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Test of AquaTrac® sol SD Feed Support in Rainbow Trout

By Yusuf Güner, Hasmet Cagiron, Volker Kizak, Hülya Saygi and Franz-Peter Rebafka

Abstract

Trials with rainbow trout *(Oncorhynchus mykiss)* have been conducted in concrete ponds at the Eger University, Turkey. Average body weight after 8 weeks feeding and biomass gain was best and significant different with 2% inclusion of AquaTrac sol SD (T1). However, FCR was best with 10% AquaTrac sol SD. It can be concluded that AquaTrac sol SD is suitable to replace fishmeal in rainbow trout.

1. Materials and Methods

Concrete Ponds

Two concrete ponds were segmented to 6 x 1.0 x 1.0 m 12 equal piece experimental groups and feeding regime of rainbow trouts were supplied from Nif Natural and Environmental Sources of Aquaculture Commercial facility.

The supplied trouts were stocked in the same place. The water quality parameters were monitored in different periods (water temperature, oxygen measured daily; pH per three day, ammonia per week).

Experimental Trouts and Feeding Regime

The rainbow trouts (*Oncorhynchus mykiss*) were 100g initial average weight. The trouts were examined for the infestation of bacteria parasites agents and viruses to ensure the absence of all pathogenic.

Trouts in groups of 2 x 3 were stocked in concrete ponds for all three experimental groups of three replicates (total 60 x 3 experimental, 60 x 1 control group).

The sub groups were stocked in ponds of 1.0 x 1.0 x 0.7m. The trials in which AquaTrac sol SD (treatment T) were used for 8 weeks. The experimental feeds supplemented of with AquaTrac sol SD were prepared by Cagatay Feed Company, Turkey.

A practical feed including 30% of fish meal served as control treatment (T). AquaTrac sol SD was added at the expense of fish meal at absolute levels of 2% (T1), 5% (T2) and 10% (T3). All treatments were applied in three replications (a,b,c). The seven parameters of main feed were analysed according to AOAC (1995) protocols as fat, ash, phosphorus, calcium, moisture, nitrogen, protein **(Table 1).**

Table 1: Proximate analysis of parameters of experimental feed (rate on dry matter %)

Experimental Group	Moisture (%)	Crude protein (%)	Crude Fat (%)	Crude Ash (%)	Ca (%)	P (%)	N (%)
Control	7.61^{d}	43.34^{b}	19.49^{b}	9.82^{c}	1.04^{a}	1.97^{a}	8.19^{a}
T1	7.85^{c}	43.40^{b}	19.15^{a}	9.75^{c}	1.02^{b}	2.00^{b}	8.30^{b}
T2	8.38^{b}	42.75^{a}	20.53^{c}	9.34^{b}	1.00^{b}	1.90^{b}	8.10^{b}
T3	8.82^{a}	44.21^{c}	21.14^{d}	8.42^{a}	0.98^{c}	1.83^{c}	8.30^{c}

Means within each column not sharing a common superscript are significantly different (p<0.05)

The feeds were given twice a day at 09:00 a.m. and 03:00 p.m. to each group. Feed consumption of trout was determined daily.

Weight measurement was done every two weeks by sampling 100% of trout of each pond segment.

At the termination period, all trout in each pond segment were weighed. The determination of weight gain was based on the total biomass.

The calculations were made for feed consumption (g/trout), average daily gain (ADG) and feed conversion ratio (FCR). 30 trout at the beginning and 5 trout at the end of the experimental period of each treatment were sampled for protein analysis to further calculation of protein efficiency ratio (PER) and apparent net protein utilization (ANPU).

The SPSS package was employed in the statistical analyses for all parameters.

2. Results

Water quality

The trial was carried out under stable ambient conditions for the entire trial period, mean pH level of 7.65 ± 0.18 and dissolved oxygen at 8.46 ppm ± 0.25.

At the same time water temperature was maintained at 12.6°C ± 0.34 **(Table 2)**. 60 healthy looking fishes were sampled randomly for the examination at virosses (IPN; VHS; IHN) bacteria (BKD,ERM) and parasites. The differences between the groups were statistically non-significant at 5.0% level.

Table 2: Average water quality parameters recorded during the trial period of 60 days

Experimental Group	pH (n=20)	Temperature (n=60) (°c)	Dissolved Oxygen (n=60) (ppm)	Ammonia (n=8) (ppm)
Control	7.65 ± 0.18	12.60 ± 0.38	8.46 ± 0.25	20.33 ± 6.88
T1	7.65 ± 0.19	12.60 ± 0.34	8.48 ± 0.21	19.50 ± 4.76
T2	7.69 ± 0.18	12.60 ± 0.34	8.48 ± 0.23	20.87 ± 6.93
T3	7.68 ± 0.17	12.60 ± 0.34	8.53 ± 0.26	18.71 ± 5.38

Mean ±: Standard deviation of three replications

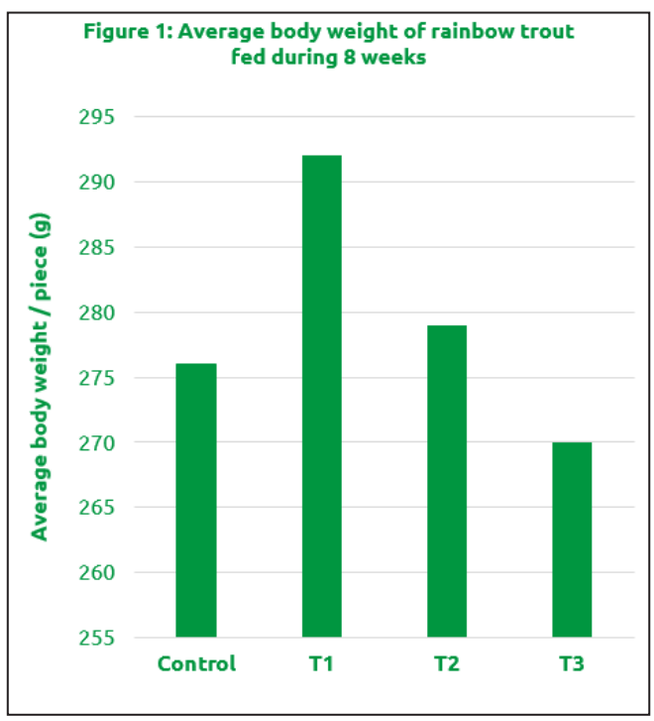
Growth Performance

- Average body weight

The initial body weight of rainbow trout were 99.3 – 100.4 g. After 8 weeks feeding period, average body weight in T to T3 ranged from 274.4-290.5 g.

Only T1 treatment was found significantly different from both T control and other experimental groups (p<0.05) **(Figure 1)**.

Figure 1: Average body weight of rainbow trout fed during 8 weeks



Average daily gain (ADG), Biomass gain

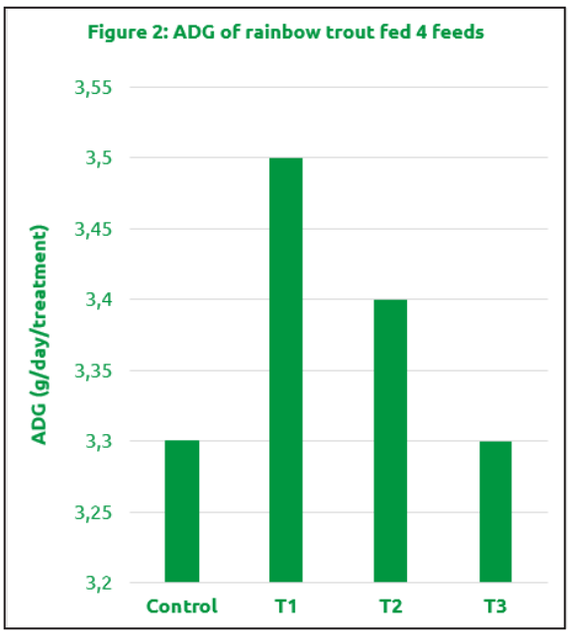
No significant difference was discovered for ADG between T1, T2, T3 and Control (p<0.02) **(Table 3, Figure 2).**

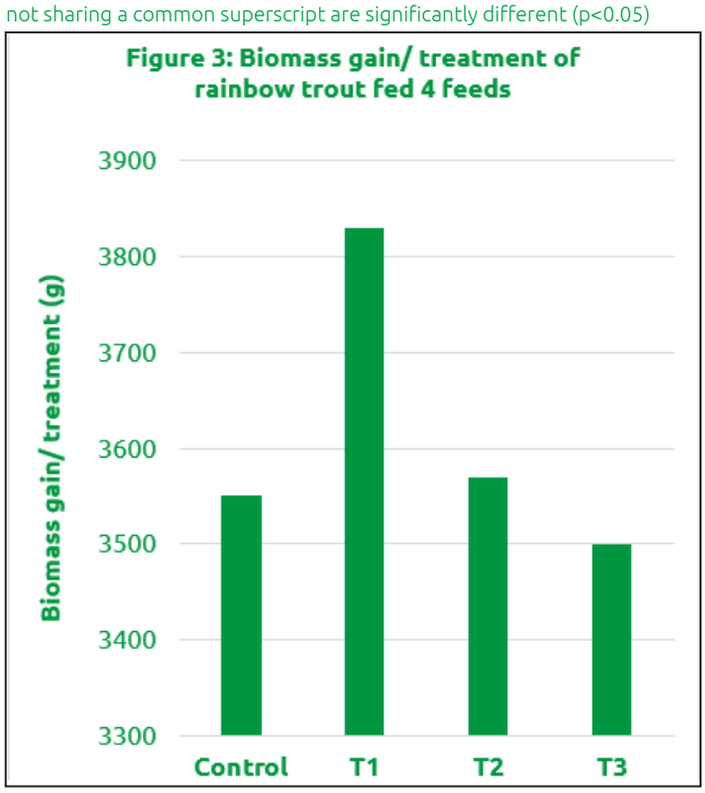
Again, biomass gain per treatment were higher in T1 than control, T2, T3 (p<0.05) **(Table 3, Figure 3).**

Table 3: Average daily gain (ADG), Biomass gain / treatment of rainbow trout fed 4 feeds

Experimental Group	ADG (g/d/group)	Biomass Gain (g/group)
Control	3.118 ± 1.081	3522.00 ± 19.97[a]
T1	3.355 ± 1.360	3803.33 ± 53.61[b]
T2	3.140 ± 1.020	3559.00 ± 49.27[a]
T3	3.086 ± 1.299	1495.00 ± 56.45[c]

Mean +/- standard deviation of three replications, means with each column not sharing a common superscript are significantly different (p<0.05)





The survival rate was 100% and no mortality was observed during treatments. Chemical composition parameters for all treatment groups were similar.

Feed efficiency

Feed conversion ratio (FCR) ranged between 0.90-0.99 between the treatments.

Although there were no significant difference noticed among treatments (p> 0.05) there was a trend observed for lower FCR from T1 to T3 **(Table 4, Figure 4).**

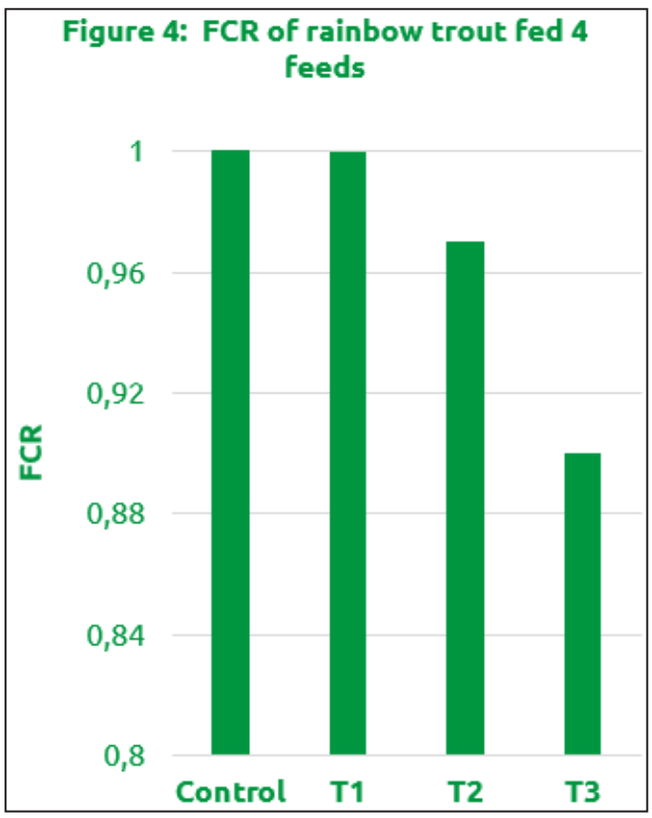
Specific growth rate (SGR) seems to be better in T1 compared to the control, T2 and T3 **(Table 4, Figure 5)**.

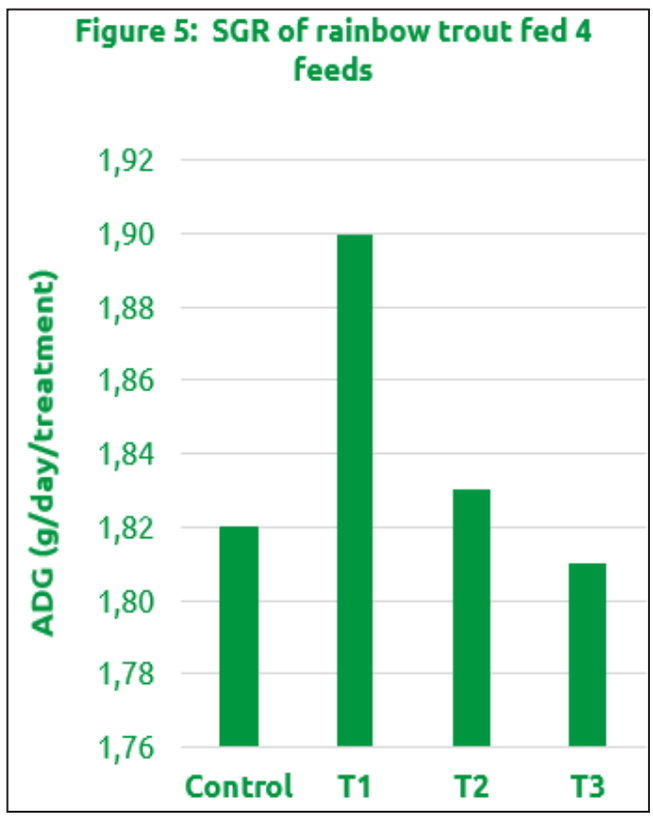
Protein efficiency ratio (PER), apparent net protein utilization (ANPU) and speediness of feed intake did not shown any significant difference **(Table 4).**

Table 4: FCR, SGR, PER, ANPU and Speediness of feed intake (min)

Experimental Group	FCR	SGR	PER	ANPU (%)	Speediness of feed intake (min)
Control	0.99 ± 0.028	1.82 ± 0.004	0.23 ± 0.01	36.40 ± 1.05[ab]	5.48 ± 2.67
T1	0.99 ± 0.0027	1.89 ± 0.018	0.23 ± 0.01	33.63 ± 0.94[a]	2.56 ± 2.81
T2	0.96 ± 0.0020	1.82 ±0.016	0.24 ± 0.005	41.20 ± 0.87[c]	5.45 ± 2.77
T3	0.90 ± 0.0067	1.81 ± 0.020	0.25 ± 0.00	39.23 ± 3.00[bc]	5.68 ± 2.82

Mean +/-standard deviation of three replications / Mean not sharing a common superscript are significantly different (p<0.05)





Authors Address:

a) Assistant Professor Dr.Yusuf Güner, Professor Dr. Hasmet Cagirgan, Assistant Volkan Kizak, Teaching Assistant Hülya Saygi
Ege University
Izmir
Turkey

b) Franz-Peter Rebafka,
GEPRO Geflügel-Protein Vertriebsgesellschaft mbH & Co.KG
Im Moore 1
49356 Diepholz
Germany