

USE OF **SUGAREX AQUA** TO MITIGATE NEGATIVE IMPACTS OF LOW-PALATABILITY AND MEDICATED FEEDS IN ATLANTIC SALMON (*Salmo salar*)

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INTRODUCTION

Neohesperidin dihydrochalcone (NHDC) is a flavanone derivative from bitter orange (*Citrus aurantium*), which is known for its intense sweetness - up to 1,800 times sweeter than sucrose. The use of Sugarex AQUA, a proprietary formulation with enhanced solubility and sensory properties containing NHDC as its active ingredient, was investigated in an eight-week trial, for its potential to mitigate the negative effects of low-palatability and medicated diets in Atlantic salmon (*Salmo salar*).

MATERIALS AND METHODS

The trial was conducted at AquaBioTech Group’s research facility, ABT Innovia, in 30 x 500l units stocked with 30 x 162g Atlantic salmon. Six treatments were fed to satiation three times a day in quintuplicate: CD, CDS - control diet with or without Sugarex AQUA (600 mg/kg feed); LP, LPS - low-palatability diet with or without Sugarex AQUA (600 mg/kg feed); LP, LPS - low-palatability diet with or without Sugarex AQUA (600 mg/kg feed); TM, TMS - diets identical to CD and CDS except in the second two-week period during which oxytetracycline was added (75 mg/kg biomass).

RESULTS

Results for growth performance and observed feeding behavior varied between treatments, as shown in **Tables 1** and **2** respectively. Differences in these parameters were most pronounced between treatments LP and LPS and between TM and TMS, with significant differences being observed.

Table 1. Growth performance (mean + SD) of fish fed the different treatments during 8 weeks of trial. Statistical analysis tested (t-test/Mann-Whitney) differences between similar diets, CD vs CDS, LP vs LPS and TM vs TMS. Means within a row with different superscripts are significantly different (p < 0.05).

Diet	CD	CDS	LP	LPS	TM	TMS
SGR (%/day)	0.49 ± 0.07	0.53 ± 0.04	0.33 ± 0.05	0.40 ± 0.07	0.39 ± 0.04 ^a	0.53 ± 0.09 ^b
SFR (%/day)	0.79 ± 0.05	0.80 ± 0.04	0.69 ± 0.03 ^a	0.76 ± 0.05 ^b	0.69 ± 0.03 ^a	0.78 ± 0.05 ^b
FCR	1.40 ± 0.14	1.35 ± 0.05	1.81 ± 0.23	1.70 ± 0.22	1.52 ± 0.16	1.34 ± 0.14
% Survival	100.00 ± 0.00	98.67 ± 1.83	100.00 ± 0.00	99.33 ± 1.49	100.00 ± 0.00	98.00 ± 1.83

SGR (Specific Growth Rate); SFR (Specific Feeding Rate); FCR (Feed Conversion Ratio).

Table 2. Feeding behaviour (mean + SD) of fish fed the different treatments during 8 weeks of trial. Statistical analysis tested (t-test/Mann-Whitney) differences between similar diets, CD vs CDS, LP vs LPS and TM vs TMS. Means within a row with different superscripts are significantly different (p < 0.05).

Diet	CD	CDS	LP	LPS	TM	TMS
1 st feeding	3.54 ± 0.14	3.45 ± 0.10	2.86 ± 0.18 ^a	3.30 ± 0.14 ^b	3.33 ± 0.34	3.46 ± 0.22
2 nd feeding	3.83 ± 0.07	3.80 ± 0.12	3.30 ± 0.15 ^a	3.49 ± 0.11 ^b	3.58 ± 0.22	3.74 ± 0.14
3 rd feeding	3.83 ± 0.04	3.71 ± 0.13	3.26 ± 0.14 ^a	3.51 ± 0.06 ^b	3.63 ± 0.18	3.75 ± 0.11
Whole day	3.73 ± 0.05	3.65 ± 0.10	3.14 ± 0.14 ^a	3.43 ± 0.08 ^b	3.51 ± 0.23	3.65 ± 0.14

CONCLUSIONS

Sugarex AQUA had a clear positive effect on feeding behaviour, feed intake and overall performance when included in the low-palatability (LP) diet. The greatest impact was observed in period 1 and 2, diminishing over time, likely due to habituation to the taste of the low-palatability formulation.

The results related to Sugarex AQUA use alongside antibiotics were also notable. No significant differences were observed in period 1. However, when antibiotics were introduced in period 2, feed intake and SGR significantly increased in the supplemented group. Significant differences in feed intake and performance persisted throughout period 3 and 4 (no antibiotics), implying some other impact of antibiotic use, possibly related to changes in gut microbiota.

The results seen here have demonstrated that Sugarex AQUA can help maintain feed intake and performance when feed formulations are changed and can counteract reduction in feed intake associated with antibiotic treatments.