

кета статистического анализа Microsoft Excel. О достоверности межгрупповых различий судили по значению коэффициента Стьюдента-Фишера.

В результате проведенного сравнительного анализа показателей спермопродукции было установлено, что у хряков опытной группы объем эякулята в период наблюдений составлял в среднем 281 мл без достоверных различий в течение 4 месяцев опыта. Подвижность сперматозоидов у хряков опытной группы составляла в среднем 77% без достоверных различий. С другой стороны, концентрация сперматозоидов через 2 месяца после начала опыта в этой группе увеличилась на 37 ($P \leq 0,01$), а количество расфасованных сперматозоидов на взятие у данных хряков увеличилось на 9,5 сперматозоидов ($P \leq 0,001$). В последующие месяцы такие показатели спермопродукции, как концентрация сперматозоидов и количество полученных сперматозоидов на взятие в опытной группе достоверно превосходили таковые у хряков контрольной группы.

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THE EFFECTS OF VISCUM ALBUM SSP. ALBUM L. EXTRACT ON BIOCHEMICAL INDICES IN PARTIALLY HEPATECTOMIZED LIVER IN RATS

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Liver can rapidly regenerate itself after acute liver injury, chronic hepatic diseases, liver transplantation and partial hepatectomy. *Viscum* species, also known as Mistletoe, are medicinal plants, which have amines (acetylcholine, choline, histamin, tyramin), antioxidant flavonoids (quercetin, chalcone and flavone derivatives) and terpenoids (beta-amyrin, betulinic acid, oleanic acid, beta-sitosterol) [1].

The aim of the present study was to investigate the hepatoprotective effect of *Viscum album* ssp. *album* extracts in the liver of *partially hepatectomized* rats using biochemical methods. The host plant, localities,

collection time of *V. album* L. ssp. *album* from *Pyrus communis* L. (dried) are Denizli, Tavas in orchard, November 2011, respectively.

The plants dried in the shadow for extraction. The air-dried plants were ground to fine powder and then, put in the flask with ethanol for extraction process. The flask mouth was closed with a rubber stopper to protect the extract from contacting with air. The flask was covered with aluminum foil to protect the extract from light. Then, it was placed in a shaker water bath at 55°C for 6 h. The extraction was repeated twice at same condition. These extracts were filtered and the solvents were removed in vacuum by a rotary evaporator at 42-49°C. The water in each extract was frozen in freeze-drying machine and then drawn out. Two different concentrations of the extract were prepared: 0.5% and 1%.

Male albino rats, weighing approximately 150-200 g, were obtained from the Pamukkale University, Faculty of Medicine, Experimental Research Center, Denizli, Turkey. The animals were allocated into three groups with three rats in each group. Before the experimental period, 50% partial hepatectomy was performed under anesthesia by removing the left lateral lobe from all the groups.

Group I: Control animals received normal rat diet and water, *ad libitum* (free-feeding). *Group II:* The plant extract at concentration of 1 was given orally for 2 weeks. *Group III:* The plant extract at concentration of 1.5 was given orally for 2 weeks.

After the experimental period, the animals were sacrificed under anesthesia, and blood samples were collected for the biochemical assays. Blood samples were taken by cardiac venipuncture at the end of two weeks after the initial treatment. Then, they were centrifuged at 1000 rpm for 10 minutes to collect serum and were stored at -20 °C. Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were measured for the determination of liver function while blood urea nitrogen (BUN) was measured for the determination of kidney function.

Table 1 gives the mean serum AST, ALT and BUN levels for 2 weeks in all groups. *V. album* ssp. *album* extract given to the hepatectomized rats significantly increased the serum AST and ALT levels when compared to controls at the end of treatment. The increased ALT and AST levels in the serum suggest the possible hepatotoxic effects of extracts. However, AST and ALT levels at the concentration of 1% were less than those of the levels of 1.5%. This effect appeared to be dose dependent. On the other hand, we found significant decrease in the level of BUN. This result indicates kidney damage. Thus, it might be due to decreased utilization of urea by damaged liver.

Little information is available in the literature on the effect of *Viscum album* on hepatic injury. Two recent studies done in patients with chronic hepatitis C, treated with a mistletoe preparation as monotherapy for 1 year, reported a significant improvement in elevated transaminases [2]. In a previous study suggests that mistletoe preparations may be a useful therapeutic intervention for patients with chronic liver disease. The mechanism(s) by which *Viscum album* modulates hepatic inflammation remains, however, unclear. The release of aminotransferases into the plasma was increased, indicating a increase in the severity of liver damage.

Table – Serum AST, ALT and BUN levels of 2 weeks in partially hepatectomized rats

Groups		AST (IU/l)	ALT (IU/l)	BUN (mg/dL)
Control		124.26±24.04	82.76±7.16	61.26±0.39
Experimentals	1%	125.46±14.05	83.06±0.08	61.08±0.12
	1.5%	129.86±24.21	86.86±0.23	46.03±0.31

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STUDIES OF INTERACTIONS BETWEEN CYCLODEXTRINS AND FLAVONOIDS

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Cyclodextrins (CDs) are cyclic oligosaccharides typically contain six (α CD), seven (β CD) or eight (γ CD) glucose residues. They have a relatively nonpolar cylindrical cavity, which can bind and solublize a wide variety of hydrophobic molecules like flavonoids for example quercetin and rutin. Quercetin is a flavonoid widely distributed in nature. It is a naturally-occurring polar auxin transport inhibitor, a plant-derived flavonoid found in fruits, vegetables, leaves and grains. It also may be used as an ingredient in supplements, beverages or foods. Rutin, also called rutoside is the glycoside