BIOCHEMICAL ANALYSIS OF PROTEINS IN THE ANDROGENIC GLAND

Abstract

Androgenic gland is a part of male reproductive system situated at the terminal portion of vas deferens. It is widely accepted that the AG of decapod crustaceans secretes hormones responsible for controlling the differentiation of the male and female genital apparatus and the secondary sexual characteristics. The proteins of androgenic gland exhibit variations in relation to the reproductive cycle. This has been extensively studied in Barytelphusa guerini. It showed the signs of increased secretory activity during the sexually active phase.

INTRODUCTION

Proteins are biochemical compounds consisting of one or more polypeptides typically folded into globular or fibrous forms facilitating biological functions and are important constituents of protoplasm. Like other biological macromolecules such as polysaccharides and nucleic acids, proteins are important and participate in virtually every process within cells. Many proteins are enzymes that catalyze biochemical reactions and are vital to metabolism. Proteins help in growth and repair of tissue.

The AG secretes a protein hormone Androgenic Gland Hormone (AGH) and it is proteinaceous in nature. The AG of crustaceans secretes AGH, with a high probability of such hormone being protein in nature in *Macrobrachium rosenbergii* (Sagi, 1988; Awari and Dube, 1999; Piera *et al*., 2000; Zhang *et al*., 2000; Okumara and Hara, 2004; *Portunus trituberculatus* (Qing *et al*., 2010) Ventura *et al*, 2009, 2011 and *Cherax quadricarinatus* (Rosen *et al*., 2013).

MATERIALS AND METHODS

Total proteins were estimated in the androgenic gland of normal animals by Biuret method (Gornall *et al*., 1949) in the three periods of the annual reproductive cycle.

RESULTS

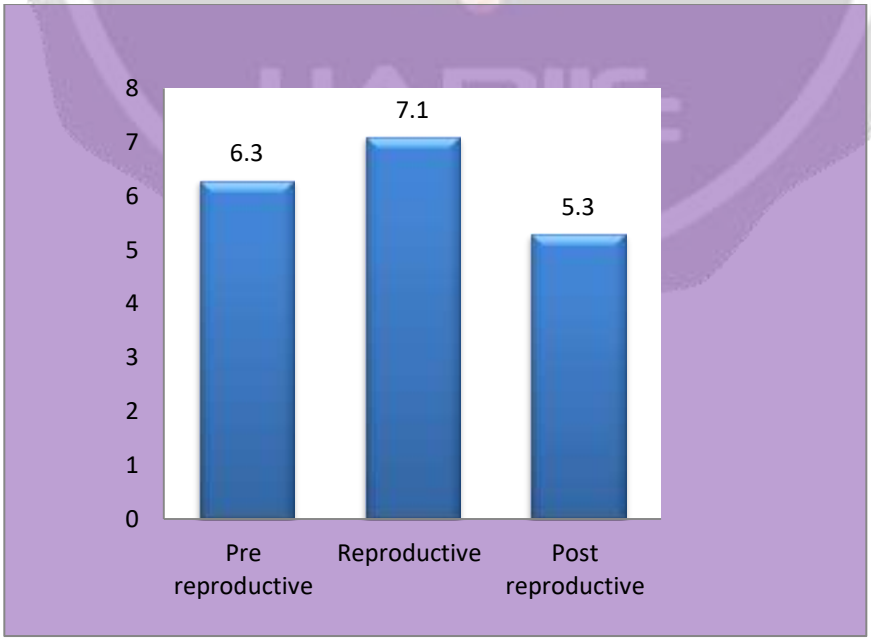
The protein content was studied in AG of normal animals in three different periods of the reproductive cycle. The total protein content in AG showed variation in relation to the reproductive cycle and expressed as mg/ gram weight of tissue. The protein content of the androgenic gland, in normal animals were:

Protein concentration in pre-reproductive period was 6.33 mg/ gram weight of tissue, in reproductive period it was 7.12 mg/ gram weight of tissue and in post-reproductive period it was 5.27 mg/ gram weight of tissue.

The AGH in *Barytelphusa guerini* is protein in nature and it was found to be maximum during reproductive period and minimum in the post reproductive period and was observed to increase gradually from the pre-reproductive period to the reproductive period.

Sample	Pre-reproductive period	Reproductive period	Post-Reproductive period
	In Normal animals	**In Normal animals**	**In Normal animals**
1	6.4 mg/gm wt of tissue	7.2 mg/gm wt of tissue	5.4 mg/gm wt of tissue
2	6.3 mg/gm wt of tissue	7 mg/gm wt of tissue	5.1 mg/gm wt of tissue
3	6.4 mg/gm wt of tissue	7.3 mg/gm wt of tissue	5.2 mg/gm wt of tissue
4	6.4 mg/gm wt of tissue	7.1 mg/gm wt of tissue	5.2 mg/gm wt of tissue
5	6.2 mg/gm wt of tissue	7 mg/gm wt of tissue	5.4 mg/gm wt of tissue
6	6.3 mg/gm wt of tissue	7.1 mg/gm wt of tissue	5.3 mg/gm wt of tissue
sum	38	42.7	26.3
Mean	6.33	7.12	5.27
S.D.	0.08165	0.116905	0.121106
Variance	0.006667	0.013667	0.014667

Graphical representation of Proteins in the AG in the normal animals during the three periods of the annual reproductive cycle



DISCUSSION

Total proteins were determined in the AG of normal male crabs. The protein content in the AG was maximum in the reproductive period and minimum in the post reproductive period.

The protein level was built up during the pre-reproductive period, increased further in the reproductive period to show a maximum level. Later it showed a decrease in the post- reproductive period. This was also found in *Macrobrachium lamarrei* where the Androgenic gland shows signs of increased secretory activity during the sexually active phase (Sarojini and Gyananath, 1985).

An increase in the protein content of gonads was noticed during the breeding season in *Portunus pelagicus* (Rahaman, 1967; Pillay and Nair, 1973); *Metapenaeus affinis, Uca annulipes* (Pillay and Nair, 1973); *Barytelphusa cunicularis* (Diwan and Nagabhushanam, 1974; Farooqui, 1983); *Emerita holthuisi* (Nagabhushanam and Kulkarni, 1977); *Caridina weberi* (Reddy, 1982) and *Macrobrachium kistnensis* (Mirajkar *et. al*., 1983).

The protein content increased in the testis and androgenic gland in normal prawns in *Portunus pelagicus* and *Portunus sanquinolentus* (Radhakrishnan, 1979); *Scylla serrata* (George and Gopakumar, 1987);

The quantitative increase in the level of protein content in AG during reproductive period may be due to various factors :

- Overall increase in the size of the AG with increase in the size and number of cells.
- Increase in the amount of AGH, indicating that the hormone increases quantitatively. This could be due to the increase in the synthesis of AGH which is a protein.

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