 2022[1]. Natural products continue to play a major role in the drug discovery of new anticancer drugs[2]. As part of our continuing studies on the genus *Heptaptera* (Apiaceae), we report here the cytotoxic activity of *Heptaptera triquetra* fruits on colon cancer cells.

The genus *Heptaptera* Marg. & Reut. (Apiaceae) is represented by 11 species worldwide, four of them; *H. cilicica* (Boiss. & Balansa) Tutin, *H. anisoptera* (DC.) Tutin, *H. anatolica* (Boiss.) Tutin and *H. triquetra* (Vent.) Tutin are growing in Turkey[3,4]. *H. triquetra* is only found in the European section of Tur-

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key[4]. *Heptaptera* species are known to contain sesquiterpene coumarin derivatives[5-11], these compounds have various biological activities such as; cytotoxicity, P-glycoprotein inhibitory, cancer chemopreventive, anti-inflammatory, antibacterial, antileishmanial, antiviral, antidiabetic, cholinesterase inhibitory etc.[10-17].

METHODOLOGY

Plant Material

The fruits of *Heptaptera triquetra* were collected in the vicinity of Tekirdağ in July 2013 and identified by Prof. A. Duran. A voucher specimen (A. Duran 9704) was deposited in the Herbarium of Selçuk University, Faculty of Sciences, Department of Biology (KONYA).

Extraction

Pulverized fruits (50 g) of the plant were sequentially extracted by maceration with dichloromethane (CH_2Cl_2) and methanol. The extracts were individually concentrated in a rotary evaporator under reduced pressure to yield crude extracts. Dichloromethane and methanol extracts of the fruits were 4.24 g (8.48 %) and 4.05 g (8.10 %), respectively. The methanol extract was redissolved in a mixture of methanol/water (10:90) and then partitioned with ethyl acetate (EtOAc), the resulting extracts were separately concentrated in vacuo to dryness. Ethyl acetate and aqueous-methanol extracts of the fruits were 1.23 g (2.46 %) and 2.81 g (5.62%), respectively.

Cytotoxicity Assay on Colon Cancer Cells

The assay used for this study was a two-day, two cell line XTT bioassay[18], an in vitro antitumor colorimetric assay developed by the MTL Assay Development and Screening Section. Colon cancer cell lines used were COLO205 and KM12. Sanguinarine was used as a positive control. The assay was performed as described previously[11].

RESULTS and DISCUSSION

This is the first report on the cytotoxic activity of the fruits of *H. triquetra*. The dichloromethane extracts of the fruits exhibited strong inhibitory activity on the colon cancer COLO205 and KM12 cell lines. The ethyl acetate extract of the fruits exhibited moderate inhibitory activity on the KM12 cell lines. The cytotoxic activities observed with these extracts are shown in Table 1.

Table 1. Cytotoxic activities of the extracts

Extracts	Cytotoxic activity (IC_{50} values in ug/mL)	
	COLO205	**KM12**
1	9.3	5.3
2	> 50	22.3
3	> 50	> 50

1: CH_2Cl_2 extract of the fruits; 2: EtOAc extract of the fruits; 3: aqueous-methanol extract of the fruits

The dichloromethane extract of the fruits of *H. triquetra* showed the highest cytotoxic activities with IC_{50} values of 9.3 and 5.3 ug/mL on the COLO205 and KM12 cell lines, respectively. The ethyl acetate extract of the fruits showed moderate cytotoxic activity with an IC_{50} values of 22.3 ug/mL on the KM12 cell line and a weak cytotoxic activity against the COLO205 cell line with an IC_{50} value greater than 50 ug/mL. Previously, researchers reported some sesquiterpene coumarin derivatives from the chloroform extracts of the fruits of *H. anatolica, H. anisoptera*[8] and *H. cilicica*[19]. Cytotoxic activities of the certain sesquiterpene coumarins were described earlier[10-12], thus, the cytotoxic compound(s) of the fruits of *H. triquetra* may be the similar type of compound(s). Currently, the bioactivity guided fractionation of the dichloromethane extract of *H. triquetra* fruits is in progress.

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