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Evaluation of Protein-rich Feed Ingredients for the Organic Production of Freshwater Prawns *Macrobrachium rosenbergii* by Smallholders in the Inlands of Costa Rica

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Abstract

In Costa Rica are many freshwater bodies unused for aquaculture purposes so far, although they are particularly suitable for the cultivation of freshwater prawn *Macrobrachium rosenbergii*. Such cultivation would be a possibility for raising the income of smallholders especially in case of ecologically produced prawns that are high-value-products. The aim of this study was to remove the lack of appropriate feeds by testing and comparing regional feed components for semi-intensive production of freshwater prawns considering the ecological background.

We evaluated two different test diets with a total maximum amount of 20 % fish meal according to the guidelines of Naturland[®] (Verband für ökologischen Landbau) as a potential certifier. The used fish meals and additional shrimp head meal were regional by-catches and processing wastes. Diet 1 contained 15 % fish meal (*Physiculus talarae*) and 10 % shrimp head meal (*Heterocarpus vicarius*) and diet 2 contained 20 % fish meal (15 % *Pontinus cf sierra* and 5 % *Hippoglossina bollmani*) and 5 % shrimp head meal (*Heterocarpus vicarius*). Further ingredients were integral wheat meal, sunflower oil, vitamins/minerals and gelatin. The test diets were compared to (1) a control feed used for the cultivation of marine shrimp (Nicovita) and to (2) a pellet feed for horses used in the only existing prawn farm in Costa Rica. A grow-out experiment was designed to determine the effect of the diets on growth performance and feed utilisation parameters of *Macrobrachium rosenbergii*. We used a randomised set-up of three natural ponds, each with four net cages of 2 m² for 28 days. The monitoring of the water quality parameters dissolved oxygen and water temperature showed no significant difference between the ponds. The highest weight gain (5.7 g ± 3.8) was achieved by diet 2 followed by the control feed Nicovita (4.4 g ± 2.8) and diet 1 (4.0 g ± 1.9). The lowest weight gain was observed by the pellet feed for horses (0.6 g ± 0.5).

These results indicate that the test diets used in this study are suitable feeds for *Macrobrachium rosenbergii*. Further research is needed to evaluate these feeds in different life stages of prawns and to optimise processing.

Keywords: Costa Rica, feed ingredients, *Macrobrachium rosenbergii*, organic production