



## EFFECT OF DIETARY INCLUSION OF TURMERIC AND CINNAMON POWDERS ON SOME IMMUNE SYSTEM PARAMETERS IN BROILER CHICKENS

Mohammad Naderi,<sup>1</sup> Nasrollah Pirany,<sup>1</sup> Ebrahim Asadi-Khoshoie,<sup>1</sup> Fariborz Khajali,<sup>1</sup> Mohammad Reza Akbari<sup>1\*</sup>

<sup>1</sup>Animal Science Department, University of Shahrekord, Shahrekord, Iran

Email: akbari-m@agr.sku.ac.ir

This study was conducted to evaluate the effects of dietary inclusion of turmeric and cinnamon powders on some immune system parameters of broiler chickens. In a completely randomized design with 6 treatments of 4 replicates each, 240 day old male broiler chicks (ROSS 308) were used. Dietary treatments were as follow: 1) basal diet (control); 2) basal diet + 10 ppm avilamycin (positive control); 3) basal diet + 0.25 % turmeric powder; 4) basal diet + 0.75 % turmeric powder; 5) basal diet + 0.25 % cinnamon powder; 6) basal diet + 0.75 % cinnamon powder. Diets were fed from 1 to 21 d of age. At d 21, two chicks from each replicate were randomly selected and blood samples were collected from wing vein for differential leukocyte count, hematocrit (PCV), and antibody titer against IBV, IBD, and ND vaccines. No difference was seen among treatment groups regarding monocyte and hematocrit percentages ( $p>0.05$ ). However, inclusion of turmeric powder at the levels of 0.25 and 0.75 % of the diet and cinnamon powder at the level of 0.75 % of the diet caused a significant increase in lymphocyte percentage compared to control group ( $p\leq 0.05$ ). Furthermore, turmeric at the level of 0.25 % of the diet significantly decreased heterophile percentage compared to control group ( $p\leq 0.05$ ). Also, heterophile to lymphocyte ratio decreased significantly ( $p\leq 0.05$ ) in groups consuming diets containing 0.25 and 0.75 % turmeric and 0.75 cinnamon powders comparing to control group. There was no significant difference among treatment groups for antibody titers against IBD and ND vaccines ( $p>0.05$ ). However, 10 ppm avilamycin in the diet caused a significant decrease in antibody titer against IBV vaccine comparing to control group ( $p\leq 0.05$ ).

Heterophile to lymphocyte ratio has been introduced as a reliable index for evaluation of stress in poultry [1]. Different stressors such as scare, hungry, thirst, and overcrowd, can increase the heterophile to lymphocyte ratio in poultry [2]. The reducing effects of both levels of turmeric, and cinnamon at the level of 0.75 % of the diet, on heterophile to lymphocyte ratio, indicates that turmeric and cinnamon powders may be used as stress modulators in poultry nutrition.

### References

- [1] Gross, W. B.; Siegel, H. S. *Avian Dis.* **1983**, *27*, 972-979.  
[2] Hocking, P. M.; Maxwell, M. H.; Mitchell, M. A. *Br. Poult. Sci.* **1993**, *34*, 443-458.

## IMPROVED OF YIELD AND YIELD COMPONENTS BY BIOFERTILIZER IN MEDICINAL PLANT FENNEL (*FOENICULUM VULGARE* MILL.)

Majid Amini Dehaghi,<sup>1\*</sup> Ayatollah Rezaei<sup>2</sup>

<sup>1</sup> Medicinal Plants Research Center, Department of Agronomy, Faculty of Agriculture, University of Shahed, Tehran, Iran

<sup>2</sup> Medicinal Plants Research Center, Department of Horticulture, Faculty of Agriculture, University of Shahed, Tehran, Iran  
E-mail: [amini@shahed.ac.ir](mailto:amini@shahed.ac.ir)

Application of biofertilizers in medicinal plants production in sustainable agriculture with aim of remove or reduce the chemical input in order to achieve increased quality and sustainability of yield is very important. The aim of this study was determining the effects of biofertilizers on yield quantification of medicinal plant fennel. The treatments consisted of mychorizal inoculation, phosphoric biofertilizer (Barvar 2) and phosphoric fertilizer (0, 50, 100 kg/ha). The experiment was performed as factorial on the base of randomized complete blocks design and three replications. Control included chemical fertilizers (NPK: 90, 60, 90 kg/ha). Results showed that inoculation with Barvar 2 lead to production of 46.48 compound umbel/plant, 0.98 tiller, 21.314 g dry biomass/plant, 1707.72 kg total dry biomass/ha and 5.716% oil yield. Compared between the two mycorrhizal inoculation showed that most compound umbel (51.422) and tiller number (1.040) were achieved by inoculation with *Cebacina vermifera* and lower dry biomass/plant (19.840 g), total dry biomass/ha (1587.23 kg) and weight of thousand seed (4.813 g) were observed under other mycorrhizal treatment. Effect of different levels of phosphorus fertilizer on the measured parameters was also significant. Maximum number of tiller (0.77), yield (314.86 kg/ha), dry biomass/plant (22.485 g), total dry biomass/ha (1798.79 kg) and the essential oil yield (5.91%) was obtained under effect of 100 kg of phosphorus. Interaction effect of phosphorus and Barvar 2 fertilizers was significant on yield, oil yield, seed yield and tiller number. Combination effect of all three fertilizers resulted in the production of 28.784 g dry biomass/plant, 2302.7 kg dry biomass/ha, 8.099 l/ha oil yield, 57.56 compound umbel/plant and 1.600 tiller/p which were greater than that of the control, but the seed yield (535.85 kg) and weight of thousand seed (6.013 g) in control conditions (fertilizer NPK) were greater than that of the treatments.