EFFECT OF MICROBIAL IMMUNOSTIMULANTS AND ANTIVIRAL PLANTS ON THE IMMUNE RESPONSE AND PREVALENCE OF *Litopenaeus vannamei* CULTURED UNDER LABORAROTY CONDITIONS

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Introduction. In Mexico, shrimp farming has been hampered by the emergence of pathogens such as protozoa, bacteria, fungi, and viruses (1,2). Viruses are a risk factor for this industry, specially the white spot syndrome virus (WSSV), which is considered a serious concern for shrimp culture. Although, there is no cure for viral infections, the immunostimulantas and antiviral plants are promisorios alternatives for prevention or treatment of diseases.

Objective. To determine the effect of microbial immunostimulants and antiviral plants on the growth, survival, immune system and prevalence of WSSV in shrimp (*L. vannamei*) cultured under laboratoy conditions.

Methodology. Powdered plants (PP), lactic acid bacteria, and yeast (BY) were included into the commercial feed (CF). Ten shrimp (weighing 11.1±1.1 g) were used per 120-L plastic tank with 80 L of seawater and constant aeration. One bioassay was conducted for 21 days with treatments in triplicate: I) Shrimp fed with CF (control group); II) Shrimp fed with CF + PP (1 g/kg feed) + PY (2.1 mg/kg feed); III) Shrimp fed with CF + PP (2 g/kg feed) + PY (4.21 mg/kg feed); IV) Shrimp fed with CF + PP (4 g/kg feed) + PY (8.5 mg/kg feed). Animals were fed twice a day. WSSV inoculum (shrimp muscle paste) was added to each tank at day 3, 7, and 13 of culture. Uneaten food and waste matter were removed every three days and water was recovered. The physicochemical parameters were determined. At the end of the bioassay, the growth, survival, and WSSV prevalence were determined. Also, hemolymph was withdrawn and the total hemocytes, phenoloxidase activity, anion superoxide, and protein were determined.

Results and discussion. Survival was 100% in all treatments. No significant differences ($p>0.05$) were found between the control group and the shrimp fed with additives on the specific growth rate (SGR), hemocyte number, the superoxide anion concentration, and the phenoloxidase activity in hemocyte supernatants. Physicochemical parameters were within of the optimal intervals for the white shrimp culture. Prevalence of WSSV varied from 100% (control) to 0% in tretaments III and IV (Table 1). Plants can be used for the control of white spot disease in *L. vannamei* (3); however, synergic effect of plants and microbial immunostimulants seems to be better.

Table 1. WSSV Prevalence, growth, survival, and immune response of *L. vannamei*. Average values and standard deviations are shown.

	Treatments			
	I	II	III	IV
Survival (%)	100	100	100	100
SGR (%/d)	1.9±0.4	1.2±0.2	1.2±0.2	1.5±0.2
Hemocytes/mL ($x 10^6$)	8.3± 2.9	10.6±4.3	11.1±7.4	7.4±2.7
Superoxide anion (Absorbance)	0.5±0.2	0.5±0.3	0.4±0.1	0.4±0.1
Phenoloxidase (Absorbance)	0.7±0.1	0.6±0.1	0.7±0.1	0.8±0.1
WSSV prevalence (%)	100	10	0	0

Conclusions and perspectives. Plants and microbial immunostimulants used in this work did not immunostimulate shrimp. Feed additives reduces WSSV prevalence to cero under experimental conditions. Further research is needed in assessing their effects in commercial farms.

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