The effect of savory (Satureja khuzistanica) essential oils on performance, liver and kidney functions in broiler chickens

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ABSTRACT. This study was conducted to examine the effect of supplementation of 0 (control-), 0.5, 1.5, 2, and 2.5 g l⁻¹ essential oils of Satureja khuzistanica (EOSk) or 3 g l⁻¹ polysorbate-80 (control+) into drinking water using 420 one-day-old Cobb 500 broiler chicks up to day 28 of age. The EOSk-treated water significantly suppressed the productive performance of the birds (P < 0.05). Addition of EOSk to water at 2.5 g l⁻¹ caused significant increases in liver weight and serum glutamate pyruvate transaminase activity (P < 0.05). A significant decrease was found in the average serum uric acid concentration for the birds receiving water supplemented with EOSk at 0.5 to 2.5 g l⁻¹. It is concluded that persistent inclusion of EOSk at 0.5 to 2.5 g l⁻¹ into drinking water suppressed performance of broiler chickens during the early growth periods. No indication was found of hepato-suppressive effects of EOSk up to 2.5 g l⁻¹.

Introduction

Satureja khuzistanica Jamzad, known as ‘marzeh khuzestani’ in Persian, is an endemic plant distributed in the southern part of Iran (Hadian et al., 2011). It is well known for its therapeutic values as an analgesic and antiseptic in traditional medicine (Zargari, 1990). A considerable level of essential oils, up to 4.5%, has been identified as a prominent characteristic for this plant (Hadian et al., 2011). The essential oils of Satureja khuzistanica (EOSk) were reported to be peculiarly rich in carvacrol (Farsam et al., 2004). It has been also shown that EOSk contains a spectrum of phenols, flavones, triterpenoids, steroids, and tannins (Moghaddam et al., 2007). The extraordinarily high levels of carvacrol along with other beneficial biological properties of EOSk have made it a promising biological compound for pharmaceutical and food industries.

It has been reported that the essential oils of Satureja spp. have antiinflammatory (Hajhashemi et al., 2002), antispasmodic, antidiarrhea (Hajhashemi et al., 2000), and antioxidant (Abdollahi et al., 2003) effects in mammals, as well as antiviral (Yamasaki et al., 1998), antibacterial, and antifungal (Skocibusić and Bezić, 2004) effects, mainly in vitro.

These properties of Satureja khuzistanica have led into its domestication and cultivation by Khorraman Medical Plants Laboratory, (Khorramabad, Lorestan, Iran) since 2006. Consequently, the mass production of EOSk for commercial purposes has been achieved. Therefore, a reliable supply of the product is guaranteed for manufacturing of poultry feed and water additives. This experiment was con-