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The effect of *Aloe vera* on growth and sex hormone of the fish *Aequidens rivulatu*

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ABSTRACT: For considering the effect of *Aloe vera* on growth performance and sex hormones in juvenile fishes of *Aequidens rivulatus* this research has been done during April to June in 2014. After a weak of compatibility with cultivation condition 360 juvenile fishes were distributed for 8 weeks and randomly in 10 aquariums with density of 30 fishes in each section by using three nutrition including business nutrition having 1% *Aloe vera* per kilogram food (first treatment), business nutrition having 1.5% *Aloe vera* per kilogram food (treatment 2) and nutrition of 2% *Aloe vera* per kilogram food (treatment 3) with three repeats (totally random design. Significant difference in final weight, especial growth coefficient, food ration conversion, hasn't been observed between experimental groups (P>0.01) and testosterone and estradiol hormones showed distinct difference (p>0.01). Totally regarding the result of this research it seems that adding plant to nutrition of juvenile fishes will be useful at growth and sex hormones.

Key words: *Aloe vera*, *Aequidens rivulatu*s, growth, sex hormones

INTRODUCTION

There are almost 1539 species of ornamental fishes in the world(Champan *et al.,* 2007) that annually the degree of global trade of ornamental fishes are more than some billion dollars (Andrews *et al.,* 2006). Green taylor fish with scientific name of *Aequidens rivulatu*s is from Soklideh family that its main habitat is south America that is an aquarium beautiful and sensitive species. At 22-24 centigrade degree and ph 7-8 it has proper growth condition. This species is damaging and sensitive with change of environmental conditions.

Successful growth of fishes depends on accessibility to proper food for feeding to be able to supply health and growth for new born and at the steps of being infant (Grrri *et al.,* 2000). On the other hand in growing fishes the main problem is supplying proper food with high quality that is accepted easily by fish and digested (Kim *et al.,* 1996). Regarding the importance of nutrition in growing system of ornamental fishes in this research this subject has been considered that in this direction proper food can cause much success in this field. Natural plant products have various performance such as anti-tension function, anti-bacterial, causing appetite and stimulation of immune system (Citaracu *et al.,* 2002). The anti-microbial activity of many plant extract has already been used in fishes and it has shown that these materials have high care power (Sodagar and Haji Beglou, 2011) regarding these points plant extract can be used as an stimulator of growth and immunity at decreasing food ratio conversion and death of fishes and finally reduce production cost. Using food additive in fish growth is one of usual methods for achieving final weight increase, improving nutrition efficiency or resistance against diseases under growth condition (Cho *et al.,* 2012). In this direction, various types of additives in foods of aquatics has been studied for improving efficiencies of fishes that can be mentioned as below. Plant products such as pharmaceutical plants (Kim *et al*., 1998; Logambal *et al.,* 2000; Jian and Wu 2003; Yin *et al*., 2006, 2009; Divyagnaneswari *et al*., 2007; Ardo *et al*., 2008) green tea (Cho *et al*, 2006, 2007) *Aloe vera* (Kim *et al.,* 1999, Farrokhi *et al.,* 2012).

Plant products through induction of the degree of transcription increases growth as the degree of RNA will be increased and therefore the degree of total amino acid will be increased and finally the degree of protein production in cells increases (Citarasu, 2010). Developing additives of aquatic food is also one of attractive cases that is paid attention by many researchers and cultivators of fishes.

Aloe vera that is famous to "desert tulip" in desert region, belongs to tropical Africa. *Aloe vera* has anti-oxidant in the form of vitamins. Generally *Aloe vera* gel is full of vitamins A, B_1, B_2, B_6, B_{12}, C, E. Minerals existed in *Aloe vera* gel consist calcium, sodium, Feros, Potassium, chloride, manganese, copper and zinc. *Aloe vera* gel has 92 different enzymes like oxidase, amylase, and catalase and so on that does various activities.

Farrokhi *et al.,* (2012) have considered the effects of ration having the plant (*Melissa officinalis*) and *Aloe vera* on efficiency of growth, survival, corpse ingredients, blood indices and oxidation of fat of rainbow trout fish but the degree of survival in these treatments has meaningfully increased.

The goal of this study is considering the effect of nutrition having Aloe vera extract on growth factors, some blood indices and resistance of *Aequidens rivulatus.*

MATERIALS AND METHODS

Studying and implementing this research has been done during April to June at the center of culturing ornamental fishes in Lahijan city in Guilan province. 420 juvenile fishes after biometric(measuring weight and length) and determining Biomass with average weight of 8 gr were chosen and was done for 8 weeks based on 3%-5% of body weight in 3 turns (9 am at noon, 3pm) (Sodagar *et al.,* 2004, Mohseni *et al.,* 2006). The experiment is done in 6 treatments and a control that each treatment has 3 repeats as below:

Third treatment	**Second treatment**	**First treatment**	**treatment with I% doze of *Aloe vera* powder per kilogram food**	**Experimental treatment**
Third treatment	**Second treatment**	**First treatment**	**treatment with I.5% doze of *Aloe vera* powder per kilogram food**	
Third treatment	**Second treatment**	**First treatment**	**treatment with 2% doze of *Aloe vera* powder per kilogram food**	

The way of making and preparing ration.

Firstly *Aloe vera* powder is mixed with biomar food by oil plant.

Calculating some of growth indices

For assessing the degree of growth and determining biomass of each aquarium, after each step of biometric, the fallowing growth indices were calculated (Ali *et al*., 2011, Hung *et al*., 1993, 1997, Merrifield *et al.*, 2011).

Percent of body weight increase (BWI %):

% BWI = (Bwf – Bwi)/Bwi × 100 *(Hung et al ; 1989)*

BWI = average primary weight in each tank. BWF = average final weight in each tank

Food conversion ratio (FCR): (Ronyai *et al.*,1990)

FCR = F/(wt-wo)

F = the amount of food consumed by fish. Wo = average primary biomass (gr).

Wt = average final biomass. (gr-fat coefficient (Lutes & Hung; 1987) Cf = (Bw/ti^3) ×100

Bw = average final mean of body based on gr. TI = average final total length based on centimeter.

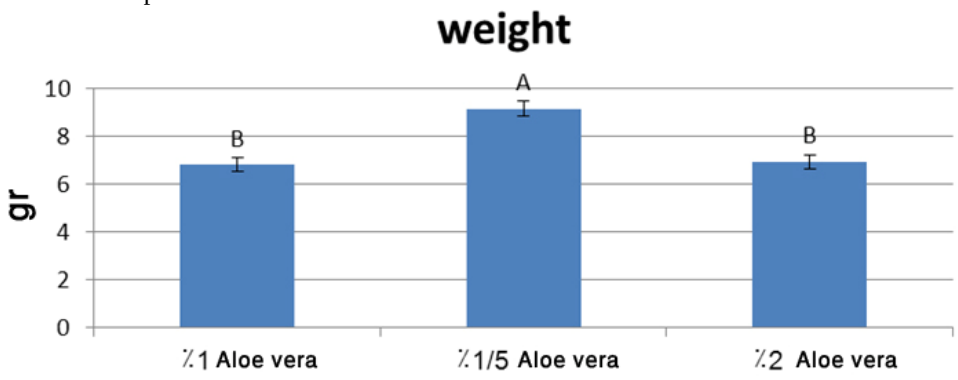
Sampling of fishes blood at the end of a period from each repeat from 8 fishes was done (*f* male and 4 female fish in each repeat) was chosen randomly and taking blood from each heparinized caudal vein vessel was done by 2ml syringe. During the process of taking blood clove anesthetic matter was used. Measuring hormone indices of blood serums (steroid, testosterone and strodiol hormones) was done through RIA method.

For data analysis from normality Spss 16 software was used. Analysis was done by using SAS 9.0I. Charts were designed by Excel 2007. All comparisons of means was recorded by using L.S.D. Hormones (testosterone and estradiol) was done as plots in times Weight and length was done as plot in time.

RESULT

Considering growth efficiency

Based on data of table there has been observed meaningful difference between different factors such as final weight, length, food conversion ratio, especial growth coefficient among different experimental groups (P>0.01). The result of average weight showed that treatment 1.5 percent was more than 1 and 2 percent but there isn't meaningful difference between treatment 1 and 2 percent.

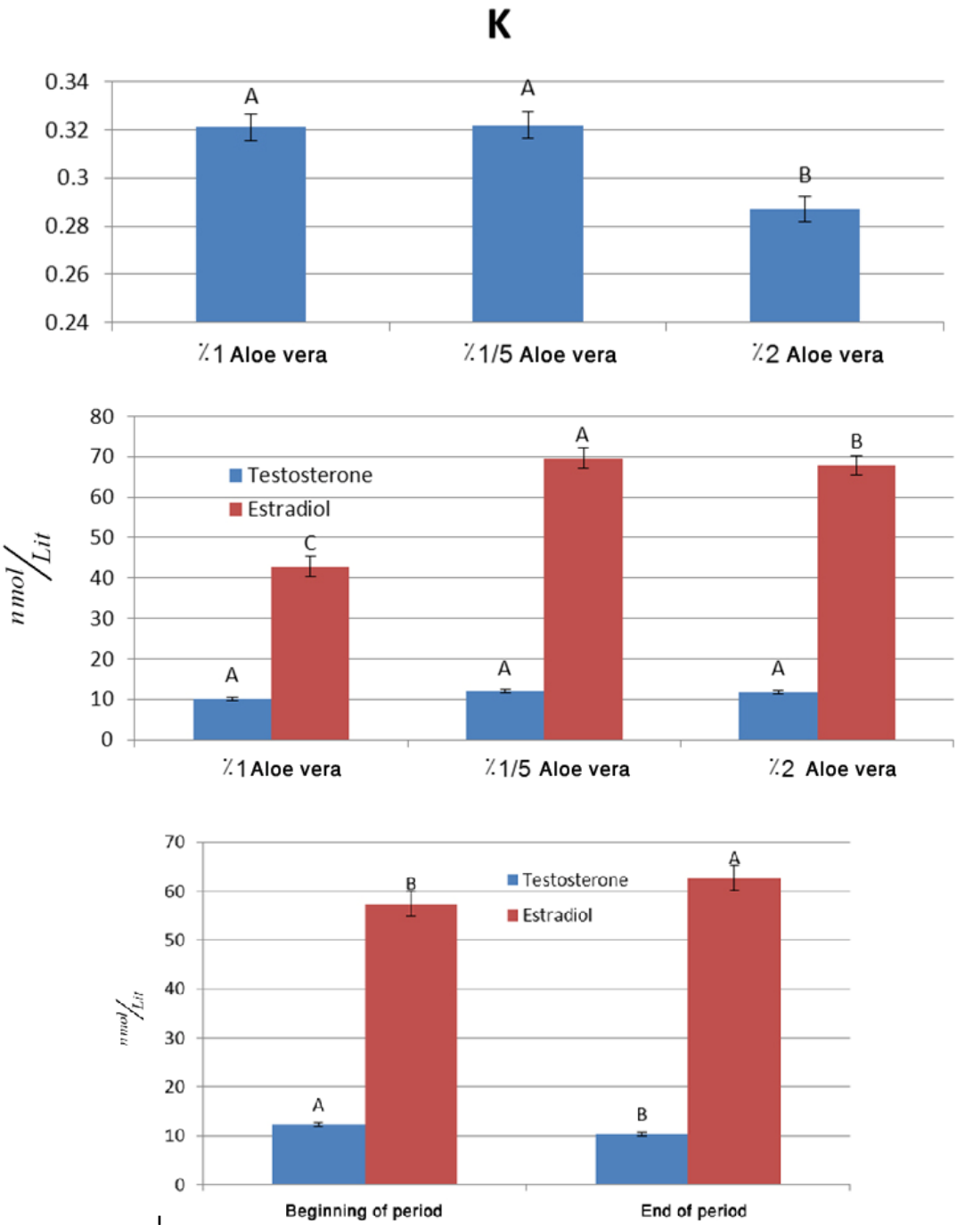


The result of k average showed that treatment 1 and 1.5 percent was more than 2 percent but there wasn't meaningful difference between treatment 1 and 1.5 percent.

Result of hormonal studies

The result of hormonal studies showed that in treatment 1.5 percent the degree of estradiol hormone was more than 2 percent and in treatment 2 percent it was more than 1 percent.

However in the degree of testosterone hormone statistical difference hasn't been observe *d* between treatments. The result of comparative studies of hormones mean during a period denotes that the degree of sex hormones during a period has changed and there has been observed meaningful statistical difference between the beginning and end of a period. Estradiol hormone at the end of a period was more than beginning of a period but testosterone hormone was less.



DISCUSSION

Enhancing growth affected by plant hormones depends on factors such as species of fish, nutrition-physiological situation of fish, proper amount or concentration, constituting ingredient of plant, management and cultivating condition (Barreto *et al*., 2008; Nasir and Grashorn, 2010; Farahi *et al*., 2011; Cho, 2012). Based on obtained data there has been observed meaningful difference between different growth factors such as final weight, length, food conversion ratio, especial growth coefficient between different groups($P>0.01$). Findings of Abdi *et al.*, (2010) on Oscar fish, Ghodsi and Sodagar and Guz *et al.*, (2011) on Guppy fish, Mesalhy *et al.*, (2008), Ashraf, Goda (2008) on Tilapia fish and Kasiri *et al.*, (2011) on angel fish of sweet water all confirm positive and meaningful effect of plant additive on indices of growth in these fishes that is coordinated with the result of this research. Aloe vera has anti-oxidant in the form of vitamins. Generally *Aloe vera* gel is full of Vitamins A, B_1, B_2 B_6, B_{12}, C, E. Minerals available in *Aloe vera* gel includes calcium, sodium, ferrous, potassium, chloride, manganese, copper and zinc. *Aloe vera* gel has 92 different enzymes like oxidase, amylase, and catalase and so on that helps body at absorbing main nutrition and also purifies them. *Aloe vera* has 20 amino acids and can provide all necessary amino acids of the body.

This result isn't compatible with the result of Farrokhi *et al*., (2011) during study of the effect of adding *Melissa officinalis* and aloe vera at ration of rainbow trout and Cho (2012) during study of adding onion powder at ration of *Paralichthys olivaceus* . They claimed in their study that adding these plant additives hasn't had meaningful effect on the degree of growth of fishes at experimental groups. However Farrokhi *et al.*, (2010) during a study claimed that adding 10, 20, 30 gr/kg garlic to ratio of rainbow trout increases growth indices significantly in this fish than control group. Result of hormonal considerations showed that in treatment 1.5 percent the degree of estradiol hormone was more than 2 percent and in treatment 2 percent it was more than 1 percent but at the degree of testosterone significant statistical difference hasn't been observed. The result of comparative consideration of hormones mean during a period denotes that the degree of sex hormones during a period has changed and significant statistical difference isn't seen at the beginning and end of a period. Estradiol hormone at the end of a period is more than beginning of a period but testosterone hormone was lower.

Positive effect of phytoestrogen on fishes caused doing many research about its probable advantages at culturing fish.

Considering effects of different food levels from *Aloe vera* latex on reproduction attributes (steps of gonadal development, reproduction, size of ovule (length and diameter), gonad histology) at tilapia fishes of *O. niloticus* that were fed up for 60 days was done. The results denote positive effect in female fishes and the effect of concussive in testicles of male fishes. Using Ginseng (mixture of business phytoestrogen) as a replacing method for production of the whole material of Sharptooth catfish was done. Potential of improvement of fish growth by natural and esteroid care was done on various species of fishes such as *Cyprinus carpio*, *Oncorhynchus myksis*, *Oreochromis niloticus.* *O. aureus* and *Perca flavescens* Malson 1988, Shiila and Pandian 1995) this result is according to current results. Jegede (2012) considered the effect of *Aloe vera* on male fish of tilapia for changing sexuality this result is another reason on hormone-like performance of *Aloe vera*.

CONCLUSION

Regarding the result of this research and previous studies it can be said that using additive of *Aloe vera* at green terver fish nutrition showed efficiency on growth of fishes (1.5 treatments). Increase of estradiol hormone at the end of a period is more than beginning of a period and testosterone hormone is lower and this subject can help changing gender of fishes with more studies. Therefore this result helps increase of economic profitability at business growth of fishes.

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