DISTRIBUTION OF THREE DIGESTIVE PROTEASE PHENOTYPES IN THE PACIFIC WHITE SHRIMP (*LITOPENAEUS VANNAMEI*) GROWN IN THREE ENVIRONMENTS

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Introduction. The importance of shrimp aquaculture in the world is mainly due to economic returns generated by this activity and its growth is on the rise annually (1). This has led to an increased in the usage of land and water resource for the production of shrimp, generating greater amount of waste into the environment. Proteins are the most expensive components in the diet of shrimp, the percentage of inclusion in formulations directly affects the cost of the diet coming to represent up to 60% of the total cost of production (2). Proteases are responsible for hydrolyzing the protein and release the components in order to be utilized for body. There is evidence that the digestive gland of *Litopenaeus vannamei* has three protease isoenzymes which differ in catalytic capacity. These isoenzymes were called C, B and A forming three phenotypes of protease CBA, CB and CA in the digestive gland of the shrimp populations. It was confirmed that the phenotypes are segregated in the population following the law of Mendel, therefore, knowing the phenotype of parents is possible to produce a pure line of shrimp with a specific phenotype that could help reduce the amount of food necessary to cover the demand of the organism and reduce the amount of ammonia released into the environment (3). The objective in this work was to describe the frequency of the three phenotypes in three environments: larval production laboratories, farms and natural environment.

Methods. In the laboratories, feces of 1000 juvenile organisms that would be used in future hatcheries were collected: (3 from Sinaloa and 1 from Nayarit, Mexico). Four hundred specimens of *Litopenaeus vannamei* were collected from commercial farms and two hundred from natural environment. In the two last cases the specimens were decapitated, digestive glands excided and homogenized individually into dH_2O (1:3). After being centrifuged twice for 30 in at 10,000xg we proceeded to separate the supernatant from the extract. The concentration of protein was measured. All samples were visualized in SDS-PAGE and stained with the coomassie technique except laboratories samples which were stained in silver stain.

Results. The three phenotypes were found in all environments. In the laboratories, the CBA phenotype was more abundant, followed by CB phenotype and less frequency CA phenotype. The CA phenotype was not found in one of the laboratories. In the commercial farms the CBA phenotype was more frequent than CB and CA, respectively. In the natural environment the distribution was similar in the commercial farms.

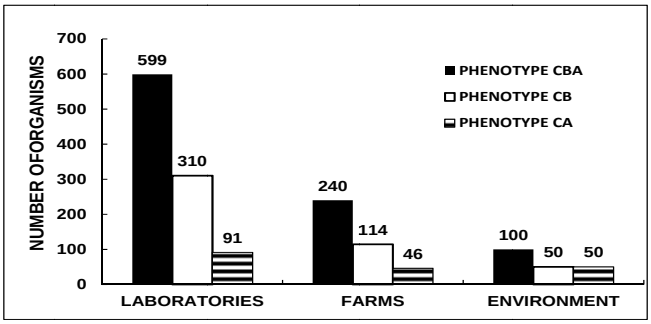

Fig.1. Distribution of protease digestive phenotypes in specimens from laboratories, commercial farms and natural environment.

Conclusions. The CBA phenotype is characterized by larger organisms, leading producers of larvae to choose it as breeding, which causes the phenotypic distribution on farms, is 50% CBA, 25% CB and 25% CA. The CA phenotype has less desirable characteristics or less advantage which has led to decrease in shrimp farming.

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