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## The Effect of Different Levels of Krill Meal Supplementation of Soybean-based Diets on Feed Intake, Digestibility, and Chemical Composition of Juvenile Nile Tilapia *Oreochromis niloticus*, L

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### Abstract

The main objective of this study was to determine the effect of different levels of krill meal (KM) as a feed attractant in juvenile Nile tilapia fed soybean (SBM) diets on growth performance, feed utilization, and body composition. Fish of an initial average weight  $0.8 \pm 0.01$ g were stocked in 18 glass aquaria (80 L each) at a rate of 25 fish per aquarium. Fish meal (FM 20% of the diet) was used as the sole source of animal protein in the control (Diet 1). Diets 2 to 6 had (SBM) protein with various levels of krill meal (0.0, 1.5, 3.0, 4.5, and 6.0%, diets 2–6 respectively). Test diets were fed to satiation to triplicate groups of Nile tilapia four times daily for 20 wk. Fish fed krill meal supplemented diets had significantly ( $P < 0.05$ ) better growth performance compared with fish fed the unsupplemented and FM control diets. The krill meal increased growth of Nile tilapia by 31.9% compared to control diets (average final wet weight,  $14.15 \pm 0.95$  g and  $10.72 \pm 0.2$  g, respectively). Moreover, weight gains were not significantly different for fish fed diets with different levels of krill meal. Feed utilization parameters such as feed intake, feed conversion ratio, protein efficiency ratio differed significantly for fish fed krill meal diets compared with control. Digestibility of nutrient and energy of diets increased with increasing levels of krill meal. The incorporation of krill meal in diets significantly affected the protein, fat, ash, and energy of whole body composition. These results suggest that supplementation of krill meal at 1.5% in the diets of Nile tilapia as attractant or stimulant may lead to increased feed intake, growth performance, and feed utilization. Soybean meal can completely replace fishmeal in diets for juvenile tilapia.

Nile tilapia *Oreochromis niloticus* is a species of commercial importance to culture in Egypt. To achieve optimal production of fish in intensive aquaculture it is necessary to understand the factors affecting fish appetite. Extensive studies have led to improvements in nutritional quality of commercial feeds, but feeds will not be utilized if palatability is poor (Toften et al. 1995). A key factor in weaning fish fry to dry diets is the attractability of food. Food attractability and stimulation of ingestion involve stimuli, such as "smell" and "taste" of food particles (Kolkovski et al. 1997a, 2000). Mackie and Mitchell (1985) stated that chemical stimuli initiate search movement for food particle identification, and subsequent feeding. Tasting and feed intake involve taste buds that are chemically stimulated (Sorensen and Caprio 1997). These stimuli are extremely important in fish larvae and juveniles because the visual sense

may not yet be fully developed and chemical sensors are the main ones used in food search (Dempsey 1978; Iwai 1980).

Feed attractants have been characterized and isolated from different marine organisms such as squid, marine worms, mussel *Mytilus edulis*, clam, krill and brine shrimp *Artemia sp.* (Tandler et al. 1982; Mackie and Mitchell 1985; Mearns et al. 1987; Hara 1993; Kolkovski et al. 1997b). These food attractants can play an important role in acceptance of dry diets in fish during the weaning period as well as enhancing growth due to higher consumption (Kolkovski et al. 1997b). One possible application of feeding stimulants may be to mask different feeding deterrents that lower the palatability of diets. It would be of interest to test the influence of using different levels of krill meal supplemented to whole plant protein diets as attractant or stimulant of juvenile Nile tilapia.