

**Herbal biomedicines induce disease resistance and immunostimulation in  
Grouper *Epinephelus tauvina* juvenile against *Vibrio harveyi* infection**

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**Keywords:** anti bacterial, herbals, *Epinephelus tauvina*; immunostimulants; *Vibrio harveyi*

**Abstract**

Herbals such as *Phyllanthus niruri*, *Cyanodon dactylon*, *Piper longum*, *Zingiber officinalis* and *Tridax procumbans* were extracted with butanol, petroleum ether, acetone and benzene and tested against the pathogen *Vibrio harveyi* isolated from the infected grouper, *Epinephalus tauvina*. Among the different solvent extractions to *V. harveyi*, petroleum ether extracts were suppressed significantly ( $P < 0.05$ ). The equal proportion of the all plant extracts were mixed with the artificial feeds at the concentration of 100, 200, 400 and 800 mg kg<sup>-1</sup> of diet and fed to the diets to the grouper juveniles from  $20 \pm 2$  g average weight for period of 60 days. Every 20 days samples were challenged with *V. harveyi* and the immune response was studied. The herbal diets significantly ( $P < 0.05$ ) increased the survival, growth and immune responses compared to the control group. Among the different concentrations of the herbals in the diet, 400 mg kg<sup>-1</sup> diet was the most effective in the experiment.

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