Effect of Turmeric Rhizome Powder on the Activity of Some Blood Enzymes in Broiler Chickens

M. Emadi and H. Kermanshahi
Department of Animal Science, College of Agriculture, Ferdowsi University of Mashhad, Mashhad, P.O. Box: 91775-1163, Iran

Abstract: In order to study the effect of turmeric rhizome powder (TRP) on the activity of some blood enzymes in broiler chicken, a 49 days experiment using corn-soybean meal based diet containing four levels of TRP (0.0, 0.25, 0.50 and 0.75%) as treatments with five replicates in a completely randomized design was conducted. 200 Ross male broiler chicken from 0-49 days were housed in 20 pens and received feed and water ad libitum. At 21 and 42 days of age, one blood serum sample from each replicate of treatment was collected. Inclusion of TRP significantly increased LDH and AST enzymes (P<0.05). TRP in the diets also significantly decreased ALT and ALP enzymes (P<0.05). Under the conditions of this study, it was concluded that TRP might have some positive effects on liver enzymes that directly or indirectly reflects a healthier liver status in broiler chickens.

Key words: Turmeric, blood enzymes, broiler chickens, liver damage

Introduction
The rhizome of turmeric has a rich history in India as spice, food preservative and colouring agent and has been used for centuries in traditional medicine. Spices like turmeric played a key role as food additive from long time ago (Srimal, 1997). The continuing research indicates that turmeric and its active compound ‘curcumin’ are unique antioxidants, antimutagenic, antitumorogenic, anti-inflammatory, anti-arthritis, anticarcinogenic, antimicrobial and hypcholesterolemic properties as reviewed recently (Majeed et al., 1995; Miquel et al., 2002). No toxic effects due to feeding turmeric or curcumin was reported in rat, guinea pig, monkey and pig (Quian et al., 1981; Dial and Chen, 1982; Zeng et al., 1982; Li and Shen, 2002). Curcumin has been applied in interventional therapy administered via the hepatic artery and produced favourable effects in patients with primary liver cancer and experimentally in rats with transplanted liver tumours as well (Cheng and Liu, 1997, Han et al., 1998, Chen and Chang, 2001, Wu et al., 2000, Li and Liang, 2003 ). Turmeric and curcumin have been shown to protect liver against a variety of toxicants including carbon tetrachloride (CCl₄), aflatoxin B1 and cyclophosphamide in mouse, rat and duckling (Donatus et al., 1990; Kiso et al., 1983; Soudamini and Kuttan, 1992). The present study was designed to investigate the possible effect of turmeric rhizome powder (TRP) as feed additive on some liver associated enzymes presented in the blood serum of broiler chickens.

Materials and Methods
In a completely randomized design, four levels of TRP (0.0, 0.25%, 0.5% and 0.75%) with five replicates were tested in 200, day-old Ross male broiler chicken for 7 weeks during starter (0-21), grower (21-42) and finisher (42-49 days of age) periods (Table 1). A corn-soybean meal based diet was used to meet the requirements of the chickens as recommended by National Research Council (NRC, 1994). Feed and water provided ad libitum. Birds were maintained under continuous light. The environmental temperature in the farm that was initially established on 31°C was gradually reduced to 20 C by week 7. Blood serum associated liver enzymes (Narasimhan and Nair, 1974), aspartate amino-transferase (AST, already named glutamic oxaloacetic transaminase, SGOT), alanine amino-transferase (ALT, already named glutamic pyruvic transaminase, SGPT), alkaline phosphatase (ALP) and lactic dehydrogenase (LDH) measured at 21 and 42 days of experiment using appropriate commercial laboratory kits with RA1000 spectrophotometer.

Data were analyzed based on a general linear model procedure of SAS (SAS, 1993) and treatment means when significant, were compared using Duncan multiple range test (Duncan, 1955).

Results and Discussion
The effect of TRP on some associated liver enzymes is shown in Table 2. TRP significantly increased LDH of the chickens at 21 days of age (P<0.05) but this effect was not significant at 42 days of age. Amount of LDH release from liver and thereby into the blood is proportional by damage of the liver (Deshpande et al., 1998; Akila et al., 1998). Curcumin and turmeric have been shown to protect liver against a variety of toxicants in vivo as well as in vitro studies (Akila et al., 1998; Srimal, 1997). LDH is a non-especially enzyme with 5