

# The immune defence system of the cattle tick *Boophilus annulatus* (Say) (Acari : Ixodidae) II – Hemagglutinin activity and sugar inhibition

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## ABSTRACT

The hemagglutinating activity of hemolymph from female *Boophilus annulatus* was assayed using human, cow, sheep, rabbit, rat and mouse erythrocytes. A high degree of hemagglutination titre was obtained towards rat erythrocytes, which might suggest common specificity towards carbohydrate structures associated with rat erythrocytes. However, no agglutination activity was observed towards cow erythrocytes. Hemolymph agglutination inhibition assays towards a panel of various inhibitors showed that the most potent inhibitor (sugar) was D-mannose and mannose derivatives. Using 10% SDS-polyacrylamide gel electrophoresis (PAGE), nearly nine major naturally occurring proteins of crude hemolymph were consistently resolved, with molecular weights 107, 57, 41, 29, 24, 18, 16, 15 and 12KDa. Among these were the active proteins responsible for the agglutination of specific mammalian erythrocytes. Accordingly, it appeared that this study may add a new information about naturally occurring hemagglutinins in *B.annulatus* towards certain mammalian erythrocytes.

**Key words:** Immune defence system, Acari, *Boophilus annulatus*, protein, hemagglutinin inhibition, sugar inhibition.

## INTRODUCTION

Hemagglutinins are generally present in the hemolymph and various tissue extracts of a variety of invertebrates including ticks (Yeaton, 1981; Vasta *et al.*, 1984; Vasta and Marchalonis, 1983; Stein *et al.*, 1985; and Kamwendo *et al.*, 1993). Many hemagglutinins have been shown to be lectins and are considered to be important components of invertebrate defence system involving detection and neutralization of pathogenic and nonself materials (Bayne, 1980). Most current research on lectins is directed towards their putative carbohydrates based on recognitory capabilities as humoral

and cellular immunosubstances. Investigations of the function of invertebrate agglutinins have highlighted the significant variations that occur, not only in the specificity of these molecules, but also on their functions (Chen *et al.*, 1993). The aim of the present work is to investigate the presence of natural agglutinin activity in the hemolymph of the cattle tick *B.annulatus* as well as its carbohydrate inhibition patterns, which might be used as an immune element anti-tick.

## MATERIALS AND METHODS

Semi-engorged female *Boophilus annulatus* ticks were field collected from Giza and Gharbyia governorates. Hemolymph