

ANTIMICROBIAL POTENTIALS OF HAEMOCYANIN

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ABSTRACT

Hemocyanin is an extracellular copper-containing protein present in the hemolymph of both mollusks and arthropods. The traditionally recognized function of hemocyanin is for oxygen transport. Lately, it was demonstrated that hemocyanin is a multifunctional protein, especially participating in multiple roles of immune defense. For better understanding its actions in immune defense, the hemolytic activity of hemocyanin from Gaint Africa and the antimicrobial potentials were investigated in this study. In order to study the antibacterial activity of heamocyanin from Gaint Africa snail were tested against six bacteria. Among the six bacterial, 95% of the bacterial showed susceptibility against e.coli at the concentrations conducted in this experiment. After studying the MIC 95% Of the bacteria were destroyed at 100mg/ml concentration. Result shows that in the presence of microbes heamocyanin become activity to form a very potent antimicrobial agent.

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KEYWORDS: Antibacterial Activity, Heamocyanin, Minimum Inhibitory Concentration, Gaint Africa Snail.

INTRODUCTION

Haemocyanin is an excellent example of molecular convergence in respiratory proteins, although the same applies to haemoglobin, myoglobin and haemerythrin, all based on iron rather than copper. One intriguing difference between haemocyanin and the globins is that the latter appear to be genomically conservative, whereas the haemocyanins are much more labile with evidence of extensive intron addition and movement (at least in molluscs). Haemocyanin occurs in both the arthropods and molluscs, and is almost certainly of independent origin although it is possible that ultimately both derive from a very ancient copper protein. The crucial similarity is that each dioxygen is held by two atoms of copper that each have a close association with three amino acid ligands, specifically histidines (this is of more than passing interest because the remarkably convergent enzyme carbonic anhydrase uses zinc in association with histidine, and it transpires that this amino acid is repeatedly employed in the active sites of enzymes). The degree of similarity between the active sites in arthropod and molluscan haemocyanin has been called "remarkable" and "startling", but actually suggests that wherever in the universe life employs copper for aerobic respiration it will call upon haemocyanin.

The blue colour of the blood of certain arthropods and molluscs is due to the presence of a protein, containing copper, which exists in oxidised and reduced forms; the former, oxyhaemocyanin, has a

blue colour, whilst the latter, haemocyanin, is colourless. The transformation of the oxidised into the reduced form is readily accomplished by exposing blood containing oxyhaemocyanin to a vacuum or by saturating it with an inert gas; the reverse change takes place spontaneously on again bringing the blood into contact with air. The properties of haemocyanin immediately suggest that this pigment exercises respiratory functions analogous to those of haemoglobin.

The Ademolu et al., (2004) reported that the flesh and hemolymph of *A. marginata* are rich in Ca, Mg, Na, Zn, Fe and Cl. The blood of snail is bluish in colour due to the presence of a respiratory pigment known as haemocyanin (Yoloye, 1988). The hemolymph contains water, sugar, salts, amino acid and white cells as found in blood which is circulated by pulsatory heart whose function is to transport digestive and excretory product around the body including carbon dioxide. All chemical exchange within the tissues are facilitated by the hemolymph. (Dimitriadis, 2005). The snail contains antimicrobial peptides which are essential components of host defense mechanism against infectious organisms. Studies show that glandular substances from edible snails cause agglutination of certain bacteria and therefore could be valuable against whooping cough and some other diseases (Akinmusi, 2004). Despite the belief of many that snail hemolymph eliminates microbial disease, yet there is no documented data that supports this. Thus, the aim of this study is to

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