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The Effects of Bay Leaf on Rainbow Trout's Growth, Aromatic and Meat Composition

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Abstract: In this study, the effects of bay leaf on the growth, aromatic and meat composition to rainbow trout was researched. This study was carried out about 10 weeks. Initial rainbow trout mean weight was 140.93±12.17 g and there was 30 fish to each group, total fish number are 240. Rainbow trout feed had about 40% crude protein and 13% crude lipid. Bay leaf was added on the rates of 3, 5 and 7% in rainbow trout feed. This study was conducted with four groups (3 experimental, 1 control) in two parallel sessions. At the end of the treatment, the highest live weight gains were at the control group (260.24±34.98 g) and 3% group (247.29±52.91 g). The least live weight gain was in 7% group (228.87±40.22 g) ($p<0.05$). At the end of study, a sensory test was conducted. The fish were treated with raw, dry cooked and cooked in bakery techniques. They were analyzed according to how they look, aroma and taste criteria. According to these criteria, it is supported that when the fish fed with bay leaf they showed aroma and taste of bay leaf. By bakery cooking method, bay leaf aroma and taste were felt the best with 3 and 5% groups and least with 7% group. By dry cooking method, bay leaf aroma and taste were felt the same with 3 and 5% groups but it was least with the 7% group ($p<0.05$). According to meat composition results in groups, it was found that the 7% group had 21.10±2.86% crude protein, 21.38±0.37% crude lipid while the control group had18.88±0.29% crude protein, 20.36±0.36% crude lipid ($p<0.05$).

Key words: Rainbow trout, bay leaf, feding, sensory test, fillet, Turkey

INTRODUCTION

Spices and herbs have been used to add color and scent to foodstuff, to improve shelf life in some cases, to benefit from antioxidant properties since the early phases of history. Without these substances, foods are lifeless and tasteless. Aromatic and specific scent of spices and herbs has its source in essential oil and oleoresins. These spices and herbs are obtained from the roots of herbs, fruits, laves, seeds and crusts (Wilson, 2003).

One of these substances, bay (*Laurus nobilis* L.) has been used as a medicine and flavoring since the Ancient Greek and Roman period. Leaves of bay are generally consumed in soups, sauces, brines and to add taste and aroma into fish and meat products in various world cuisines with the blend of herbs (Kumar *et al*., 2001).

Although, livestock dealer and cattle dealer feed their animals on some blends of herbs in order to make their meat delicious and smell more aromatic, no study has been conducted on fish yet about bay leaf (Ionescu and Mazuranok, 2003; Jamroz and Kamel, 2002; Mazuranok and Ionescu, 2004). Bay leaves are used in fish products to give a nice scent and aroma during cooking. The study aims at analyzing effects of bay leaf inclusive fodder which is prepared by adding bay into fish fodder in various proportions on rainbow trout growing, meat composition and sensoric.

MATERIALS AND METHODS

This research was made of Trout Unit in Sapanca Inland Water Fish Research and Applied Station. In this tiral use of rainbow trout (*Oncorhynchus mykiss*) initial mean weight was 140.93±12.17 g and there were 30 fish to each group, total fish number are 240. Bay leaf was added on the rates of 3, 5 and 7% in rainbow trout feed and the last group was control group (no added bay leaf). Fish were fed a twice a day. This research period of the 75 days and the given feed ratio in 2% body weight for fish.

At the initial and final period were taken 3 fish from each group and theirs meat were analyzed for moist, protein, lipid and ash. On the other hand at the end of research was made sensory analyzes for total 10 panelists.

Analyses: Samples for dry substance analyses in fodder raw substances and experiment fodder were obtained by

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storing them for one night in 105 degrees in sterilizer; crude protein with Kjeldahl method, crude oil in azote determination device (N×6.25) with extraction method in soxhlet, crude fibre with Lepper method and ash in 550°C ash owen with Wendee analyses according to AOAC (1990).

Values for performance criteria in fish (specific growing proportion, condition factor) was calculated according to fodder assessing coefficient (Goddard, 1996).

At sensory evaluation of raw fish, ten experienced panelists analyzed fish at last day according to EU fish sensory schema for whitefish (EEC, 1996) and for the EU schema. Panelists were asked to score taste of fish using a 0-3 acceptability scale (scale: 3.0-2.7 = the best, 2.6-2.0 = better, 1.9-1.0 = worse, 0.9-0 = worst) scores of the ten assessors were averaged to give the panel mean score. The fish were judged unfit for consumption when the mean value for sensory score was below 1.0.

Statistical analysis: Variant analyses of results obtained from experiment groups (ANOVA) and multiple comparison of group which cause difference were calculated according to Duncan test.

RESULTS AND DISCUSSION

In results of meat, the 7% group had 21.10±2.86% crude protein and 10.84±0.21% crude lipid while the control group had 18.88±0.29% crude protein and 12.43±0.16% crude lipid ($p<0.05$). However, groups of 3% and 5% were represented at similar results (Table 1).

At the end of the treatment, the highest live weight gains were in the control group (260.24±34.98 g) and 3% group (247.29±52.91 g). The last live weight gain was in 7% group (228.87±40.22 g) ($p<0.05$) (Table 2). Live weight increasing in groups, the best result is control group (119.31±22.22) and the lowest live weight increasing was 7% group (87.94±27.46) ($p<0.05$) (Table 1 and Fig. 1). Also, Feed Conversation Rates in Groups, the best results provided in control group (2.16) and then 3% group (2.30) ($p>0.05$) (Fig. 2).

When the fish were fed with bay leaf they showed aroma and taste of bay leaf. By bakery cooking method, bay leaf aroma and taste were felt the best with 3 and 5% groups and least with 7% group. By dry cooking

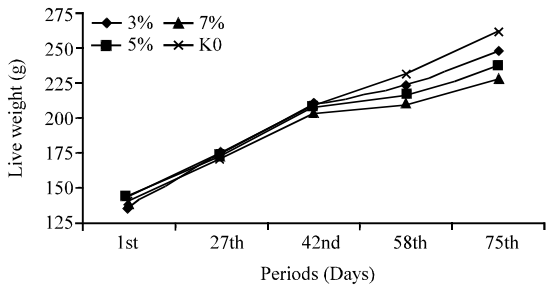

Fig. 1: Live weight increasing in groups

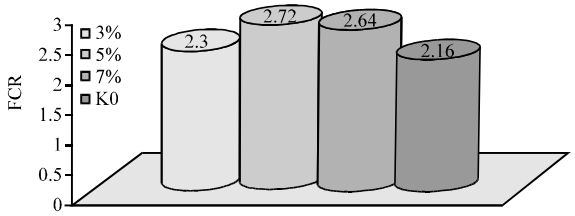

Fig. 2: Feed conversation rates in groups

Table 1: Proximate analysis chemical composition of trial groups (*)

	Diets of trial groups			
Ingredients	K0	3%	5%	7%
Dry matter	91.66±0.19^{a}	88.12±0.04^{b}	87.72±0.08^{bc}	87.33±0.08^{c}
Crude protein	39.45±6.24^{a}	40.20±0.67^{a}	40.84±1.39^{a}	38.46±1.20^{a}
Lipids	20.36±0.36^{a}	20.67±0.19^{a}	21.08±1.41^{ab}	21.38±0.37^{b}
Ash	13.67±0.08^{a}	13.41±0.09^{a}	13.71±0.04^{a}	14.14±2.45^{a}
Meats of trial groups				
Dry matter	74.75±0.30^{a}	74.06±2.44^{a}	73.53±0.84^{a}	73.26±0.04^{a}
Crude protein	18.88±0.29	19.12±1.04	20.26±0.57	21.10±2.86
Lipids	12.43±0.16^{a}	11.27±0.77^{a}	11.49±0.18^{a}	10.84±0.21^{a}
Ash	5.88±0.49^{a}	5.70±0.14^{a}	5.24±0.88^{a}	5.12±0.43^{a}

(*)Means within the same row not sharing a common letter are significantly different (X±SD, $p<0.05$)

Table 2: Growth performance of trial groups (*)

Groups	AFLW	ALLW	LWI	SGR	FCR
3%	138.22±18.36^{a}	247.29±52.91^{a}	109.07±34.55^{ab}	0.78±0.001^{ab}	2.304±0.16^{a}
5%	142.49±13.67^{a}	237.49±24.55^{a}	95.00±10.88^{ab}	0.68±0.102^{b}	2.725±0.41^{a}
7%	140.93±12.76^{a}	228.87±40.22^{a}	87.94±27.46^{b}	0.65±0.011^{b}	2.636±0.11^{a}
K0	140.93±12.76^{a}	260.24±34.98^{a}	119.31±22.22^{a}	0.82±0.006^{a}	2.164±0.15^{a}
p-value	p>0.05	p>0.05	p<0.05	p<0.05	p>0.05

(*)Means within the same row not sharing a common letter are significantly different (X±SD, $p<0.05$), AFLW: Avarage of First Live Weight (g), ALLW: Avarage of Last Live Weight (g), LWI: Live Weight Increasing (g), SGR: Spesific Growth Rate, FCR: Feed Conversation Rate

Table 3: Sensory evaluation of rainbow trout in groups

	Raw				Boiling				Bakery cooking			
Groups	3%	5%	7%	K	3%	5%	7%	K	3%	5%	7%	K
Structure	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Smell	-	-	-	-	2.8	2.5	2.0	1.4	2.6	2.8	2.5	1.4
Taste	-	-	-	-	-	-	-	-	2.8	2.7	2.5	1.2

3.0-2.7 = The best; 2.6-2.0 = Better; 1.9-1.0 = Worse; 0.9-0 = Worst

method, bay leaf aroma and taste were felt the same with 3 and 5% groups but it was least with the 7% group ($p<0.05$) (Table 3).

CONCLUSION

Even though there are many studies on using variety of herbs for poultry and farming animals, no study was found on using bay leaf for farming animals. Since there exist no literature to evaluate the study from this point of view, we only presented the results of the study.

According to the results, the best bay leaf concentration was found at 5% and then at 3%. So we can say that if we cooked with aliminium folio or other folios it is effected of its aroma protect. In addition, on growth performance of bay leaf added feed, best performance were observed in groups 3 and 7%, respectively other than the control group. Thus, the best level of bay leaf concentration was found at 5% and then at 3%.

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