



ORIGINAL ARTICLE

The study of the effects of adding Yarrow to Broiler chickens' ration as the growth stimulant

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ABSTRACT

Yarrow with the scientific name of *Achillea millefolium* is an herbal plant. There is evidence that this plant has several compounds with anti-bacterial and growth stimulant characteristics. Considering the widespread use of yarrow in humans and some animals, this research tried to study impact of the powder of this plant on growth and the challenges posed by its use as a feed additive in broiler poultry. In this regard, the dried leaves were crushed and milled into powder. Two groups were selected as the control and experimental groups, each consisting of 85 Arbor Acers chickens which were randomly selected and kept under identical conditions for 7 weeks. 1% yarrow powder was added to the experimental group's ration. At the end of the seventh week the two groups were compared regarding the growth rates. The results of the weight in the experimental group at the end of the seventh week was significantly different from the control group ($732/2 \pm 245/3$ gr for the experimental group vs. $961/6 \pm 574/7$ gr for the control group ($p<0.05$). Due to the lack of deaths in the treatment group and the absence of pathological damages after autopsy, it seems that the addition of the used amount of the yarrow powder to the broilers ration will be very useful in this study.

Keywords: Yarrow, Broilers, Weight Gain, Pathological Damages

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INTRODUCTION

Due to the risks of using chemical drugs in various fields including: drug resistance, environmental problems, high cost and side effects, the use of herbal medicines has increased in all sciences associated with human and animal health (1). Herbal remedies include: extracts, powders and various forms of medications which are used for various aims including: fighting against various bacteria, viruses, fungi, stimulating the immune system, increasing feed efficiency and eliminating parasites. Due to the broad climate in Iran and benefitting from diverse vegetation, the use of the mentioned plants is increasing day by day.

Yarrow with the scientific name of *Achillea millefolium* is an herb the use of which has a long history in traditional medicine. This plant is native to Europe and America and can be frequently found in Iran [2]. The history of using this herb in Chinese medicine dates back to 3000 years ago [3]. This herb causes hypotension [4, 5] and hypoglycemia [6, 7], and has anti-inflammatory effects [4] and its pharmacological properties such as anti-histamine and anti-cholinergic system has been studied [8]. Yarrow is used in the treatment of infectious fevers, typhus and diarrhea [2]. The antimicrobial effects of various extracts of yarrow were examined and it was found that the methanol extract was more effective than other extracts and yarrow acts more severe against Gram-positive bacteria [9]. In another study in 1388, the effects of long-term use of Yarrow on some components of metabolic syndrome were studied [10]. Positive effects of alcohol extract of yarrow have been reported in healing wound caused by leishmaniasis with leishmania major factor in mice [3]. Yarrow has several compounds that Pozenya Kowsky et al. has examined its use in 2003 in human diet. This material contains polyphenol compounds, pectin, resin, ascorbic acid, and malic acid [11]. The most important alkaloid found in the bark of stems is berberine and the effects of reported for yarrow are mostly related to this alkaloid (12).

Due to the lack of reports regarding the use of this herb in birds in order to achieve various objectives such as weight gain and feed efficiency and regarding the use of yarrow in humans and some animals, this study aims to evaluate the possibility of its use in poultry and evaluating the effects of its use to improve

feed efficiency, growth and FCR in poultry industry as a feed additive and as an investigation of the histological damages.

MATERIALS AND METHODS

Animals: 170 one-day-old Arbor Acers broilers chickens were selected and were randomly divided into two groups of control and experimental, each consisting of 85 chickens. Both groups were kept in the same environmental conditions (relative humidity of 50% and temperature 32 ° C) in a special place. The first day, all the chicks were individually weighed and recorded.

Preparation of the plant powder and its use in the ration of the experimental group: after collecting, the leaves of yarrow, they were washed and dried at room temperature using air flow, they were milled into powder, dried and stored in a dry place. The experimental group received yarrow for about 1 % of its ration.

The control group was given the same amount of seed. The amount of the received seed was determined based on the recommendation of the company's catalog. During the breeding period, a regular light schedule and bio-security measures were applied by preventing the entry of various individuals into the maintenance yard of the chickens and using disinfectants at the door of the maintenance yard. Weighing chickens was performed with the least stress on random days of 3, 10, 21, 28, 33, 38 and 49.

During the breeding period, three chicks died in the control group. At the end of the breeding period the studied poultry were slaughtered and autopsied by human and their liver, heart and skeletal muscles were examined regarding the presence of superficial damages. Random samples were separated from the corpse and were placed in 10% formalin until histopathological examinations, and the tissues were placed in paraffin and after providing the slides, hematoxylin eosin coloring was used.

Method of data analysis:

The prepared slides were examined under a light microscope regarding the presence of damages. The obtained information was studied using SPSS software version 11.5 by the two independent samples t-test.

RESULTS

The obtained weights on random days of weighing in both control and experimental groups were given as mean ± SD in Table 1. The results indicate that in the performed weightings on days 38 and 49 (end weight) there is a significant difference between the weight of the poultry in both, experimental and control groups. Food intake in both groups was equal to 190.5 grams. The elimination of three chickens in the control group has been considered as FCR at the final stages due to the consumption of seed up to the end of the breeding period. By the consumption of yarrow powder in the experimental group's ration, feed conversion rate declined to 0.24 (1.65 for the experimental group versus 1.89 for the control group).

Table 1 - Mean ± SD of body weight in both control and experimental groups on different days of weighting

Testing	Control group	Weighting days
54 ±4/1	54/1 ±4	3
171/5 ±15/1	161/2 ±14/2	10
600/4 ±41/8	560/9 ±37/2	21
845/2 ±52/3	767/9 ±55/5	28
1072/1 ±77/4	971/7 ±71/3	33
1511/2 ±61/7	1373/8 ±76/8	38
1822/2 ±75/1	1662/8 ±85/2	49
1/65	1/89	feed conversion rate

With the autopsy examination of dead poultry during the breeding period (3 of the control group), the death reason of CRD was diagnosed due to infection with Mycoplasma and Escherichia coli with signs of pus in the peritoneal cavity with perihepatitis and pericarditis and extreme thinness. No lesions were proved after physical and microscopic examination and histopathological autopsy conducted on poultry corpse and the separated samples of corpse in both groups.

DISCUSSION

In this study, the effect of adding yarrow on the output of poultry feeding and the possibility of its usage as a food additive in poultry feeding was examined. In the present study with the use of 1% yarrow powder for 7 weeks, there was a significant difference in daily weighting and decrease in FCR. However, there were no apparent or histopathological lesions observed due to the use of yarrow powder in nourishment of poultry group.

Vegetarian food additives (usually called phytobiotic or Botanical) are defined as plant derivatives that are added to the basic ration with the aim of improving the production. These materials are effective on production through improving diet, increasing poultry and improved nutrient by poultry (13). Several mechanisms have been stated for the beneficial effects of these food additives. Free radicals are produced by oxidative reactions in the body and are affecting the entire body. Plants have antioxidant properties that neutralize free these radicals and help the body to stay healthy. Yarrow contains various substances that exist in different parts at different levels. In the study of Iman Shahidi and Hussein-Zadeh in 2008, it was shown that the most important substances in this herb include: palmatine and 5methoxyhydnocarpin (14). Alkaloid berberine in yarrow that has been used in this study has the property to clean up free radicals of reactive nitrogen species (15) and to prevent damage in living cells (14). Eliminating free radicals can reduce the stress of poultry and improve the FCR and output. On the other hand we can relate the improved effects of output due to the use of yarrow powder to its antibacterial property that through avoiding the growth of harmful bacteria helps the digestion system of the body stay healthy and improves the intake through the septum of digestion system. In the course of other studies garlic (15), thyme (16) Oregano (17), rosemary (18), American yucca (19) and Herbal mixed (20) has been used as a food additive in poultry diets and the effect of these additives were investigated on FCR, final body weight and food intake rate.

In a study of human samples, it was found that short-term use of black yarrow has no effect on energy intake and macronutrient in 4 weeks (21). The findings of this are in accordance with the results of the above mentioned study, and given the consumption of same weight of meal on both groups diets, using yarrow powder has no effect on food intake. The antimicrobial effect of yarrow extracts was studied in vitro and it was found that the methanol extract was more effective than other extracts and generally yarrow acts against Gram-positive bacteria with a greater intensity (9). In the present study after the end of the study period, there was no evidence of infection in the corpse of the test group, regarding the loss of 3 pieces of chicken of control group due to CRD and the absence of even a single case of disease caused by Micro-plasma and Escherichia coli in the experimental group, antimicrobial effect of yarrow can partly be emphasized.

Yarrow contains materials which are effective on a variety of organisms, including viruses (human immunodeficiency virus), bacteria (*Helicobacter pylori*, *Staphylococcus aureus* and *Candida albicans*) and parasites (*Giardia* and *Entamoeba Histolytica* Lambly). Studies are on human cases and fewer studies have been done on animals. However, further investigations aimed at confirming the existence of effective antibacterial and finding the effective material in creating these effects is recommended.

Regarding the consumption of yarrow in nourishment, many studies have been done in human medicine on its role in human health and the long history of its usage as an herbal medicine. In a study the antifungal effects of aqueous and alcoholic yarrow extracts were investigated and were compared with Clotrimazole in lab environment. Based on the findings of this study it was indicated that yarrow has antifungal properties, and these properties are more obvious in alcoholic extract than aqueous (22). The effect of alcoholic extract of yarrow on wounds caused by *Leishmania major* in BALB / c mice was investigated. Based on the results of this study, it was found that the extract with 20 % density has positive relieving effect on Leishmaniasis wound (3). The effect of using black processed yarrow in apple cider vinegar was investigated on blood pressure and inflammatory factors in patients with type 2 diabetes and it was found that yarrow intake has no effect on systolic and diastolic blood pressure and inflammatory factors (23). In this study the effects of long-term use of black yarrow on some of the components of metabolic syndrome, were examined and according to the results of this study, it was found that after 8 weeks of yarrow use there was no significant changes in body mass index, total cholesterol density, triglycerides, glucose and serum insulin, however, HDL-C density was significantly increased and LDL-C density and the ratio of total cholesterol to HDL-C was reduced (10).

CONCLUSION AND SUGGESTIONS

The findings of this study showed that consumption of 1% yarrow powder in broiler poultry ration had a positive and significant impact on the final weight of poultry, and by reducing the FCR increases the output. However, due to the lack of autopsy and histopathological lesions in the corpus, taking this dose of yarrow powder in poultry diets seem to pop up very useful. Rates of less than 1 % are usually not effective in biological studies. The reason of not selecting higher than 1% yarrow in broiler poultry ration is on one hand because of reducing it's delicious taste and it's consumption, and on the other hand reducing the availability of other nutrients especially nitrogen and energy that can have a negative impact on weight gain and FCR.

It is recommended for the future studies to focus on the extraction of effective combination of this plant on creating the growth stimulant, so that this active ingredient could be used for the treatment of idiopathic reasonably determined weight loss.

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