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# Dietary potassium diformate improves growth performance of male Nile tilapia

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## Fish fed KDF diet grew significantly faster than control group

Despite strong progress in tilapia nutrition and feed formulation as production intensity rose during the last 20 years, disease outbreaks in tilapia ponds often led to farming setbacks and increased use of antibiotics. However, growing awareness in consumers and aquaculture producers has resulted in a demand for responsible aquaculture practices that include less use of antibiotics.

Regulatory authorities in most exporting countries now focus on the misuse of antibiotics in aquaculture. As a result, many feed additives to replace antibiotics – which have been EU-banned in animal feeds in the European Union since 2006 – have been tested. Products including plant extracts, prebiotics, probiotics and organic acids or their salts have been evaluated as alternatives to antibiotics, but results have been inconsistent.

Some of the more promising additives are found in the group of organic acids and their salts. This was partly confirmed in a recent study, which showed the most consistent results in fish that received



Tilapia fed a diet supplemented with potassium diformate over 74 days had greater growth than fish fed a control diet without the compound.

dietary citric acid, formic acid and their respective salts. In further study by the authors, the effects of supplementation of formic acid in the form of its potassium double-salt on the production parameters of Nile tilapia (*Oreochromis niloticus*) were determined.

## Feeding trial

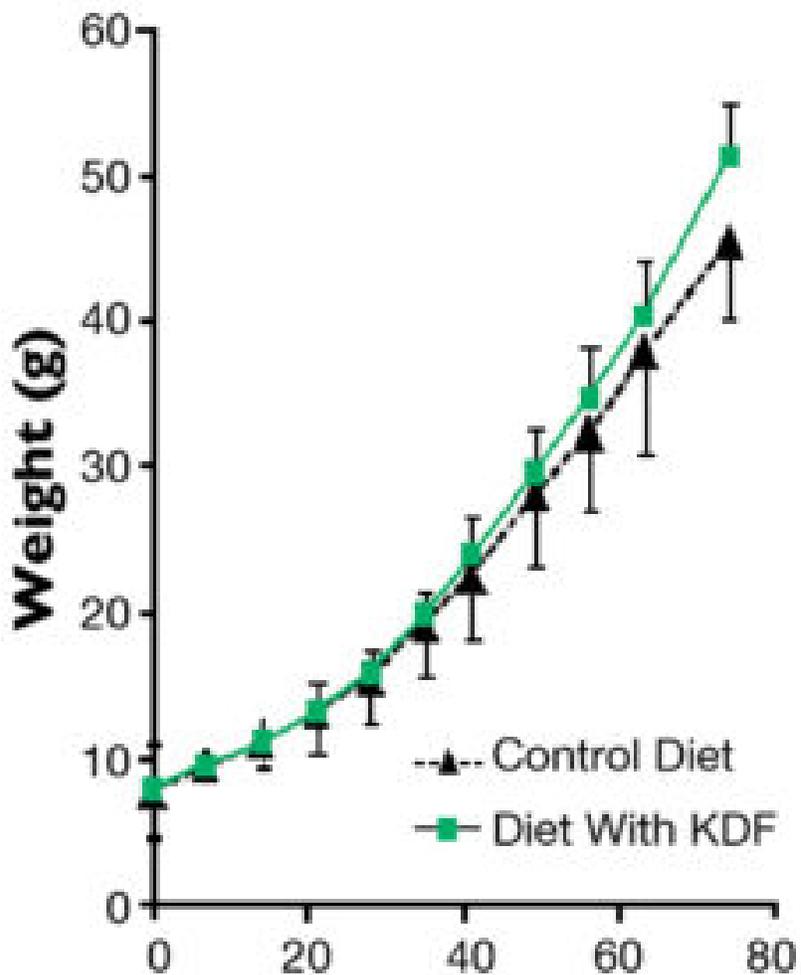


Fig. 1: Growth of Nile tilapia fed control and KDF-supplemented diets.

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The feeding trial was conducted at the facilities of the Binangonan Freshwater Station of the Aquaculture Department of the Southeast Asian Fisheries Development Center in Rizal, Philippines. Twenty-five male Nile tilapia with individual mean weights of  $7.84 \pm 0.90$  grams were stocked in each of eight 240-L polyethylene tanks in a static-renewal system. The fish in four tanks were given commercially formulated feed, and the rest received commercial diets supplemented with 0.3 percent potassium diformate (KDF).

The commercial feed pellets were finely ground and sieved. For the test diet, 0.3 percent KDF was incorporated into the ground feed, mixed well, repelletized and dried. The proximate composition of the commercial feed was 31.4 percent crude protein, 6.9 percent crude fat, 8.6 percent crude fiber, 52.3 percent nitrogen-free extract, 0.8 percent ash and 2.4 percent moisture. The fish in both treatments were given feed three times a day with a daily ration equivalent to 5 percent of their body weights.

Eighty percent of the water was changed every three days one hour after the morning ration was dispensed. Water quality parameters such as dissolved oxygen, temperature, pH and ammonia were monitored prior to water replacement. The experimental run lasted 74 days.

## Results

Water quality parameters were within the acceptable range for Nile tilapia growth for the KDF trial. Mean dissolved oxygen was  $6.3 \pm 1.5$  mg/L, temperature was  $26.7 \pm 0.8$  degrees C, pH was  $6.8 \pm 1.3$  and ammonia was under 0.02 mg /L.

As shown in Fig. 1, tilapia fed the KDF diet grew significantly more than fish in the control group. At  $51.40 \pm 2.23$  grams, the mean weight achieved on the final day of the experiment by tilapia given the KDF supplement was significantly higher than the  $45.45 \pm 1.12$  grams for those given the control feed. Specific growth rate was also significantly better for the tilapia fed the KDF-supplemented diet (Table 1).

## Lückstädt, Production parameters of Nile tilapia, Table 1

| Parameter             | Control Diet         | Diet With KDF        |
|-----------------------|----------------------|----------------------|
| Initial weight (g)    | $7.84 \pm 0.89$      | $7.84 \pm 0.89$      |
| Final weight (g)      | $45.45 \pm 1.12^b$   | $51.40 \pm 2.23^a$   |
| Weight increase (%)   | $479.76 \pm 14.29^b$ | $555.66 \pm 28.52^a$ |
| Survival (%)          | $99.0 \pm 2.0$       | $99.0 \pm 2.0$       |
| Daily growth rate (g) | $0.508 \pm 0.015^b$  | $0.589 \pm 0.030^a$  |
| Specific growth rate  | $2.38 \pm 0.03^b$    | $2.54 \pm 0.06^a$    |
| Feed-conversion ratio | $1.97 \pm 0.07^a$    | $1.81 \pm 0.09^b$    |

Row means with different superscripts are significantly different ( $P < 0.05$ ).

Table 1. Production parameters of Nile tilapia fed control and KDF-supplemented diets.

The daily growth rate for the KDF tilapia was  $0.589 \pm 0.030$  grams, compared to  $0.508 \pm 0.015$  grams for the control at day 74. No difference in survival of the fish in both treatments was observed. The final feed-conversion ratio (FCR) significantly improved for the tilapia fed the KDF diet. Their FCR was  $1.81 \pm 0.09$  compared to  $1.97 \pm 0.07$  for the control group.

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