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4.22. EFFECT OF SMALL QUANTITIES OF PROTEOLIZATES OR SYNTHESIZED AMINOACIDS IN DUCKLING FEED.

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EFFECT OF SMALL QUANTITIES OF PROTEOLIZATES OR SYNTHESIZED AMINOACIDS IN DUCKLING FEED

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INTRODUCTION

In the last years several tests were carried out to verify the effect of using proteolizates in animal feed. The use of proteolizates in very small quantity seems to have an auxinic effect on the performances of different animal species (3,4,6,7,8,9,10,11,12,14,15). This fact is of particular interest since in Nature several animal by-products with high protein content might be used as animal feed by submitting them to enzymatic digestion or acid hydrolysis. The use of proteolizates, obtained by chemical and/or enzymatic lysis of animal proteins (aa-pools), gave good results in all the tested species. The AA gave only hypothesis on the physiological mechanism of their action; however all the AA excluded the alimentary hypothesis due to the premix effect of the added aminoacids (aa.) (5, 13). The aa-pools are consist of a known and an unknown part. The known part may change according to the intensity and duration of the enzymatic and chemical hydrolysis (different ratio between free aa., dipeptides, polipeptides and so on). The unknown part may vary according to the intensity and the num-

Tab.1 Components of the basal-diet.

| | STARTER | FINISHER |
|---------------------------|---------|----------|
| corn, yellow grain.....% | 61 | 70 |
| soybean meal (44%prot).* | 14 | 12 |
| fish meal (AAFCO).....* | 4 | 4 |
| meat meal(45%prot).....* | 4 | 2 |
| Alfalfa meal (17%prot).* | 3 | 2 |
| wheat, shorts.....* | 9 | 6 |
| corn, distillers.....* | 1 | 0.5 |
| corn, gluten feed.....* | 1 | 1.2 |
| CaCO ₃* | 1 | 0.5 |
| CaHPO ₄* | 1 | 1 |
| NaCl.....* | 0.4 | 0.25 |
| premix(*).....* | 0.5 | 0.5 |
| dl-metionine.....* | 0.1 | 0.05 |

(*) premix furnished the following ingredients per kg of feed: vit.A, UI-15000; vit.D₃, UI-2000; vit.B₁, mg-1.5; vit.B₂, mg-3; vit.B₆, mg-2; vit.B₁₂, mg-.025; vit.E, mg-7.5; vit.K, mg-1.5; vit. PP, mg-25; d-pant.acid, mg-8; choline,mg-500; Co, mg-2; Fe, mg-30; I, mg-1.4; Mn, mg-80; Cu, mg-1.5; Zn, mg-30;BHT, mg 50.

ber of purification passages. The free aa. or an unknown growing factor (UGF) contained in the unknown part of the aa-pool determines the auxinic effect, which is the present question (13). The auxinic effect of proteolizates on growth and slaughtering traits was demonstrated also in Muscovy duck (3); if the effect was due to the free aa. or to an eventual UGF contained in the aa-pool remained to be tested. With this aim the same aa. content of an aa-pool was artificially reconstituted, using synthetic aa. (aa-synt), and the effect of the aa-pool and the aa-synt was evaluated on Muscovy duckling performances.

MATERIAL AND METHOD

185 male Muscovy duckling were used for the trial. Birds were bred on wooden shave in small pens inside a force-draught poultry hou-

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se and divided into 12 homogeneous groups (3 theses, 4 replicates each), four of which were used as control. Density was 3 males/m² and breeding conditions were similar to our previous trials (2). Control groups (diet C) were fed a basal diet - whose composition was similar to the diet used by Bonomi et Al. (1986) (3) - and the other

Tab.2 Composition of the basal-diet.

| | STARTER | FINISHER |
|---------------------|---------|----------|
| CALCULATED (a.f.b.) | | |
| M.E.(poultry).MJ/Kg | 11.99 | 12.47 |
| protein.....% | 18.35 | 16.55 |
| fat.....* | 3.35 | 3.29 |
| fibre.....* | 4.49 | 4.07 |
| ash.....* | 7.85 | 6.12 |
| Ca.....* | 1.38 | 0.94 |
| P(total).....* | 0.87 | 0.73 |
| methionine.....* | 0.419 | 0.351 |
| cystine.....* | 0.245 | 0.227 |
| lysine.....* | 0.935 | 0.821 |
| tryptophane.....* | 0.224 | 0.202 |
| threonine.....* | 0.704 | 0.638 |
| ANALYZED (on d.m.) | | |
| d.m.....% | 88.30 | 87.54 |
| protein.....* | 19.78 | 17.67 |
| fat.....* | 3.53 | 2.98 |
| fibre.....* | 4.36 | 3.69 |
| ash.....* | 7.78 | 6.64 |
| Ca.....* | 1.31 | 1.13 |
| P(total).....* | 0.92 | 0.79 |

Tab.3 aa-pool, composition (d.m.=93.5%)

| | AA content total | free |
|------------------------|------------------|-------|
| Arginine.....% | 4.61 | 1.56 |
| Glycine.....* | 4.20 | 2.28 |
| Histidine.....* | 0.98 | 0.03 |
| Isoleucine.....* | 2.76 | 0.61 |
| Leucine.....* | 4.85 | 1.67 |
| Lysine.....* | 3.36 | 0.66 |
| Methionine.....* | 0.60 | 0.29 |
| Phenylalanine.....* | 3.28 | 1.04 |
| Treonine.....* | 2.62 | 0.69 |
| tryptophane.....* | 0.41 | 0.25 |
| Valine.....* | 4.34 | 0.98 |
| Total essential aa...* | 32.01 | 10.06 |
| Aspartic acid.....* | 6.21 | 2.21 |
| Alanine.....* | 3.98 | 1.58 |
| Cystine.....* | 0.70 | 0.52 |
| Glutamic acid.....* | 11.15 | 5.21 |
| Proline.....* | 5.10 | 2.13 |
| Serine.....* | 6.15 | 3.14 |
| Tyrosine.....* | 1.65 | 0.61 |
| Total content.....* | 66.95 | 25.46 |

Mineral content: Ca 5.6%⁰⁰; P 4.3%⁰⁰; Mg 2%⁰⁰; K 12%⁰⁰; Na 4.8%⁰⁰; Cu ppm 5.3; Fe 785ppm; Zn 47.4ppm; Mn 31.9ppm.

two groups were fed the same feed but with an added aa-pool (+.10%) (diet P) or with the same quantity

of aa-synt (diet S). Basal diet-components, -composition and aa-pool-composition are given in tab 1,2 and 3, respectively.

Individual live weight (lw), feed consumption (fc) and feed conversion efficiency (fce) was monitored weekly. Slaughtering traits (ST) were determined according to Bagliacca et Al. (1989) (1).

All data were analyzed by least square analysis: ST, lw and fce + fc, were analyzed considering diet and pen as categorical variable and lw as continuous variable, only diet and pen and only diet, respectively.

RESULTS AND DISCUSSION

Parameters taken during the growing period and the slaughtering traits are given in tab. 4 and 5, respectively.

At the end of the growing period, duck fed diet C (lw = g 3798) were smaller compared with those fed diet P (lw = g 3927) and diet S (lw = g 3840). The differences were significant between P and C. The difference between S and P and the difference between C and S were not significant.

ST showed better performance with diet S [(ready to cook carcass(RCC) = +3.6%) or diet P (RCC = +2.3%) compared with diet C (RCC = g 2392) which had the poorest ST. The differences were significant between C and experimental groups. The difference between S and P was not significant.

The increase of the RCC was mainly due to the weight-increase of the skin with subcutaneous fat (SF) and the abdominal fat (AF). SF of experimental groups was

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significantly heavier than control group. No difference was observed between AF.

Tab.4- Growth performances.

| AGE | PARAMETERS | DIET C | DIET P | DIET S |
|-------|------------------------|---------------|-----------------|--------------|
| | | CONTROL GROUP | HYDROL. AA-POOL | SYNTHETIC AA |
| 1 | day bird.....n | 62 | 61 | 62 |
| " | " live weight.....g | 49 | 47 | 47 |
| 14 | days live weight.....g | 328 | 323 | 311 |
| 1-14 | " Avg. daily cons..g | 34 | 33 | 32 |
| " | " Feed efficiency | 1.69 | 1.70 | 1.70 |
| 28 | days live weight.....g | 1184 | 1162 | 1162 |
| 15-28 | " Avg. daily cons..g | 133 | 129 | 133 |
| " | " Feed efficiency | 2.18 | 2.16 | 2.18 |
| 42 | days live weight.....g | 2080 | 2042 | 2037 |
| 29-42 | " Avg. daily cons..g | 185 | 185 | 184 |
| " | " Feed efficiency | 2.89 | 2.96 | 2.98 |
| 56 | days live weight.....g | 3099 | 3081 | 3034 |
| 43-56 | " Avg. daily cons..g | 210 | 216 | 211 |
| " | " Feed efficiency | 3.09 | 3.24 | 3.19 |
| 70 | days live weight.....g | 3798a | 3927b | 3840ab |
| 57-70 | " Avg. daily cons..g | 252 | 275 | 274 |
| " | " Feed efficiency | 4.75 | 4.23 | 4.45 |
| 1-70 | " " " | 3.02 | 3.03 | 3.07 |

Means bearing different letters on the same row are different per $P < .05$

Tab.5- Slaughtering traits.

| | DIET C | DIET P | DIET S |
|-------------------------|---------------|-----------------|--------------|
| | CONTROL GROUP | HYDROL. AA-POOL | SYNTHETIC AA |
| Observations.....n | 28 | 28 | 28 |
| DEAD WEIGHT.....g | 3334 | 3335 | 3380 |
| HEAD WITH NECK....." | 338 | 331 | 341 |
| LEGS....." | 116 | 115 | 116 |
| INTESTINE....." | 225 | 222 | 219 |
| LIVER....." | 78 | 79 | 80 |
| GIZZARD....." | 98 | 94 | 97 |
| READY-COOK CARCASS...." | 2392b | 2447a | 2478a |
| SKIN....." | 449b | 510a | 499a |
| BREAST MUSCLES....." | 395 | 393 | 410 |
| TIGHT-LEG MUSCLES...." | 486 | 493 | 498 |
| TIGHT-LEG BONES....." | 84 | 85 | 86 |
| ABDOMINAL FAT....." | 64 | 71 | 72 |

Means bearing different letters on the same row are different per $P < .05$

CONCLUSION

Our results confirmed the trend observed in previous researches (3, 8, 14) with statistically significant effect on bird performance in relationship to an aa. pool (obtained by proteolysis or chemical synthesis) added to diet.

No valuable difference between the effects obtained with synthetic pooled aa. and natural lysate was observed.

The absence of difference between the aa-pool and the aa-synt allow us to conclude that the auxinic effect is mainly due to the presence in the diet of free aa..

REFERENCES

- 1-Bagliacca M.et Al.(1989)- Proc. 8th Int. Symp. of Water-fowl. Budapest: -.
- 2-Bagliacca M.et Al. (1988) - Ann. Fac. Med. Vet Univ. di PISA 41:175-.
- 3-Bonomi A. et Al. (1986) -Riv. di Avicoltura 56(5):37-.
- 4-Lambertini et Al.(1985) -Riv. di Coniglicoltura (12): 45-.
- 5-Mordenti A. (1985) - Conv. su "Aggiornamenti nella additivazione dei mangimi". Bologna.
- 6-Mordenti A.et Al.(1984)-Proc. XIII World Con. on Disases of Cattle Durban 2:634-.
- 7-Mordenti A.et Al.(1985) -Atti 6° Con.Naz.ASPA Perugia:93-.
- 8-Mori B. et Al. (1986) - Riv. di Avicoltura 55 (1): 27-.
- 9-Pignatelli (1984) -Conv.su"La lepre di allevamento" Garda.
- 10-Scipioni R. (1983) - Atti 5° Con. Naz. ASPA Gargnano: 139. and: 147-.
- 11-Scipioni R. et Al.(1985)- Atti 6°Con.Naz.ASPA Perugia: 63-.

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- 12-Scipioni R. et Al (1986) - Zoot. Nutr. Anim. 12: 423-.
 13-Scipioni R. et Al. (1989) - Zoot. Nutr. Anim. 15: 321-.
 14-Tocchini M. et Al (1984) - Ann. Fac. Med. Vet. Univ. di PISA 37: 297-.
 15-Zaghini G. et Al (1984) - Riv. Zoot. Vet. 12 (5): 298-.

EFFECT OF SMALL QUANTITIES OF PROTEOLIZATES OR SYNTHESIZED AMINOACIDS IN DUCKLING FEED

A trial was carried out to study if the auxinic effect of minimum quantities of aa-pools added to duck feed is due to their content in free-aa.. or to a possible unknown factor contained in the pool. The effects of synthetic-pooled aa.. and of the same aa.. obtained through chemical-enzymatic lysis of animal proteins were compared. The results confirm the trend observed in previous researches with effects on live weight and slaughtering traits. No valuable difference between the effects obtained with synthetic pooled aa.. and natural lysate was observed.

EFFET DE PETITES QUANTITÉS DE PROTEOLYSÉES OU DE AMINOACIDES SYNTHÉTISÉS DANS L'ALIMENTATION DES CANETONS DE BARBARIE.

Il a été effectuée una essai pour étudier si l'effet auxinique de proteolysées ajoutées à la nourriture pour les canards de Barbarie est provoqué des aa. ou d'un éventuel facteur inconnu contenu dans le pool. Les résultats confirment la tendance observée dans les précédentes recherches avec effets sur le poids vif et sur les rendiments d'abattage. Aucune diffirence a été observée entre les effets obtenus avec aa. synthétiques et les proteolysées.

EFEECTO DE LOS PROTEOLISADOS O DE LOS AMINOACIDOS SINTETICOS AÑADIDOS EN EL ALIMENTO DE LOS PATOS EN ACRECIMIENTO

Se ha hecho una prueba para averiguar si el efecto auxínico de los pools de proteolisados añadidos a pequeñas dosis a la dieta alimentar de los patos sea atribuible a los aa. presentes en el pool o sobre todo a la parte no conocida de los mismos. Los resultados confirman el efecto auxínico de los proteolisados a pequeñas dosis para el peso vivo y el busto mientras no ponen en evidencia minguna diferencia en las dos tesis sperimentales.

DIE WIRKUNG KLEINER QUANTITÄTEN VON PROTEOLYSATEN ODER SYNTHETISIERTEN AMINOSÄUREN IN DER FÜTTERUNG VON MUSCHUSENTEN

Eine Probe wurde ausgeführt, um zu untersuchen, ob die auxinische Wirkung von der Fütterung der Mushusenten hinzugefügten von proteolysaten, auf die reinen aa. oder auf einen unbekanntem Faktor im pool selbst zurückzuführen ist. Die Ergebnisse bestätigen die Tendenz, die schon in vorigen Untersuchungen beobachtet wurde, mit Wirkungen auf das Lebendgewicht und den Schlachtungsgewinn. Es wurde keinen Bedeutung zwischen den durch synthetisierte Aminosäure und natürliche Proteolysaten erhaltenen Wirkungen beobachtet.

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