

Adaptation of digestive enzymes to dietary protein, carbohydrate and fibre levels and influence of protein and carbohydrate quality in



Activity of digestive enzymes (trypsin, chymotrypsin and amylase) was studied in relation with food in *Penaeus vannamei* larvae first stages. Microparticles containing casein involved the decrease of soluble protein content and enzyme activities. Specific trypsin activity but not chymotrypsin was correlated ($p < 1\%$) to casein level between 10 and 60% in microparticles. Cellulose fibres in food seemed to have little effect on digestive enzymes. Starch, between 1 and 20% in microparticles, had no influence on specific amylase activity. The effect of different feeding conditions were also tested on growth. No clear relationship between growth and enzyme is established since only trypsin is concerned in the case of a casein dose effect in the food. The protein source (casein, gelatin, squid meal or fish protein soluble concentrate) as well as the carbohydrate quality (soluble starch, standard corn starch, amylopectin corn starch or pregelatinized corn starch) were tested. Squid meal stimulated significantly chymotrypsin activity ($p < 2\%$) while trypsin activity decreased with fish protein soluble concentrate $p < 5\%$. Source of carbohydrate seemed very important,

amylase activity increased significantly ($p < 2\%$) with corn starch. These adaptations are not correlated to growth performances since squid meal or fish protein soluble concentrate improved larval development until zoe 3 substage. These results suggest a specific induction of digestive enzymes to the food quality in larvae independent of growth performances.

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