



IMPACT OF UNILATERAL EYESTALK ABLATION ON PROTEIN CONTENT IN FRESHWATER CRAB *SPIRALOTHELPHUSA HYDRODROMA*

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ABSTRACT

The present study was taken to study the impact of unilateral eyestalk ablation on the protein content in muscle of the male and female (fresh water crab) *Spiralothelphusa hydrodroma*. The experiment was carried out after 10 days of unilateral eyestalk ablation of male and female *Spiralothelphusa hydrodroma*. The protein content in the muscle of experimental crab was compared to the control. The result shows the significant decrease in the protein level in the muscle of both male and female experimental crab when compared to the control crabs.

KEY WORDS: Unilateral Eyestalk ablation, Muscle, and Protein.

INTRODUCTION

Protein is as an important nutrient. The muscle of the Fresh water crab *Spiralothelphusa hydrodroma* is highly rich in protein. Due to the environmental stimulations, the neuroendocrine organs produce significant alterations in physiology of crustaceans (Adiyodi and Adiyodi, 1970). The effect of eyestalk ablation reduces the GIH and causes accelerated growth of ovary. The ablation of eyestalk induces the endocrine organs which stimulates the maturation of gonads. The hormones of the eyestalk influence the metabolism of carbohydrate and lipid. But it may vary in different species and times (Madhyasthan and Rengnekhar, 1979; Vernberg and Vernberg, 1974 and Soundarapandian, 1996). Eyestalk ablation reduces the level of GIH in females which in turn induces ovarian growth (Aktas *et al.*, 2003). Maturation of ovary by the eyestalk ablation in *Penaeus duorarum* (Caliouet, C.W.jr., 1973). The movements and the accumulation of protein and lipid in different tissues of crustaceans were noticed and that protein and lipid was utilized for the maturation of oocytes. The synthesis of protein and lipid was more and level was increased in crustaceans (Pillay and Nair, 1973; Palacios *et al.*, 2000; Barbara and Felder, 2006). Hence, in the present study reveals the impact of the unilateral eyestalk ablation on protein content of the muscle of fresh water crab *Spiralothelphusa hydrodroma*.

MATERIALS AND METHODS

The male and female *Spiralothelphusa hydrodroma* (Herbst) were brought in live condition to the laboratory

from the dormant paddy field of Terathur village, Thiruvallur Taluk, Thiruvallur District, Tamilnadu. They were acclimatized in troughs containing well aerated fresh water for 10 days under natural photoperiod and at room temperature. During the experimental period, the control and experimental crabs were fed with fish meal and fish meat twice in a day. For the analysis of protein in muscle, five male and female *Spiralothelphusa hydrodroma* was selected, dissected and the muscle tissue was taken out from the normal and unilateral eyestalk ablated *Spiralothelphusa hydrodroma*. Protein content in the muscle was estimated by using the Lowry's method (Lowry *et al.*, 1951).

RESULTS

Protein level was analyzed in the muscle of the fresh water crab *Spiralothelphusa hydrodroma*. Protein in the muscle of control (male) crab (Fig 1, 2 and 3) is 69.85 ± 5.70 mg/g wet tissue. After the unilateral eyestalk ablation the muscle of male *Spiralothelphusa hydrodroma* shows decrease (58.43 ± 4.44 mg/g wet tissue) in protein level (TABLE 1, 3 and FIGURE 1). Protein in the muscle of control (female) crab is 66.99 ± 5.43 mg/g wet tissue. Similarly, after the unilateral eyestalk ablation the muscle of female *Spiralothelphusa hydrodroma* shows (73.19 ± 5.42 mg/g wet tissues) a significant decrease in protein level (Table 2, 3 and Figure 2).



FIGURE 1. *Spiralothelphusa hydrodroma* (Dorsal view)



FIGURE 2. *Spiralothelphusa hydrodroma* (female)



FIGURE 3. *Spiralothelphusa hydrodroma* (male)

TABLE 1. Protein (mg/g wet tissue) level in the muscle of male *Spiralothelphusa hydrodroma* (Control and Experimental crabs)

Sex	Muscle	
	Control	Experimental crab
1F	71.22	64.56
2F	68.34	56.55
3F	71.63	61.32
4F	61.25	53.45
5F	76.83	56.25
Mean $\pm$ SD	69.85 $\pm$ 5.70	58.43 $\pm$ 4.44

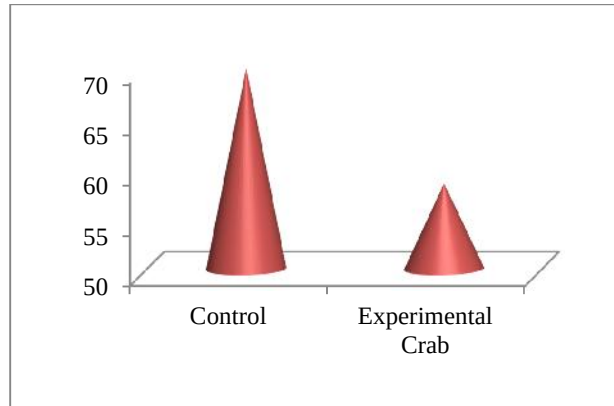


FIGURE 4. Protein (mg/g wet tissue) level in the muscle of male *Spiralothelphusa hydrodroma* (Control and Experimental crabs)

TABLE 2. Protein (mg/g wet tissue) level in the muscle of female *Spiralothelphusa hydrodroma* (Control and Experimental crabs)

Sex	Muscle	
	Control crab	Experimental crab
1F	76.56	70.62
2F	74.45	67.67
3F	78.85	73.52
4F	64.88	60.26
5F	71.24	62.92
Mean $\pm$ SD	73.19 $\pm$ 5.42	66.99 $\pm$ 5.43

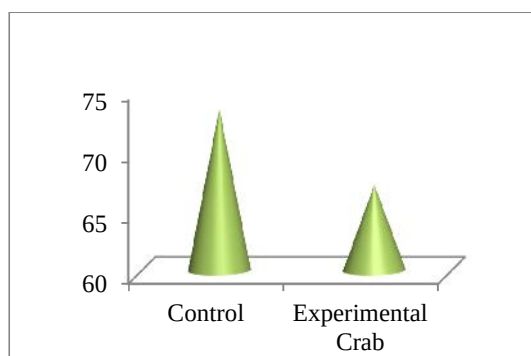


FIGURE 5. Protein (mg/g wet tissue) level in the muscle of female *Spiralothelphusa hydrodroma* (Control and Experimental crabs)

TABLE 3. Effect of Unilateral Eyestalk Ablation on Protein Content in the muscle of Freshwater Crab (male and female) *Spiralothelphusa hydrodroma*

Parameter	Control crab	Unilateral Eyestalk ablated crab	P-value
Protein in Female	73.19±5.42	66.99±5.43	<0.001
Protein in Male	69.85±5.70	58.43±4.44	<0.001

DISCUSSION

Protein used for the synthesis of vitellogenesis, and the protein consumption was mainly for the growth. Vitellogenesis and gonadal maturation has been induced by the eyestalk ablation. But the gonadal maturation was inhibited by the hormones of eyestalk Keller R (1992). There was no reduction in moulting process after the eyestalk ablation in female *M. americanum*. Because more intake of food increase the growth even in the eyestalk ablated female *M. americanum*. More intake of food also increases the protein content in haemolymph of female *M. americanum* which is essential for energy production and growth. The hormones in the eyestalk influence the metabolism of lipid, protein and carbohydrate in crustaceans (Highnam and Hill, 1979). In penaeid shrimps due to the effect of eyestalk ablation there is a 50% decrease in protein level in the haemolymph (Perazzolo *et al.*, 2002). In female *L. vannamei* after the unilateral ablation there is no significant increase in protein content (Maggioni *et al.*, 2004; Sainz-Hernández *et al.*, 2008). Hence, in the present study we have seen the significant decrease in protein in the muscle of both in male and female *Spiralothelphusa hydrodroma* after the unilateral eyestalk ablation. Because, after the unilateral eyestalk ablation, the protein content in muscle was utilized for the maturation of gonads both in male and female *Spiralothelphusa hydrodroma*. The analysis of protein was done particularly in the muscle of male and female *Spiralothelphusa hydrodroma*. Because, the muscle is an edible part and it consists of high protein when compared to other organs in *Spiralothelphusa hydrodroma*. So, this study helps to confirm the essentials of protein for the growth and maturation of gonads in *Spiralothelphusa hydrodroma*.

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