THE EFFECT OF FOLIC ACID AND METHIONINE *IN OVO* ADMINISTRATION ON DEVELOPMENT AND SELECTED BLOOD PARAMETERS OF DOMESTIC CHICKEN (*Gallus gallus domesticus*).

Karolina Barbara Trzeciak

ABSTRACT

The aim of this study was to determine the impact of various doses of methionine and/or folic acid administered *in ovo* at different stages of embryonic development on the embryogenesis and postnatal development, as well as selected haematological and biochemical blood parameters of the domestic chicken (*Gallus gallus domesticus*).

The experimental material constituted 835 eggs from the broiler breeder flock of Ross 308 line. The experiment was performed in two stages. The aim of the first stage of the experiment was to investigate the influence of early administration (E4) of methionine and/or folic acid on the course of embryogenesis and postnatal development, as well as selected haematological and biochemical blood parameters of the domestic chicken. In the second stage investigational substances were injected *in ovo* during the late stage of embryonic development (E17).

In both stages of the experiment the basic parameters of hatching was determined. Biochemical (the concentration of uric acid and homocysteine in the blood plasma and the glucose in whole blood) and hematological (blood hemoglobin content, hematocrit value, RBC, WBC with leukogramem, MCV, MCH, MCHC) analyzes of blood were performed as well as the histological analyzes of selected organs. Dead and unhatched embryos was subjected subjected to embryopathological analysis. Furthermore, in the second stage of experiment the weight of chicks was determined on 1., 7. and 35. days of age.

It was proved that excess of methionine may interupt the embryogenesis process and cause malformations and also affect the histological image of pancreas, kidney and liver. The administration of methionine at 4th day of embryogenesis increases

mortality immediately after manipulation, whereas folic acid may prevent the disturbance of homeostasis immediately after *in ovo* injection at early stage of embryogenesis. Nevertheless embryo mortality after early iniection of folic acid increases during peri-hatching period because of improper orientation of the chick inside the egg. This may indicate a defect of the nervous system of the embryo. Folic acid also affects the weight and function of heart and red blood cell's measurments, however it is difficult to unambiguously conclude whether these changes are beneficial. There was no long-term effect of experimental substances on body weight of chicks regardless the injection time. After *in ovo* injection at E17, both folic acid and methionine increased the degree of the yolk sac resorption during the first week of life. However the number of white blood cells in methionine supplemented groups were the lowest. It may indicate a reduction in the resistance of the chicks in relation to other groups. At an early stage of embryogenesis the level of homocysteine in the blood decreased after supplementation with folic acid.

Results presented in this study suggest that *in ovo* injection of methionine and/or folic acid affects hatchability and haematological and biochemical blood parmeters in chicks.

Keywords: chicken embryo, methionine, folic acid, hematology, homocysteine, embryogenesis .

Treciale