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The Effect of Some Phytoadditives on Growth Performances and Blood Parameters in Common Carp (*Cyprinus carpio* L.) Juveniles

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Abstract. Plants have been used for millennia by humans and animals alike, but only recent the attention has been focused on them as substitutes for chemically synthesized drugs. The aim of this research was to determine the effects of different combinations of phytoadditives (garlic + ginger; oregano + Echinacea) on growth performances, and blood indices of common carp (*Cyprinus carpio L.*) juveniles.

Keywords. common carp, phytoadditives, health, growth, blood indices

Introduction. Plants have been used for millennia by humans and animals alike, but only recent the attention has been focused on them as substitutes for chemically synthesized drugs. Although extensive researches had been carried out on the multitude of plants used, their mode of action is still not fully understood, more research being needed to unlock their secrets, their effects being generally positive (Block, 1992; Kroismayr, 2007; Kyo *et al.*, 1998)

Aims and Objectives. The aim of this research was to determine the effects of different combinations of phytoadditives (garlic + ginger; oregano + *Echinacea*) on growth performances, and blood indices of common carp (*Cyprinus carpio L.*) juveniles.

Materials and Methods. Research has been carried out on a number of 90 common carp (*Cyprinus carpio*) juveniles reared in a recirculating system. The fish (initial body weight of 32.19±0.05g) have been randomly assigned into 3 groups –a control group and 2 experimental groups (each group consisting of 30 fish). The experimental period was 93 days (27 July 2011–27 November 2011). The phytoadditives (garlic, ginger, oregano and *Echinacea*) were purchased from the local market, dried and grounded and were incorporated in the fodder as follows: control group –base diet without phytoadditives; group 1E –base fodder supplemented with 2% garlic and 1% ginger and group 3 –base diet supplemented with 1% oregano and 0.5% *Echinacea*. During the experiment and at the end of the experimental period body weight gain, specific growth rate, FCR, losses, PCV, hemoglobin concentration, erythrocyte count, MCV, MCH, MCHC, serum GPx, ALT, AST, serum total protein and serum cholesterol concentrations were determined.

Results and Discussions. The data presented in Tables 1, 2 and 3 indicate the positive effects of the used phytoadditives. The production indices were improved by the use of phytoadditives (Tab. 1). The survival rate was due to the use of the recirculating system that ensured the optimal rearing conditions. The main blood indices indicated a milt case of anemia in the experimental groups, possibly due a problem in hematopoesis (Tab. 2).

The main blood indices indicated a state of bio-stimulation (Tab. 3) as seen in the increase of the total protein and cholesterol concentration. The high value of GPx indicated a

good Selenium status and also a good anti-oxidant status. The values of ALT and AST indicate a possible liver/pancreas condition in the experimental groups.

Tab. 1

Growth and consumption indices and survival rate in common carp juveniles

Specific characters	M	L1E Garlic+Ginger	L2E Oregano+*Echinacea*
Initial weight	32.19 ± 0.05	32.19 ± 0.05	32.19 ± 0.05
Weight gain (g)	16.11	30.26	21.71
Specific growth rate (g/day)	0.173	0.325	0.233
FCR	2.2	2.04	2.16
Survival (%)	100	100	100

Tab. 2

Main blood parameters in common carp juveniles

Parameters	M	L1E Garlic+Ginger	L2E Oregano+*Echinacea*
Hematocrit (%)	32.25 ± 0.65a	30.25 ± 0.52ab	28.57 ± 0.64b
Hemoglobin (g/dL)	6.40 ± 0.12a	5.78 ± 0.19ab	5.26 ± 0.29b
Erythrocyte ($x10^{12}$)	1.27 ± 0.02a	1.16 ± 0.01b	1.05 ± 0.01c
MCV (fL)	274.23 ± 2.14a	266.58 ± 1.78b	269.32 ± 2.13ab
MCH (pg)	53.21 ± 0.39	54.26 ± 0.93	55.69 ± 0.60
MCHC (g/dL)	20.24 ± 0.37a	21.64 ± 0.81a	23.75 ± 0.28b

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

Tab. 3

Main biochemical parameters of blood in common carp juveniles

Parameters	M	L1E Garlic+Ginger	L2E Oregano+*Echinacea*
GPx (U/ml HCT)	76.1 ± 1.53	84.34 ±0.73	81.09 ± 0.62
ALT (U/L)	27.4 ± 0.45a	48.35 ± 0.76b	27.34 ± 0.55a
AST (U/L)	97.1 ± 0.69a	96.9 ± 0.81a	118.7 ± 0.76b
Total protein (g/dL)	4.23 ± 0.08	4.58 ± 0.13	4.46 ± 0.06
Cholesterol (mg/dL)	129.35 ± 0.47a	131.68 ± 0.28b	151.62 ± 0.59c

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 growth and production indices. Although the blood parameters indicated a mild anemia, the biochemical parameters indicated a state of bio-stimulation and a good anti-oxidant status.

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