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THE USE OF SOIA BEAN IN BROILER FEED FORMULAS

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Key words: soya bean, broiler, antinutritive factors.

Abstract: Protein sources from feed especially that of bird destination, were reconsidered because of the ban for feed utilization of some protein sources (meat meal, meat and bones meal) and because of their high prices. And so legume seeds meals became the best alternative. Their increased feed utilization raises problems concerning antinutritive factors. Antinutritive factors from feed come in majority from soya bean meals and other soya products. To evaluate the broiler productive performance and the effect of soya beans products on broilers' health. 700 one day-old broilers were distributed in 7 homogenous groups. Even the chicks were fed with isocaloric, isonitrogenous diets some differences registered: in evolution of body weight (between 12, 17 %- 21, 28%), pancreas hypertrophy (0, 82-1, 04% from body weight) and in pancreas cells integrity.

INTRODUCTION

One of the main problems standing before mankind on the threshold of the XXI century is satisfaction of demand in protein. About 70% of world protein stocks have vegetative origin and therefore preparations of this protein are very important.

Importance of soya is connected with following reasons: high content of protein with functionality for food products, good essential amino-acid balance, lipids and other biologically active compounds & micronutrients.

It is a common practice to elaborate broiler feeds including soya bean. However, it is well known that feeding growing animals on diets containing raw legumes as major sources of protein brings about a number of undesirable physiological and biochemical effects. They have a sulphur containing amino-acid deficiency and a variety of antinutritive factors (phytic acid, trypsin inhibitor, soine, ascorbidase, allergic factors lizinalanine, unusefull methionine, nitril-glycosizis).

Inactivation of intrinsic growth inhibitors present in soya beans through conventional heating methods must not affect organoleptic properties and nutritive value of the products.

This paper means a small piece in a whole complex of problems concerning antinutritive level from soya, keeping protein quality and a proper evaluation of \the inactivation process.

The purpose of the trial was to evaluate the broiler productive performance and the effect of using soya beans on pancreas hypertrophy.

MATERIALS AND METHOD

Some symbols will be used:

- SBM - soya bean meal
- FFSB - full fat soya bean
- M - Dl-methionone

- Mix - a mixture (yeast-*Hansenula sp., Lactobacillus sp., Bacillus sp.*)

A total of 700 one day-old broilers hatched from breeders of the same age and strain were randomly distributed in 7 groups:

- Group 1- control group
- Group 2- fed with a diet based on corn + SBM
- Group 3- fed with a diet based on corn + SBM + Mx + M
- Group 4- fed with a diet based on corn + SBM + Mix
- Group 5- fed with a diet based on corn + SBM + M
- Group 6- fed with a diet based on corn + FFSB
- Group 7- fed with a diet based on corn + FFSB + M

The broilers were fed with isocaloric, isonitrogenous diets graded in ME levels from starter to finisher feed. One of the seven groups of chicks was assigned to a control group. The remaining groups received formulations containing soya bean or soya meal in addition with DL-methionine or/and a mixture (yeast-Hansenula sp., Lactobacillus sp., Bacillus sp.)

The antinurritive level of soya bean samples were determined by the methods:

- Urease activity-IOS method 5506/1978;
- Tripsin inhibitor activity- Kakade method;
- Lectin activity- Petres method.

RESULTS AND DISCUSIONS

The chick's body weight was constantly quantified. At the end of the period, the control group was exceeded by the other groups. The methionine supplementation improves weight gain with 21, 28% (to groups E_2-E_5) and with 12, 17 %(to group E_4-E_7). Best results registered to group E_3 - 1805, 71 g (its diet containing both supplementations).

Table 1. The Evolution Of The Mean Body Weight

		E1	E2 p=0.0123	E3 p=0.0149	E4 p=0.0162	E5 p=0.0123	E6 p=0.0048	E7 p=0.2085
1		42.85 ±2.50	43.30 ±3.33	42.00 ±2.80	42.33 ±3.06	44.00 ±3.80	43.60 ±4.20	43.00 ±3.40
2		71.90 ±7.69	65.04 ±4.28	64.30 ±4.38	66.30 ±3.26	64.00 ±2.66	55.9 ±6.36	57.00 ±5.20
3		156.50 ±13.07	178.5 ±11.57	173.60 ±17.21	179.3 ±9.60	175.3 ±29.66	128.60 ±20.36	117.30 ±18.60
4		280.00 ±36.5	368.46 ±20.30	364.28 ±31.42	344.00 ±26.40	361.42 ±46.14	235.45 ±45.90	222.60 ±40.60
5	X ±Sx	463.50 ±50.20	605.90 ±47.22	591.92 ±45.33	519.28 ±44.64	578.07 ±46.38	358.88 ±79.33	375.76 ±71.44
6		624.28 ±105.85	836.80 ±83.63	807.22 ±56.00	735.83 ±71.66	881.66 ±97.91	402.85 ±102.85	514.09 ±92.40
7		731.42 ±85.57	1200.00 ±80.54	1162.77 ±112.24	978.91 ±97.08	115.90 ±91.81	630.00 ±107.14	687.22 ±122.42
8		937.14 ±82.28	1533.00 ±130.20	1555.55 ±172.77	1347.50 ±125.08	1520.00 ±112.72	877.14 ±148.51	1007.27 ±168.57
9		1126.00 ±68.40	1782.50 ±193.12	1805.71 ±232.42	1563.00 ±198.00	1753.33 161.00	974.00 ±156.60	1230.00 ±145.40

By way of exception the group E_6 accomplished only 86, 5% of the body weight obtained in the control group (its diet containing soya meal without any supplementation).

Fig.1. The evolution of the mean body weight

The mean carcasses and internal broilers' organs weight (% from body weight) were quantified. All the groups registered relatively close values concerning the internal organs' weight: glandular stomach, muscular stomach, liver, heart, spleen, gall bladder. Pancreas hypertrophy registered to some groups (table 2).

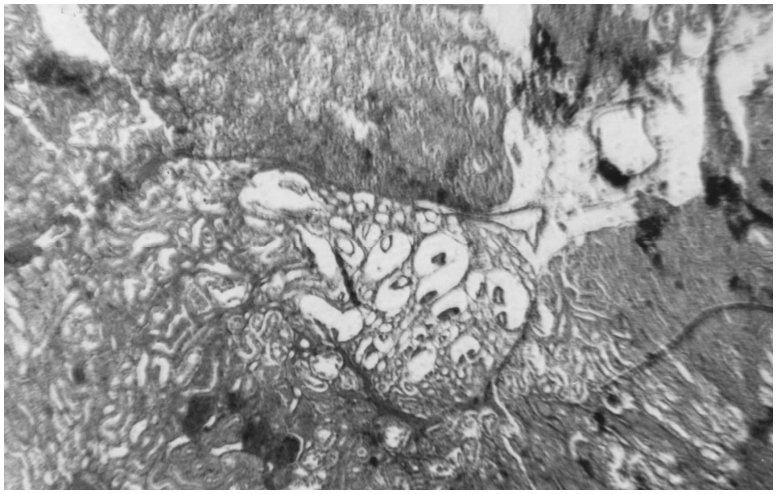
Table 2. The mean carcasses and internal broilers' organs weight

		body weight	glandular stomach	muscular stomach	liver	heart	pancreas	spleen	gall bladder
E1	g	361.50	13.90	15.40	14.10	2.70	1.90	0.34	0.20
E2		435.00	16.95	15.30	16.00	2.90	2.20	0.65	0.20
E3		465.00	15.70	15.69	18.50	3.20	2.20	0.60	0.20
E4		360.00	13.00	13.14	14.40	3.30	1.50	0.80	0.20
E5		268.00	11.70	11.32	17.40	2.30	1.10	0.50	0.30
E6		269.00	13.10	12.17	8.55	2.15	2.80	0.50	0.20
E7		332.50	9.70	17.20	9.90	2.05	2.75	0.40	0.35
E1	% from body weight	100.00	3.84	4.26	3.90	0.75	0.52	0.09	0.05
E2		100.00	3.89	3.52	3.68	0.66	0.51	0.15	0.05
E3		100.00	3.38	3.37	3.58	0.69	0.47	0.12	0.04
E4		100.00	3.61	3.65	4.00	0.91	0.41	0.22	0.05
E5		100.00	4.36	4.22	6.49	0.86	0.41	0.18	0.11
E6		100.00	4.87	4.52	3.18	0.80	1.04	0.18	0.07
E7		100.00	2.92	5.17	2.97	0.61	0.82	0.12	0.11

Pancreas hypertrophy diminished with aging of chicks towards the end of the experiment. The groups E_1 to E_5 situated themselves between 0, 41-0, 51% from body weight (control group-0, 52%). It seems that soya meal gives higher values (0, 82-1, 04% from body weight to group E_7, respectively to group E_6)

Morfopathological changes are initial of congestive type (hemorrhages, capillary ecstasies) in liver, kidney, pancreas (col.H.E.A.-fig2, foto 1,2,3) becaming degenerative to the end of the experiment: vacuolization, necrosis of pancreatic noble cells (col. uronil- acetate and Pb. citrate Reynold's- fig.3,foto 4,5).

Fig.2. Foto 1,2,3 col. H.E.A.(images of liver-1,Kidney-2 and pancreas-3),10x3



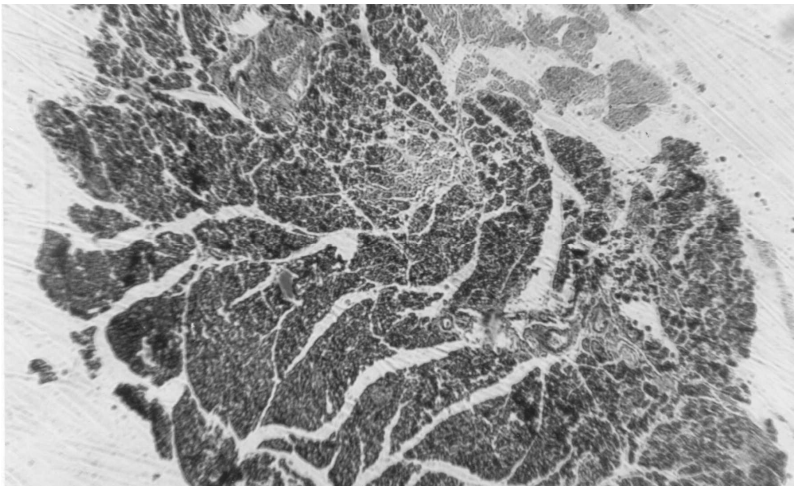
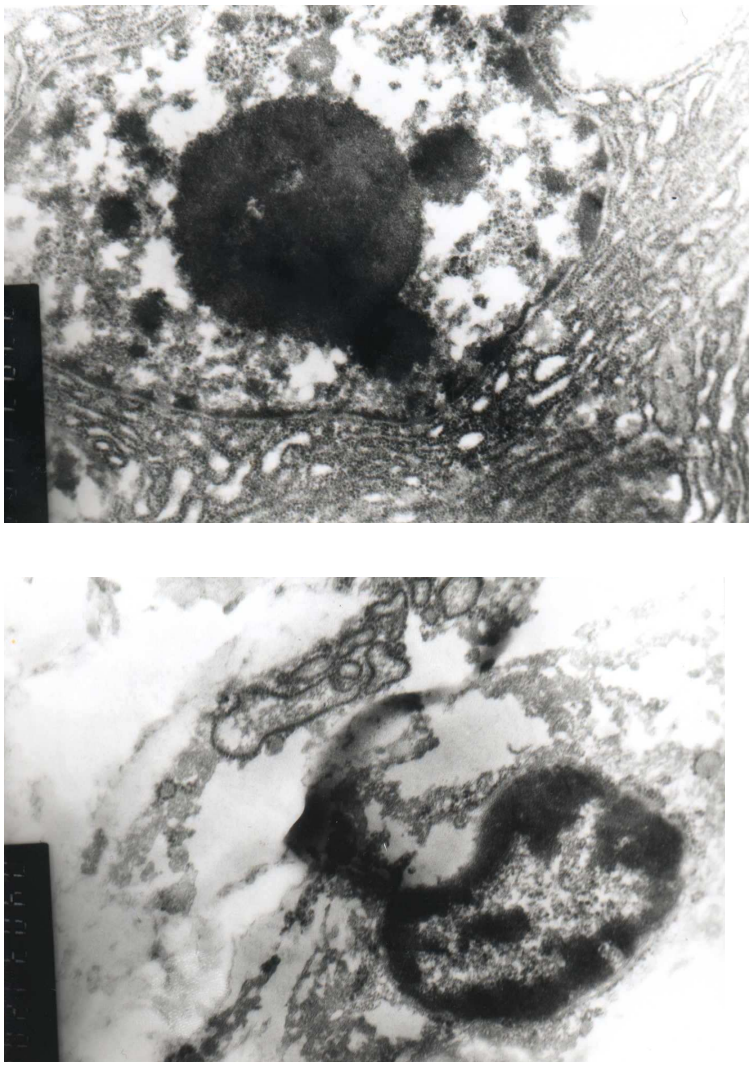


Fig.3. Foto 4,5(pancreatic cells) col. uronyl- acetate and Pb. citrate Reynold's , 22500x



Raw chemical composition of soya products comparing with reference values (I.N.R.A. 89, N.R.C. 94, C.V.B. 94, S.E.T.N.A. 95) show significant differences only in fiber content. (FFSB – 3.05% , SBM -1,58%) and in fat content (SBM -1%).

Table 3. Raw chemical composition of soya products

Parameters		DM %	MS %	RP %	FIBER %	FAT %
FFSB	determinate value	90.99	49.4	33.11	11.45	19.27
	references value	88.30–90.60	5.10	34.30–37.00	5.30–8.50	18.00–19.80
SBM	determinate value	88.87	8.37	38.94	9.98	2.24
	references value	88.5	6.50	41.15–45.10	6.20–8.40	1.20–1.24

CONCLUSIONS

- The broiler productive performances are better when feed formulas containing SBM;
- DL-methionine and described mixture supplementation always improves results (with 1- 4,7%) ;
- Soya meal, even with the supplementation, can affect chicks' health;
- The pancreas hypertrophy is correlated with IU (Urease Activity) and with the broiler's age.

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