Effects of dietary *Satureja khuzistanica* essential oils and \( \alpha \)-tocopherol on productive performance, organ weights, blood lipid constituents and antioxidative potential in heat stressed broiler chicks

Einfluss einer Zulage der essentiellen Öle von *Satureja khuzistanica* und von \( \alpha \)-Tocopherol zum Futter auf die Leistung, die Organgewichte, die Blutlipide und das antioxidative Potential von Broilern unter Hitzestress

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Introduction

The widely use of antibiotics over the last decades as growth promoters in poultry nutrition is criticised increasingly due to the appearance of residues (CASTANON, 2007) in products and resistant strains of bacteria (WHO, 2004). Sub-therapeutical application of antibiotics in broiler diets has been banned in Denmark in 1986 and thereafter in the European Union since 2006 (CASTANON, 2007). Bans on the use of antibiotics as broiler feed additives have accelerated investigations on natural and safe alternative feed additives including essential oils. The natural plant derived feed additives are commonly believed to be safer, healthier and less subject to vulnerability for humans and animals (HASHEMI and DAVOODI, 2011). There is increasing numbers of herbs and plant extracts showing antimicrobial activities and antioxidant properties in repeated experiments creating prospects for introducing natural animal feed additives (FAIXOVA et al., 2008). Among many herbal medicines the plants belonging to the Lamiaceae family, including thyme, savory and rosemary, has received more attraction mainly based on antimicrobial (ALÇIÇEK et al., 2004; ZHANG et al., 2005) and antioxidative (WILLIAMS et al., 2004, MANESH, 2012) properties of their essential oils. *Satureja khuzistanica* Jamzad is an endemic plant distributed in many subtropical regions of the world (HADIAN et al., 2011) and contains up to 4.5 per cent essential oil peculiarly rich in carvacrol (KHOSRAVINIA, 2013). The plant is well-known for its therapeutic virtues in traditional medicine (ZARGARI, 1990). Inclusion of *Satureja khuzistanica* essential oil (SkEO) in drinking water caused no hepatotoxicity and nephrotoxicity in broiler chicks through day 28 of age (KHOSRAVINIA et al., 2013). Further experimentation revealed that SkEO at 400 mg/l level improved broiler performance efficiency (KHOSRAVINIA, 2014) and deceased carcass fat through altered steroids ratio in birds raised under thermo-neutral conditions at day 42 of age. Information on effects of carvacrol-rich essential oils in birds exposed to environmental stressors are scarce and warranting further experimentation, specifically when the results are compared to synthetic or natural conventional dietary antioxidants such as vitamin E.

This experiment aimed at assessing the effects of SkEO and \( \alpha \)-tocopherol on productive performance, organ weights, blood fat constituents and blood antioxidative stability in broiler chicks, when administrated dietary to birds raised in thermo-neutral conditions or exposed to high ambient temperatures in a 42-d experimental period.