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Free amino acid composition in egg capsules of *Hemifuscus pugilinus*

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ABSTRACT

The egg capsules of *Hemifuscus pugilinus* collected from the Pondicherry, South east coast of India. The free amino acid samples were made from the egg capsules and then subjected to free amino acid analysis quantitatively by HPLC. Fifteen free amino acids have been determined in the egg capsules of *H. pugilinus*. The essential amino acids were isoleucine, leucine, lysine, methionine, phenylalanine, threonine, valine and histidine and while the non-essential amino acids were alanine, aspartic acid, arginine, glutamic acid, glycine, serine and tyrosine, respectively. Glutamic acid is of higher concentration whereas valine were detected very less in concentration in the egg capsules. The total concentration of free amino acid exhibit in the egg capsules of *H. pugilinus* was low as it serves potential nutrients for embryos. © 2012 Trade Science Inc. - INDIA

KEYWORDS

Gastropod;
Hemifuscus pugilinus;
Egg capsule;
Free amino acid;
Pondicherry.

INTRODUCTION

Free amino acids play an important role in physiological functions such as osmoregulation and buffer capacity in the tissues of aquatic animals^[19]. Their biological roles have been postulated to include the potent intracellular pH-buffering capacity control of enzyme activity^[13], neurotransmitter function^[1] and inhibition of oxidative reactions^[2]. Recently, free amino acids have been implicated as a fuel in energy metabolism of marine eggs and larvae^[7]. Collagen like macromolecules has been identified in the egg capsules of sharks and skates on the basis of partial amino acid analysis^[11,17]. Some encapsulated embryos may be protected from UVR through chemical sunscreens, such as mycosporine-like amino ac-

ids (MAAs). The concentration and composition of MAAs can vary in organisms according to latitude^[3], altitude^[18] depth^[9], sex^[20], and species^[21]. MAAs has been reported from the eggs and larvae of several invertebrates including urchins, corals, ascidians, and gastropods. A tyrosine-rich protein^[14,15], a shell gland enzyme and polyphenol oxidase, which converts phenolic residues to quinones^[4,15] provides evidence for a protein which associates with a collagenous matrix and then undergoes quinone tanning. The mixture of these materials would be expected to contribute to the mechanical rigidity, chemical resistance, and maturational tanning of egg capsules. The objective of the present study focuses on the pattern of distribution of free amino acids in egg capsules of *Hemifuscus pugilinus*.

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MATERIALS AND METHODS

The egg capsules of *Hemifuscus pugilinus* were collected from fish landing center at Chinakalpet, South east coast of India. The egg capsule were immediately transferred to laboratory and rinsed thoroughly with filtered sea water and there in distilled water. The extraction of amino acid^[12] was performed with slight modification and analysis was carried out using high performance liquid chromatography (HPLC) as done by Fang et al.,^[6].

RESULTS AND DISCUSSION

Fifteen free amino acids have been determined in the egg capsules of gastropod, *H. pugilinus* (Figure 1).

Among these, the essential amino acids were isoleucine, leucine, lysine, methionine, phenylalanine, threonine, valine and histidine and while the non-essential amino acids were alanine, aspartic acid, arginine, glutamic acid, glycine, serine and tyrosine, respectively. The nonessential amino acids play a more important part than the essential ones in the regulation of cellular osmotic pressure^[8]. Glutamic acid (17.2 imoles/ml) exhibit higher concentration, these are the important substances for the regulation of osmotic pressure^[5] followed

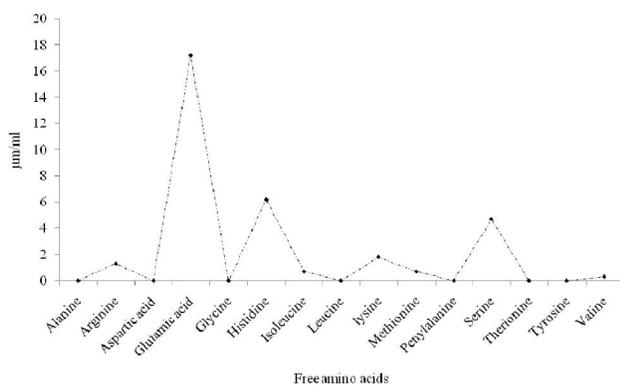


Figure 1 : Free amino acid composition in egg capsules of gastropod, *Hemifuscus Pugilinus*

by histidine (6.2 imoles/ml), serine (4.7 imoles/ml), lysine (1.8 imoles/ml), Arginine (1.8 imoles/ml) and valine (0.3 imoles/ml) were detected in lower concentrations. Free amino acids such as lysine and arginine occur at relative concentrations. Lysine play an important role in structural protein in egg capsule like in solubility of egg capsule^[10]. The concentration of methionine was equal to isoleucine. Among all amino acids, valine (0.3 imoles/

ml) was very much less in concentration. Some amino acids such as aspartic acid, glycine, threonine, alanine, tyrosine, phenylalanine were not exhibit in our study. It suggests that as embryonic development proceeds, the proteins present in the inner capsule walls might have potentially provide nutrients to the embryos^[16]. Further, some proteins may dissolves and/or disintegrate as larval development advances. Moreover some amino acids might be destroyed by acid hydrolysis and were not determined. The total concentration of free amino acid found in the egg capsules of *H. pugilinus* was low since it acts as a nutrient for embryos.

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