

The Effect of Some Phytoadditives on Growth Performances and Blood Indices in Rainbow Trout (*Oncorhynchus mykiss* W.)

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Abstract. As new species of drugs-resistant pathogens arise, the search for alternatives to antibiotics and other chemically synthesized compounds has begun, and one of the major contestants are plants or plants extracts, known generally as phytoadditives. They represent a new class of fodder additives and the knowledge regarding their use or effects are scarce. The aim of this research was to determine the effects of different phytoadditive combinations (garlic + ginger; oregano + Echinacea) on growth performances, and blood indices of rainbow trout (*Oncorhynchus mykiss* W.).

Keywords: rainbow trout, phytoadditives, health, growth, blood indices

Introduction. As new species of drugs-resistant pathogens arise, the search for alternatives to antibiotics and other chemically synthesized compounds has begun, and one of the major contestants are plants or plants extracts, known generally as phytoadditives. They represent a new class of fodder additives and the knowledge regarding their use or effects are scarce. The main advantage of their use is that they are natural substances and don't pose any threat to animals or humans, their effect being positive (Kroismayr, 2007; Cardozo *et al.*, 2008). Still, more research is needed in order to understand their full effects and their mode of action.

Aims and Objectives. The aim of this research was to determine the effects of different phytoadditive combinations (garlic + ginger; oregano + *Echinacea*) on growth performances, and blood indices of rainbow trout (*Oncorhynchus mykiss* W.).

Materials and Methods. The research has been carried out in the ICAS farm from Gilău, Cluj County on a total number of 600 rainbow trout (*Oncorhynchus mykiss*) distributed in 3 groups (one control group and 2 experimental groups) consisting of 200 fish/group, with a mean initial weight of 91.90g. The fish were reared in concrete tanks (L/W/H=4/1/1.5), in the same rearing conditions. The experimental period was 95 days (25.06.2010–27.09.2010). The fodder used was purchased from Skretting (41% crude protein, 12% crude fat, 7.8% ash) and was supplemented with the additive combinations as follows: control group – base diet, group 1E –garlic (2%) + ginger (1%) and group 2E –oregano (1%) + *Echinacea* (0.5%). During the experimental period the body weight evolution, the weight gain, the growth rate, the feed conversion ratio (FCR) and the survival rate were monitored. At the end of the experimental period, losses, PCV, hemoglobin concentration, erythrocyte count, MCV, MCH, MCHC, serum GPx, ALT, AST, serum total protein and serum total lipids were determined.

Results and Discussions. The data presented in Tables 1, 2 and 3 indicates the positive effects of the phytoadditives used. The highest weight gain, SGR and the best FCR were recorded in the experimental groups; also the survival rates were improved by the use of phytoadditives. The main blood indices indicated a possible state of anemia, due an aging of the erythrocyte population in the blood from the experimental fish.

The blood chemical parameters indicate a state of bio-stimulation, the high value of GPx recorded in the experimental groups indicating a good Selenium status but also a good anti-oxidant capacity of the organisms.

Tab. 1

Growth and consumption indices and survival rate in rainbow trout

Characters	M	L1E	L2E
Initial weight	91.90	91.90	91.90
Weight gain (g)	227.1	247.08	232.08
Specific growth rate (g/day)	2.39	2.60	2.44
FCR	1.518	1.455	1.472
Survival (%)	86.5	92.5	87.5

Tab. 2

Main blood parameters in rainbow trout

Parameters	M	L1E	L2E
Hematocrit (%)	45.00 ± 2.24	40.42 ± 2.42	32.28 ± 1.25
Hemoglobin (g/dL)	10.57 ± 0.64	9.84 ± 0.51	8.61 ± 0.58
Erythrocyte (x10 ¹²)	1.19 ± 0.03	0.98 ± 0.08	0.84 ± 0.03
MCV (fL)	377.63 ± 3.89	367.81 ± 17.14	372.05 ± 12.72
MCH (pg)	88.65 ± 3.46	88.88 ± 4.69	96.27 ± 3.34
MCHC (g/dL)	23.43 ± 0.79	24.38 ± 0.25	26.84 ± 2.12

Means with the same letter in the same row were not statistically different (p<0.05)

Tab. 3

Main biochemical parameters of blood in rainbow trout

Parameters	M	L1E	L2E
GPx (U/ml HCT)	14.42 ± 2.02	15.42 ± 0.35	15.09 ± 0.97
ALT (U/L)	4.97 ± 0.99	5.85 ± 1.07	4.96 ± 1.74
AST (U/L)	277.4 ± 24.74	273.67 ± 21.57	335 ± 49.99
Total protein (g/dL)	2.82 ± 0.14	4.26 ± 0.67	4.1 ± 0.40
Total lipids (mg/dL)	1391.80 ± 70.47	1738.93 ± 95.01	1897.80 ± 86.79

Means with the same letter in the same row were not statistically different (p<0.05)

Conclusion. The combined use of phytoadditives had a positive effect on both the growth/production indices and also on the survival rate. Although the blood parameters indicated an aging of the erythrocyte population, the biochemical parameters indicated a state of bio-stimulation, a good anti-oxidant status and also a good Selenium status in the experimental fishes.

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