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EFFECT OF DIETARY POTASSIUM DIFORMATE ON THE GROWTH AND DIGESTIBILITY OF ATLANTIC SALMON (*Salmo salar*)

Introduction

The preservation of fish and fishmeal with potassium diformate (KDF) is practised in Norway and is gaining popularity elsewhere. Studies using potassium diformate in piglets and in tropical fish species have shown improved growth and digestibility. However, data from temperate aquaculture are still missing. The objective of the present study was therefore to investigate the effect of KDF, added at various points in the feed production process, on growth and digestibility in Atlantic salmon (*Salmo salar*).

Material and methods

The trial was carried out at AKVAFORSK research station in Norway. 216 Atlantic salmon, with a mean weight of 650g were randomly allocated to 9 fibreglass tanks (1 m³), with 24 fish in each tank. The tanks were supplied with sea water (31-35‰) for a total experimental period of 80 days. Fish were fed one of three different experimental diets *ad libitum*, at 15 minute intervals, 24 hours per day. Two of the diets contained 1.35% KDF, added at different stages of the feed production process (diet 1: KDF added to the raw fish prior to fish meal production; diet 2: KDF added during diet mixing prior to extrusion), while the third diet contained no KDF. The total biomass and the number of fish in each tank were determined regularly, while the apparent digestibility of nutrients was calculated at the end of the trial with the aid of the inert marker yttrium oxide. Data were subjected to statistical analysis and a significance level of 0.05 was used in all tests.



Fig. 1 Salmon farm on the Atlantic coast

Results and conclusions

The fish performed very well during the trial and there was no mortality during the experimental period. The inclusion of potassium diformate (KDF) had no effect on the pH in the gastro-intestinal tract of the fish; however Atlantic salmon fed the diets containing KDF added to the raw material had a significantly increased body weight (1303g compared to 1180g and 1219g in diet 2 and the negative control, respectively). The SGR of the fish fed diet 1 was also significantly increased compared to the other diets. Furthermore, both diets treated with KDF had a significantly better digestibility of protein, dry matter and gross energy (Table 1).

Table 1: Effects of potassium diformate KDF on growth and digestibility in Atlantic salmon (*Salmo salar*) (P<0.05)

	Final weight [g]	SGR [%]	Protein Digestibility [%]	Energy Digestibility [%]
Negative Control	1219 ^b	0.78 ^b	90.1 ^b	88.5 ^b
Diet 1 with KDF	1303 ^a	0.87 ^a	91.1 ^a	89.8 ^a
Diet 2 with KDF	1180 ^b	0.75 ^b	91.0 ^a	89.5 ^a

Based on these results, it can be concluded that applying potassium diformate to fish raw materials prior to fish meal production can have a beneficial impact on performance and digestibility in farmed Atlantic salmon. Further studies are needed to validate the results achieved under Norwegian conditions in order to clearly identify its role in metabolism.