

D-Xylose absorption test: A tool for the assessment of the effect of anticoccidials on the intestinal absorptive capacity of broilers during experimental coccidiosis

B. Mansoori^{a,*}, H. Nodeh^b, M. Modirsanei^a,
S. Rahbari^c, P. Aparnak^a

^a Department of Animal and Poultry, Health and Nutrition, Faculty of Veterinary Medicine, University of Tehran, P.O. Box 14155-6453, Tehran, Iran

^b Department of Physiology, Pharmacology and Toxicology, Faculty of Veterinary Medicine, University of Tehran, P.O. Box 14155-6453, Tehran, Iran

^c Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, P.O. Box 14155-6453, Tehran, Iran

Received 28 May 2007; received in revised form 15 March 2008; accepted 23 April 2008

Abstract

Coccidiosis in chickens causes intestinal mucosal lesions and disrupts its integrity leading to a disturbance in absorption of dietary components. The D-xylose absorption test is a sensitive tool of measuring the absorption capacity of the intestine in diseased chickens. In an experiment on broilers, the influence of different anticoccidials on the intestinal absorption capacity of the birds challenged with experimental coccidiosis was evaluated, using the D-xylose absorption test. The experiment had 5 groups of 10 Ross male broiler chickens (24-days-old) as follows: Group 1—negative control received no *Eimeria* oocysts, Group 2—positive control challenged with mixed *Eimeria* oocysts, Group 3—positive control dosed with an attenuated oral coccidiosis vaccine, Group 4—positive control dosed with 25 ppm toltrazuril in drinking water and Group 5—positive control received 66 ppm salinomycin sodium, in the diet. The D-xylose absorption test was carried out 5 days after the coccidial infection. Results showed that coccidiosis highly reduced the plasma D-xylose peak level of Group 2 when compared with Group 1 (31 mg/dl at 90 min *versus* 50 mg/dl at 30–60 min after the D-xylose

* Corresponding author. Tel.: +98 21 61117105; fax: +98 21 66933222.

E-mail address: mansoori61@yahoo.co.uk (B. Mansoori).

administration, respectively). The concentration of D-xylose followed cubic ($P < 0.001$, $r^2 = 0.886$) and quadratic ($P < 0.001$, $r^2 = 0.686$) correlations with time in Group 1 and 2, respectively. Anticoccidials enhanced the uptake of D-xylose in the infected birds. The plasma D-xylose reached to its peak in Group 3, 4, and 5 (38.9, 50 and 47.0 mg/dl, respectively) at 60–90 min after the D-xylose administration and had quadratic functions with time ($r^2 = 0.802$, 0.883 and 0.860, respectively, $P < 0.001$). The D-xylose absorption test was a sensitive test for evaluating the influence of anticoccidials on the absorption capacity of intestinal mucosae during coccidiosis in broiler chickens.
© 2008 Elsevier B.V. All rights reserved.

Keywords: Coccidiosis; Anticoccidials; Intestinal absorption; D-Xylose test; Broilers

1. Introduction

Coccidiosis is among the most important diseases of poultry worldwide caused by a protozoan parasite, *Eimeria*. The parasite invades the cells of the intestine producing enteritis, diarrhoea and mortality. The bird develops a disability to absorb sugars, amino acids, vitamins, fats and minerals through the disruption of the integrity of the intestinal mucosae (Sharma and Fernando, 1975; Ruff and Fuller, 1975; Pesti and Combs, 1976; Ruff and Wilkins, 1980; Ruff and Edgar, 1982; Turk et al., 1982; Ball et al., 1991; Adams et al., 1996; Greif, 2000; Persia et al., 2006; Zhao et al., 2006). In order to prevent, control and/or treat poultry coccidiosis, several coccidial vaccines, coccidiostats and coccidiocidal drugs have been developed and used commercially. Although anticoccidials are able to prevent or control the disease, reports are scarce on the influence of anticoccidials on the absorption capacity of intestinal epithelium in affected chickens.

Intestinal absorption capacity has routinely been assessed by the D-xylose absorption test in man and animals (Verma et al., 1995; Rutgers et al., 1996; Sorensen et al., 1997; Schreiber, 2000; Venner and Ohnesorqe, 2001; Rutgers, 2005; Semrad, 2005). D-Xylose, a poorly metabolisable pentose sugar, is well absorbed from the small intestine of chickens (Schutte et al., 1991a,b). Any change in plasma concentration of D-xylose, over a 3 h period is indicative of its absorption from the intestinal tract of the bird (Doerfler et al., 2000). The D-xylose absorption test has been successfully used to evaluate the malabsorption syndrome in birds caused by antinutrients, mycotoxins, viruses and intestinal parasites (Goodwin et al., 1984a,b, 1985; Hill et al., 1985; Perry et al., 1991; Doerfler et al., 2000; Ismail et al., 2003; Rosenberger, 2005; Mansoori et al., 2007). The test is a sensitive tool for evaluating the effects of coccidial infection and correlates well with body weight gain and feed conversion ratio of the bird (Goodwin et al., 1985; Hill et al., 1985). The present study aimed to demonstrate the potency of D-xylose absorption test for evaluating the efficacy of anticoccidials on the intestinal absorptive capacity of broiler chickens during experimental coccidiosis.

2. Materials and methods

2.1. Rearing of the birds

The experiment contained 5 groups of 20 1-day-old broiler cockerels (Ross 308) placed on wire-floored starter batteries and given *ad libitum* access to water and unmedicated starter

Download English Version:

<https://daneshyari.com/en/article/2420614>

Download Persian Version:

<https://daneshyari.com/article/2420614>

[Daneshyari.com](https://daneshyari.com)