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THE CYTOTOCIXITY AND THE ANTIBACTERIAL ACTIVITIES OF *Rubus sanctus* Schreber

RUBUS SANCTUS BiTKiSİNİN SİTOTOKSİK VE ANTİBAKTERYEL AKTİVİTELERİ

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ABSTRACT

PE, $CHCl_3$, EtOAc extracts were obtained from the aerial parts of Rubus sanctus Schreber. A triterpenoid compound was isolated from the EtOAc extract. All extracts and the pure compound were controlled with the Brine Shrimp (Artemia salina) method. After that microbiological methods were applied to the extracts and the pure compound.

Key words: *Rubus sanctus* Schreber, *triterpenoid, Brine Shrimp, Antibacterial activity.*

ÖZET

Rubus sanctus Schreber *bitkisinin toprak üstü kısımlarından PE, $CHCl_3$, EtOAc ekstreleri elde edilmiştir. EtOAc ekstresinden triterpenoid yapısında bir madde izole edilmiştir. Turn ekstreler ve saf madde Brine Shrimp (Artemia salina) yontemiyle kontrol edilmiş ve daha sonra mikrobiyolojik olarak incelenmiştir.*

Anahtar kelimeler: *Rubus sanctus, triterpen, Brine Shrimp, Antibakteryel aktivite.*

INTRODUCTION

Nine Rubus species (Rosaceae) grow widely in the Turkish flora (1). These are known as "bogiirtlen" . The aerial parts of *Rubus* species are used for many disease treatments in various countries, especially diabetes (2). These plants have antibacterial effects against Gram-positive bacteria and allergic activities, especially against allergic rhinitis, atopic dermatitis and asthma (2,3). The plant is also used for diabetes in Turkish traditional folk medicine(4).

The fruits, seeds and roots of these plants have been used as folk medicine for their anticancer and antibacterial activities for a long time in China (5).

Many *Rubus* species have been studied for their biological activities (2,6), but there are no biological activity reports about the extracts and the pure compounds of *R. sanctus.* For this reason, we wanted to find out the cytotoxic and the microbiological activities of *Rubus sanctus* that is common in Anatolia.

EXPERIMENTAL

Plant Material

The plant was collected from Northern Turkey. It was identified by Prof. Dr. Ertan Tuzlaci. A voucher specimen is deposited in the Herbarium of the Faculty of Pharmacy, Marmara University (MARE 8146).

Extraction and Isolation

The aerial parts of *R. sanctus* were air-dried (2,5 kg), powdered and macerated with MeOH at room temperature. The MeOH macerate was evaporated to dryness. The residue was dissolved in warm water and the solution was successively extracted with PE (9.1g), $CHCl_3$ (15g), EtOAc (17g) (3,5) . All extracts were controlled with TLC and glycosidic compounds were seen in the EtOAc extract. The purification of the EtOAc extract was started by Si gel column. The compound was separated from the EtOAc:MeOH (60:40) fraction The structure elucidation of the pure compound that has a triterpenoid structure is being studied in another paper.

Studied Activity Methods

The Brine Shrimp *{Artemia salina)* lethality bioassay method was used in the cytotoxic activity(7). Agar well diffusion (8) and agar dilution (9) methods were used for the microbiological activity tests.

RESULTS AND DISCUSSION

The results of the cytotoxic activity are summarized in **Table I.** The extracts and the pure compound were compared with ursolic acid, because ursolic acid has a triterpenoid structure and has been previously used for the biological activity studies on *Rubus* species (6).

Antibacterial activity was compared with meropenem. The used microorganisms are shown in **Table II.** All of the obtained extracts showed antibacterial activity against *S. epidermidis, S. aureus, P. aeruginosa, P.mirabilis.* Furthermore, the EtOAc extract showed antibacterial activity against *Exoli* and *C. pneumoniae.* What's more, the pure compound which we have isolated showed antibacterial activity against *Exoli* . The results are summarized in **Table III.**

Table I: The Cytotoxic Activity

Tested Material	**ppm**	LC_{50}
PE extract	1000:100:10	8.1932
$CHCI_3$ extract	1000:100:10	17.0746
EtOAc extract	1000:100:10	0.3938
Pure compound	1000:100:10	0.4867
Ursolic acid	1000:100:10	204.681

Table II: Used microorganisms

Bacteria
S .aureus *ATCC 6538*
S.epidermidis ATCC 12228
E.coli ATCC 11229
P.aeruginosa ATCC 1539
P. mirabilis ATCC 14153
C.pneumoniae ATCC 4352

Table III: Antibacterial activity

Bacteria	PE ext.		$CHC1_3$ ext.		EtOAc ext.		Compound		Meropenem	
	Zone (mm)	MIC (µg/ml)	Zone (mm)	MIC (µg/ml)	Zone (mm)	MIC (µg/ml)	Zone (mm)	MIC (µg/ml)	Zone (mm)	MIC (µg/ml)
S.aureus *ATCC 6538*	15	<34.47	14	4864	15	6023	18	<6.22	22	<0.0625
S .epidermidis ATCC 12228	12	2206	6	9728	12	24092	6	**3185**	22	<0.0625
E.coli ATCC 11229	–		–		2	>24092	6	>12470	18	<0.0625
P .aeruginosa ATCC 1539	11	2206	6	9728	5	12046	5	12470	22	<0.0625
Pmirabilis ATCC 14153	11	4412	5	38912	7	24092	5	>12470	20	<0.0625
C .pneumoniae ATCC 4352	-		-		3	>24092	-		17	<0.0625

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