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RESEARCH ARTICLE

STUDY OF THE EFFECT OF ADDING GINSENG PLANT ROOTS TO FEED SMALL COMMON *CARP CYPRINUSCARPIO* L.

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ABSTRACT

Powder of Ginseng root, type Panax ginseng has been used in three experimental fodders with three concentrations which were as follows: G1: 100mg/1kg, G2: 200mg/1kg, G3: 300mg/1kg of carp fish fodder. Results have shown equation of the first treatment with the ginseng free control group regarding average of weight and total length of fish. The treatments G2 and G3 overweigh the control treatment. The treatment G3, 300mg ginseng/1kg fodder overweigh the other treatments including the control one as it have has a high value. No significant concerning micronuclei number in red blood cells is noticed among fish treatment of this experiment. The aim of the present study is to find fodder additives or natural motives which promote fish growth and to shorten the production period which, in its best condition, is not less than one year in Iraq and to secure the sanity of the flesh of these fish for the consumer.

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INTRODUCTION

Ginseng plant is a well known one among the plants which are used in numerous medical nutrition fields. Moreover, it is an important nutritional complementary depending on its species. Generally, ginseng is classified as referring to Araliaceae family, Apiales order. It is a dicotyledonous plant. Its many species have various medical and nutritional functions the effects of which vary according to the body topology whether being used for human or animal. It is also used as growth stimulus and immunity factor in some animals, including man (Jang *et al.,* 2008). This plant roots are the most important part from which materials are extracted to be used as growth stimulus or immunity enhancing material, or materials with direct effect on the central nervous system. In addition, they may raise sex abilities in human and animal (CHM, 2004). Man exerts his efforts to increase animal production as the demand for animal-source protein increases due to the increase of earth population. Therefore, man resorts to find out nutritional alternatives and growth stimuli which are safe for consumers. In addition, these fodder additions are available. The important point is the natural source of these additions. Producers return back now to nature in order to enhance, push and increase animal growth to avoid the perils result from the use of antibiotics, hormones and the other growth stimuli which threaten public health (Fuller, 1998) and (Go´ngora, 1998), such as, the use of vitamins, bio-enhancers, probiotic, medical odorous plant, lipoid acids, etc of the organic materials which stimulate animal growth directly by accelerating muscular growth of the animal body, or indirectly, through hormone stimulation of the animal gland which are responsible to push the growth and increase animal production (Krauthammer and Kullen, 1999) and (Finley *et al.,* 2005). Both (Xiang and Zhou, 2000) and (Lin *et al*., 2006) mentioned that there is an ancient Chinese medical mixture prescription composed mainly of plants, including ginseng and other essential oil plants, regarded as one of the best growth promoters. It rises up the animal apatite by its smell and increases its metabolism and its maximum use of the food stuff. Moreover, it enhances the performance of the animal immune system, particularly as this mixture prescription had been adopted to feed aqua-organisms, including fish particularly. Ginseng plant roots have many advantages regarded important in increasing fish production. They help organizing body physiology; develop ability for adaptation and acclimatization and building muscles. Moreover it helps boots ability for endurance and competes (Francis *et al.,* 2002c). In an Egyptian study on the use of ginseng in feeding Nile tilapia fish, results show excellent weight increase of the fish in addition to enhance blood immunity characteristics; nutrient performance, and fish embarking upon the fodder given to

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them (Francis and Goda, 2008). The hematological parameters are important toevaluate the health condition and physiological status of fish (Blaxhall, 1972; Hrubec *et al.,* 2000) they are related to the response of the fish to its environment (Gabriel *et al.,* 2004). The erythrocyte micronuclei test has been used with different fish species as a marker to identify integrated response to the complex mixture of aquatic pollutants, it is an index of accumulated genetic damage during the life span of the cells (Bolognesiand Hayashi, 2011; DeFlora *et al.,*1993).

MATERIALS AND METHODOLOGY

100 common carp fish distributed among 4 treatments, i.e., 25 fish for each treatment of initial average weight of (1.7 ± 0.2 g); initial average length of (4.6 ± 0.2 cm). Reading of fish weight and length has been taken each 15 days with modification of study fish feeding percentage. Traditional fodder materials have been used to compose balanced fodder for carp fish. Ginseng has been added in three different concentrations. Experiment treatments were three: G0 free of ginseng addition; G1: 100 mg, G2: 200 mg; G3: 300 mg ginseng/ kg fodder. Samples of blood of each treatment were taken each 15 days in order to prepare blood smears to study the genetic affect on the ginseng-fed fish blood cells as follows: peripheral blood obtained from each fish with heparinized syringes, was immediately smeared. After fixation in methanol (100%) for 10 min, the slides were initially left to air-dry, and after stained with 5% Giemsa. One thousand erythrocytes were examined at 1000v magnification. Micronuclei were defined as round or oval intra cytoplasmatic bodies neither linked nor connected in any way to the main nucleus, with a diameter of 1/30 – 1/10 of that of the major nucleus and on the same plane (17), (18).

RESULTS AND DISCUSSION

Traditional fodder materials have been used in the experiment. The material used in the experimental fodder composition have been as shown in table 1. The material used in the experimental fodder composition have been analyzed (% of the dry material) as shown in table 2.

Table 1. Components of the experiment fodder materials

Fodder components	Material percentage
Grain mixture	50%
Soya	30%
Fish powder	10%
Dicalicium	0.7%
Table salt	0.3%
Vegetable oil	0.1%
Vitamin mixture	8%

Table 2. Analysis of the material used in the fodder composition of the study

	Wet	Ash	Protein	Fat	Fabrics	Carbohydrates
Fodder	5.38	3.42	27.55	4.06	5.80	53.79

It is found of the results in tables 1 and 2 that the fodder has been appropriate for the common carp fish needs of protein, fat, and carbohydrates as (Bolognesi and Hayashi, 2011) has shown.

Table 3. Results of experiment fish water analysis

Water analysis	Measures each 15 days to the end of the experiment			
Temperature	30 c	29 c	25 c	26 c
pH	8.5	7.8	7.9	8.2
KH	ppm. 143.2			
GH	ppm. 322.2	ppm. 340.1	ppm. 451	ppm. 451
NH3	0.25 mg/L			
TDS	ppm. 348	ppm. 347	ppm. 406	ppm. 416

Table 4. Morphological general properties before the experiment

Treatment	Total length (cm)	Weight (gm)
Control	4.936 ± 0.492	1.9956 ± 0.649
G1 (100 mg/ 1kg)	4.776 ± 0.418	1.904 ± 0.521
G2 (200 mg/ 1kg)	4.512 ± 0.427	1.6672 ± 0.464
G3 (300 mg/ 1kg)	4.566 ± 0.408	1.7688 ± 0.428

Protein 27.5% is regarded as appropriate for the experiment fish. Protein is the most important gradient of the body tissue to sustain growth (Saleh, 1984). Results of analysis of fish growing water regarding temperature, hydrogen exponent, carbonic hardship degree, ammonia concentration and the total of dissolvent salts (TDS) have been as shown in Table 3. It is noticed from Table (3) that water analysis, particularly hydrogen exponent have been appropriate for the conditions of fish growing along the experiment period. Hydrogen exponent value has been changing in the range of temperature suits carp fish as (Hapher, 1988) showed. It points that hydrogen exponent suitable for carp fish ranges from (6.2 – 8.2). Carbonic hardship has been suitable, too, for common carp (Al-Salman, 1990; FAO 1981). The same table show that the total dissolvable salts (TDS) represented by the percentage total salt

in the water in addition to the other blemishes is deemed suitable for carp fish breeding (FAO 1984). Results of statistic morphological general properties before the experiment are shown in Table 4. Ginseng has been added to three experimental fodders. Fodder no. 1 has been free of any non-traditional addition. The other treatments were distributed as shown in Table 4 where ginseng has been added to G1 as 100 mg/ 1kg concentration; G2 200 mg/ 1kg; G3 300 mg/1kg of the fodder. Ginseng is not a nutrient element that might be added to the composition of fodders, rather it is a fodder additive which may enhance growth (Hickling, 1971) by increasing immunity of the animal and consequently obtaining good weight increase. Majority of researchers agree that the most successful fodder additives, particularly the organic and non-organic additives which increase animal immunity and consequently enhance growth are vitamins, hormones, aromatic compounds, organic acids, or some salts (Finley *et al.,* 2005). Results of statistic morphological general properties after the experiment are shown in Table 5. Table 5 shows that the results have high significant values for all this experiment treatments. G3 of 300mg/kg significantly overweighed the control treatment and the other treatments. These results agree with (Francis and Goda, 2008) which has shown that increasing ginseng concentration in the fodder of Oreochromisniloticus leads to increase growth rates. It is noticed, moreover, that growth rate increase represented by the total weight and length increase of carp fish analogue the increase of ginseng increase so that the daily weight which expresses the daily growth increases. This

Table 5. The results of the statistical treatments after the experiment

Date of recording data	Control		G1 (100mg/1kg)		G2 (200mg/1kg)		G3 (300mg/1kg)	
	Total length (cm)	Weight (gm)	Total length (cm)	Weight (gm)	Total length (cm)	Weight (gm)	Total length (cm)	Weight (gm)
14.09.2015	5.034 ± .545**	2.1024± 0.693**	5.016 ± .554**	2.1708 ± 0.641**	4.786 ± 387**	1.9932 ± 0.552**	5.108 ± 0.515**	2.3328 ± 0.656**
05.10.2015	5.344 ± 0.468**	2.2116 ± 614**	5.246 ±0. 393**	2.4492 ± 0.491**	5.0608 ± 0.371**	2.282 ± 0.608**	5.402 ± 0.303**	2.6664 ± 0.401**
20.10.2015	5.74 ± 0.4401	2.3816 ± .618**	5.324 ± 0.434**	2.6448 ± 0.471**	5.3768 ± 0.365**	2.560 ± 0.633**	5.668 ± 0.3102	2.9112 ± 0.367**

Table 6. Nucleoli of the erythrocytes of the fish blood which have received different levels of ginseng for different periods of time

Treatment	MN/ 1000 cell + SD	Date of recording data
Control	1 ± 0	
G1 (100 mg/ 1kg)	1 ± 0.577	
G2 (200 mg/ 1kg)	1 ± 0	14.09.2015
G3 (300 mg/ 1kg)	2 ± 0.577	
Control	1 ± 0	
G1 (100 mg/ 1kg)	1 ± 0	05.10.2015
G2 (200 mg/ 1kg)	1 ± 0	
G3 (300 mg/ 1kg)	2 ± 0.577	
Control	1 ± 0	
G1 (100 mg/ 1kg)	1 ± 0	
G2 (200 mg/ 1kg)	1 ± 0.577	20.10.2015
G3 (300 mg/ 1kg)	2 ± 0.577	

agrees with (Francis, 2002c), as the growth criteria represented by the daily weight increase, metabolism sufficiency and digestion coefficient increase analogically with the increase of ginseng concentration in fish fodder. Al-Janabi (2005) has mentioned that the basic components of ginseng roots are the triterpenoid which is known together as gensenoids (Huang, 1999). This group consists of two derivatives: aglicones and panaxadiol which are clearly capable to be multiplied in tissues, and consequently enhance these tissues growth (Attele *et al.,* 1999; Briskin, 2002). Francis (2002c) has made it clear that providing fodder of 150g/ kg concentration derived from triterpenoid resulted in growth enhancement of *Cyprinuscarpio* L. and Oreochromisniloticus. Test results of mini nucleoli of the erythrocytes of *Cyprinuscarpio* L. blood (table 6) show that there are no significant differences between the control group fish and the three treatment fish which have received three different concentrations of ginseng as they have been within the normal range. This means that the various concentrations of the fodder additives hove not affected the genetic material of the fish during the experiment period compared to the control group which has not received ginseng. Thus, it is possible to adopt these concentrations as a growth motivator faster than the normal fodder. This is depicted in Table 5. Some studies have shown that ginseng roots, in certain of its compounds, contain anti-inflammation and anti-virus compounds. These have been noticed of the rats' liver when they were given low dosages of ginseng roots fearing that high dosages may have negative impact on the body tissues. Other studies on rats have found that swells due to pathogenic factors were totally vanished due to these compounds (Yun and Choi, 1990). Therefore, powder of ginseng plant roots have given good growth motivation, increased fish immunity against external pathogenic factors and do not have blood genetic changes when used as fodder additive to feed little Cyprinuscarpio L. It has given clear good results in spite of the short period of the experiment in all the treatments to which ginseng has been added, particularly in the third treatment where it gave its highest rate where ginseng concentration was 300 mg/ kg of fish fodder. More studies on the mechanism of this plant operation are needed in the body to attain to better fish production. Sanity of fish flesh and its suitability for human consume should be confirmed.

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