The anthelmintic effects of the ethanol extract of *Terminalia catappa* L. leaves against the ruminant gut parasite, *Fischoederius cobboldi*

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SUMMARY

Presently, no effective anthelmintic drugs have been used to treat and control paramphistomosis, a severe disease of ruminants. In this study, we have investigated the *in vitro* anthelmintic effect of the leaves of *Terminalia catappa* L. crude extract (TcCE) and albendazole (ABZ) on adult *Fischoederius cobboldi* after incubating the flukes in RPMI-1640 medium containing the TcCE at various doses and times. The TcCE-treated flukes at all dosages exhibited rapid decrease of motility, and the relative motility (RM) values were decreased sharply from start to 3 h. Worms were killed after 6 and 12 h of treatment with 1000, 1500 and 2000 µg mL⁻¹ as well as 300 µg mL⁻¹ of TcCE, respectively. By light microscopy examination, the flukes exhibited the earliest alteration in a limited area of the tegument. At scanning electron microscopy level, the flukes' tegument showed similar sequence of morphological alterations after treatment with ABZ and TcCE that consisted of swelling of ridges and folds, followed by blebbing and rupturing of the blebs, leading to the erosion, lesion and disruption of the tegument. Hence, *in vivo* studies should be performed to examine whether the TcCE may serve as a powerful anthelmintic drug for treatment of paramphistomosis.

Key words: *Fischoederius cobboldi*, *Terminalia catappa* L., anthelmintic drug, motility, survival, tegument, light microscopy, scanning electron microscopy.

INTRODUCTION

Paramphistome, also known as rumen fluke, is one of the most common parasites that reside in the rumen and reticulum of domestic and wild ruminants, i.e. cattle, goats, sheep and buffaloes. Rumen flukes belong to the superfamily Paramphistomoidea and are an important cause of paramphistomosis in many countries (Horak, 1971; Hanna et al. 1988; Wang et al. 2006; Sanabria and Romero, 2008; Anuracpreeda et al. 2008, 2012). Adult paramphistomes cause chronic ulcerative ruminitis and anaemia (Hanna et al. 1988; Rolfe et al. 1991; Anuracpreeda et al. 2013b). Large numbers of immature parasites cause severe acute gastroenteritis, dehydration, maldigestion and death, particularly in young animals (Ilha et al. 2005; Khan et al. 2008). In addition, paramphistomosis in domesticated animals causing economic losses with morbidity and mortality rates as high as 80–90% in livestock industry (Prasitirat et al. 1977a, b; Gupta et al. 1978; Hanna et al. 1988; Khan et al. 2008; Tariq et al. 2008; Anuracpreeda et al. 2015). It was reported that the outbreaks of clinical paramphistomosis caused by immature flukes in ruminants are not diagnosed and subclinical infection often passes undiagnosed. The prevalence of paramphistomosis is high and distributed in tropical and subtropical regions in Africa, Australia, Eastern Europe, Russia as well as South and Southeast Asia (Gupta et al. 1978; Nikitin, 1979; Hanna et al. 1988; Rolfe et al. 1991; Geurden et al. 2008; Tariq et al. 2008; Panyarachun et al. 2010). It has been revealed that paramphistomosis by *Gastrodiscoides hominis*...