

## The influence of the addition of chamomile extract to the diet of chickens

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**Abstract:** The use of some herbs showing antimicrobial effects can be one of such alternatives to antibiotic growth promoters, which were banned in 2006. Our experiment involved 28 male chicks of the hybrid combination Ross 308. In this experiment, effects of three different concentrations of chamomile (*Matricaria chamomilla*) extract, (0.3%; 0.6% and 1.2%) in feeding doses on increments, feed consumption and carcass yield of broiler chickens were studied. Chickens were weighted every week at the age of 17, 24, 31 and 38 days. Feed consumption was measured every day. The experiment lasted 39 days that were slaughtered. The differences from in weight, feed consumption and carcass yield of broiler chickens were not significant.

**Key-Words:** chamomile extract, broiler chicken, weight, feed consumption, carcass yield

### Introduction

Use of antibiotics concerning animal nutrition and as antimicrobial growth promoters is undoubtedly beneficial for the improvement of zootechnical performance parameters and prevention of disease. Nevertheless, because of the security threats for human and animal health which come from escalating resistance of pathogens to antibiotics and the accumulation of antibiotic residues in animal products and the environment, there is a global need to remove antimicrobial growth promoters from animal diets. The complete ban of all antimicrobial growth promoters has been in European Union since 2006. As a result, the demand for alternative products to antibiotics that can be used as prophylactic and growth promoting agents is very high [1].

Chamomile (*Matricaria chamomilla*) has been used in folk medicine throughout history [2]. *M. chamomilla* belongs to a major group of cultivated medicinal plants. It contains a large group of therapeutically interesting and active compound classes. Sesquiterpenes, flavonoids, polyacetylenes and coumarins are considered the most important constituents of the chamomile drug. The coumarins are represented in chamomile by herniarin, umbelliferone, and other minor ones (Z)- and (E)-2- $\beta$ -d-glucopyranosyloxy-4-methoxycinnamic acid (GMCA), the glucoside precursor of herniarin, were described as native compounds in chamomile.

Eleven bioactive phenolic compounds, such as herniarin and umbelliferone (coumarin), caffeic acid (phenylpropanoids) and chlorogenic acid, apigenin, apigenin-7-O-glucoside, luteolin and luteolin-7-O-glucoside (flavones), quercetin and rutin (flavonols), and naringenin (flavanone) are found in chamomile extract. More than 120 chemical constituents have been identified in chamomile flower as secondary metabolites, including 28 terpenoids, 36 flavonoids, and 52 additional compounds with potential pharmacological activity. Components, such as  $\alpha$ -bisabolol and cyclic ethers are antimicrobial, umbelliferone is fungistatic, while chamazulene and  $\alpha$ -bisabolol are antiseptic [3]. The *M. chamomilla* could be used as a natural antimicrobial agent for human and infectious diseases and in food preservation. Furthermore, the development of natural antimicrobial agents will help to decrease negative effects (pollution of environment, resistance) of synthetic chemicals and drugs. The interesting antimicrobial effects observed in some cases support the traditional use of this plant, particularly by the local population, which needs cheap medicine [4].

### Material and Methods

#### Experimental design

The experiment involved 48 male chicks of the hybrid combination Ross 308. All chicks were

seven days old. There were altogether 4 groups of these birds, viz. control and three experimental groups receiving chamomile extract supplements in concentrations of 0.3%, 0.6% and 1.2%.

**Birds and experimental conditions**

Prior to the beginning of the experimental period, chicks were weighed, identified with wing tags, assorted into four groups and placed into metabolic cages. All birds received water and feed mixture *ad libitum*. Composition of the feed mixture is shown in the table 1. Chamomile extract was added into the

feed mixture in concentrations of 0.3%; 0.6% and 1.2%.

The light regime was 6 hours of darkness and 18 hours of light. On the 7th day of age chicks were kept at the ambient temperature of 29.9°C and relative humidity of 50%. The temperature was decreased daily by 1°C to 23°C.

**Statistical processing**

Obtained results were analysed using the programme Microsoft Excel 2010 and the software Statistica 10 CZ.).

Table 1 Composition of feed mixture (%)

Ingredient	%
Wheat	25
Maize	37
Soybean meal	28
Sunflower oil	6
Mineral-vitamin mixture without anticoccidial drugs	3
Monocalcium phosphate	0.8
Finely ground limestone	0.2

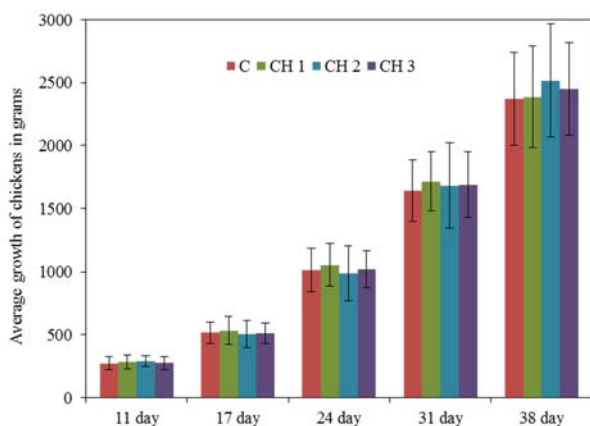
**Results and Discussion**

The experimental animals showed no health problems during the experiment.

**Body weight**

Body weight of chickens was measured in week intervals. There were no differences between groups with or without addition of chamomile extract. Body weight of chickens is shown in Figure 1.

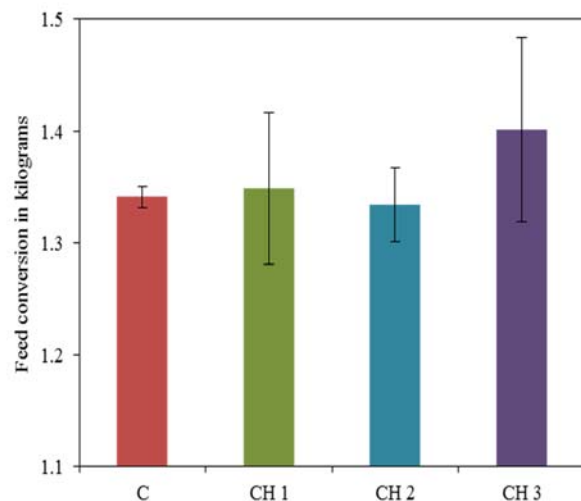
Fig. 1 Average body weight of chickens in grams.



C – concentration 0% of chamomile extract  
 CH 1 – concentration 0.3% of chamomile extract,  
 CH 2 – concentration 0.6% of chamomile extract,  
 CH 3 – concentration 1.2% of chamomile extract

Feed conversion is shown in Figure 2. There were no differences between groups

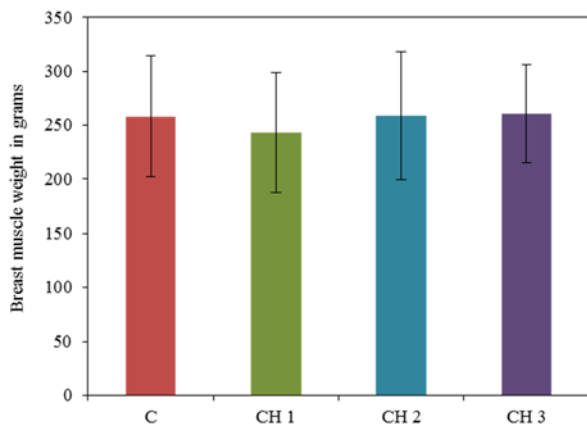
Fig. 2 Feed conversion in kilograms.



C – concentration 0% of chamomile extract  
 CH 1 – concentration 0.3% of chamomile extract,  
 CH 2 – concentration 0.6% of chamomile extract,  
 CH 3 – concentration 1.2% of chamomile extract,

Breast muscle weight is shown in Figure 3. There were no differences between groups

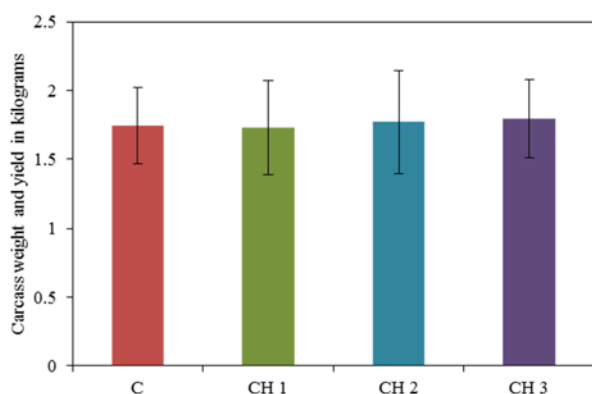
Fig. 3 Breast muscle weight in grams.



C – concentration 0% of chamomile extract  
 CH 1 – concentration 0.3% of chamomile extract,  
 CH 2 – concentration 0.6% of chamomile extract,  
 CH 3 – concentration 1.2% of chamomile extract,

Carcass weight and yield is shown in Figure 4. There were no differences between groups

Fig. 4 Carcass weight and yield in kilograms.



C – concentration 0% of chamomile extract  
 CH 1 – concentration 0.3% of chamomile extract,  
 CH 2 – concentration 0.6% of chamomile extract,  
 CH 3 – concentration 1.2% of chamomile extract,

According to (Cabuk et al., 2006) the herbal essential oil mixture may be considered a potential growth promoter. In their study demonstrated that supplementation of a mixture of herbal essential oils to the diet reduced feed intake and improved feed conversion ratio. These effects were different for broilers originating from young compared to old breeder flocks at 21 days of age. Broilers originating from young breeders had better feed conversion ratio than old breeders [5].

Use of herbal extracts especially garlic improved feed conversion ratio than old breeders comparable to virginiamycin in broilers. This effect could be attributed to improvement of digestive enzymes

secretion. The most effective in immune function enhancement of the test herbal extracts were extracts from coneflower and garlic. These extracts were able to reduce the serum lipids. Remarkable was improvement of selected intestinal bacterial populations through these extracts [6].

Skomorucha and Sosnówka-Czajka (2013) demonstrated positive effect of the addition of 2 ml·l<sup>-1</sup> chamomile in drinking water on broiler chickens organisms. Herb extract contributed to a decrease in cholesterol level and an increase in the immunoglobulin complex in the blood of experimental birds compared to the control group. The chamomile increased the body weight of the birds [7]. Supplementation of diets with thymol and cinnamaldehyde has positive impacts on gut microbiota, growth performance and welfare in monogastric animals [8]. Inclusion of 1 % anise and 1 % in broiler diets significantly improves the daily live weight gain and feed conversion ratio during a growing period of 6 week. These additives may be considered as a potential growth promoters for poultry due to stimulating digestive effect, antimicrobial effect and positive effect on performance [9].

## Conclusion

In our experiment, which was based on supplementation of chamomile extract, we monitored its effect on increments, feed consumption and carcass yield of broiler chickens. Our experimental hypothesis that the supplementation of chamomile extract, will affect the higher chickens weight, improve feed conversion and better carcass yield was not confirmed.

## Acknowledgement

This study was supported by the IGA IP 9/2014 Vliv přísadky fyto-genických aditiv do krmné dávky brojlerových kuřat na jejich růst a složení mikroorganismů v trávicím traktu.

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