

From the State Veterinary Medical Institute, Helsinki, Finland.

## ON THE EFFECT OF PAYZONE-FEEDING ON SOME BLOOD CONSTITUENTS OF GROWING CHICKENS

By

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ANDERSSON, P. and ANNA-STINA GARRY-ANDERSSON: *On the effect of payzone-feeding on some blood constituents of growing chickens*. Acta vet. scand. 1973, 14, 229—232. — Payzone-feeding has been found to cause a decrease in thyroid activity. In this study the blood of payzone-fed birds was investigated to find if this decrease would be strong enough to cause any changes in the content of GPT, GOT, alkaline phosphate, glucose, cholesterol, BUN, UA, total protein or globulin. No significant changes were found. A slight increase in GOT and UA was observed.

payzone; chicken; blood.

The mode of action of payzone [1,5-bis(5-nitro-2-furyl)1,4-pentadien-3-one amidinohydrazone hydrochloride] in improving the weight gain and feed conversion of chickens is not well understood. *Andersson & Garry-Andersson* (1973) found a depressed thyroid activity in connection with payzone-feeding, judged by changes in relative thyroid weight, epithelium:colloid relation and serum protein bound iodine (PBI). The increase in body weight might then, at least partly, be ascribed to a depressed thyroid activity.

Pathologically decreased thyroid activity, e.g. hypothyroidism, is followed by reduced blood sugar and increased cholesterol and globulin values in the blood of chicken (*Sturkie* 1965). In man glutamic-oxalacetic transaminase (GOT) is slightly increased in hypothyroidism (*Fleisher & McConahey* 1964).

The purpose of this study was to find out if the depressed thyroid activity found in connection with payzone-feeding is of a degree high enough to cause any changes in the content of any of the following blood constituents: glutamic-pyruvic transaminase (GPT), GOT, alkaline phosphatase, glucose, cholesterol, urea nitrogen (BUN), uric acid (AU), total protein or globulin.

### MATERIAL AND METHODS

Payzone, 10 p.p.m. in a commercial food, was given to three chickens for three weeks. Three chickens got the commercial food only during the same period. The birds were at the start five weeks old and came from the same flock. When the experimental feeding was finished, blood samples were taken in connection with decapitation and blood serum investigated for the constituents mentioned. The methods\* used were: for GPT and GOT a modified Reitman-Frankel method, for alkaline phosphatase a buffered magnesium thymolphthalein monophosphate substrate method, for glucose a glucose oxidase procedure, for cholesterol a modified Lieberman-Burchardt method, for BUN a method utilizing the Berthelot reaction, for UA the phosphotungstate procedure modified after Brown, for total protein the Biuret method modified after Rosenthal and for globulin the Erlich benzaldehyde reaction followed by diazo coupling.

### RESULTS

The results can be seen in Table 1. No significant changes were obtained. There was a slight increase in GOT and UA and decrease in cholesterol.

### DISCUSSION

The depression of thyroid activity observed in connection with payzone-feeding is within physiological ranges. True goitre has never been observed. Still the gain in weight might point to a depression of thyroid activity strong enough to be reflected in a depressed metabolic rate. Hypothyroidism, if pronounced, is followed by increased cholesterol and globulin and reduced blood

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\* The Unitest system.

Table 1. Results of blood tests of broiler chickens fed payzone compared to controls.

|          | GPT | GOT  | Alk.<br>phosph. | Glucose<br>mg/ml | Choleste-<br>rol<br>mg/ml | BUN | UA  | Tot. prot.<br>g/100<br>ml | Glob.<br>g/100<br>ml |
|----------|-----|------|-----------------|------------------|---------------------------|-----|-----|---------------------------|----------------------|
| Payzone  | 5   | 30   | > 100           | 2.30             | 1.40                      | 5   | 5.0 | 3.4                       | 2.5                  |
|          | 6   | 29   | > 100           | 2.90             | 1.50                      | 8   | 5.1 | 4.0                       | 2.6                  |
|          | 4   | 33   | > 100           | 2.60             | 1.22                      | 6   | 5.4 | 4.4                       | 2.7                  |
| Average  | 5   | 30.7 | > 100           | 2.60             | 1.37                      | 6.3 | 5.2 | 3.9                       | 2.6                  |
| Controls | 4   | 27   | > 100           | 2.70             | 1.60                      | 8   | 3.0 | 4.2                       | 2.9                  |
|          | 3   | 28   | > 100           | 2.50             | 2.10                      | 8   | 4.1 | 3.6                       | 2.4                  |
|          | 4   | 27   | > 100           | 2.50             | 1.33                      | 7   | 4.9 | 3.4                       | 2.3                  |
| Average  | 3.7 | 27.3 | > 100           | 2.57             | 1.679                     | 8.7 | 4.0 | 3.7                       | 2.5                  |

sugar values. No changes were observed in these values in this experiment. Alkaline phosphatase activity is high in growing chicks up to four weeks of age but in general decreases thereafter (*Tanabe & Wilcox 1960*). An increase in weight gain as a consequence of increased growth rate might then be reflected in an increased alkaline phosphatase activity, whereas a weight gain achieved by an increased deposition of fat in connection with a decreased metabolic rate should probably not cause any changes. The value of alkaline phosphatase were at eight weeks of age still > 100 in both groups and gave no information on this point. GOT was slightly increased. This has been reported in connection with hypothyroidism (*Fleisher & McConahey 1964*). If the depression in thyroid activity caused by payzone is strong enough to cause a significant increase in GOT, further studies are needed. Also UA was somewhat increased, which might point to changes in the protein metabolism as impaired kidney excretion has so far not been reported in payzone-fed birds.

Functional thyroid disorders of man produce significant inverse correlations in serum creatine phosphokinase (CPK) activity and PBI (*Graig & Smith 1965*). Investigations on CPK in connection with payzone-feeding might reveal greater differences than the parameters here used.

## REFERENCES

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## SAMMANFATTNING

*Effekten av payzoneutfodring på en del blodvärden hos kycklingar.*

Payzone har visat sig ha en nedsättande effekt på sköldkörtelfunktionen. I detta arbete undersöktes om denna effekt är kraftig nog att återspeglas i ändrade värden i blodets halt av GPT, GOT, alkalinfosfatas, glukos, kolesterol, ureakväve, urinsyra, totalprotein eller globulin. Inga signifikanta skillnader erhöles. En lätt ökning av GOT och urinsyra förelåg.

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