

# EFFECT OF INCREASING DIETARY LEVELS OF RAW FULL FAT SOYBEANS ON PERFORMANCE AND PANCREAS WEIGHT OF BROILER CHICKEN

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## INTRODUCTION

The soybean (*Glycine max*) is one of the most important components in diets for broilers, and for others animals too. It has high nutrient value: a high content of crude protein and energy. Currently, most soybeans in poultry diets are used in the form of soybean meal (SBM) and extruded soybeans. However, the thermal treatment process could also destroy some essential nutrients. In the earlier studies focused on the use of raw full-fat soybean (RFFS) has been shown negative results of broilers linked to trypsin inhibitor (TI) impact. There is not so many results available on the lower TI soybean hybrids less-required treatment for optimally inclusion full-fat soybeans in to the broilers diets. In recent years, there has been progress in soybean breeding with lower TI content in soybean hybrids as outcome. These hybrids can be used by omit the energy and costly intensive operation for soybean treatment and get better use of its nutrients.

The aim of this study was to evaluate the influence of soybean meal and oil replacement by increasing levels of raw full-fat soybean in broiler diets on growth performance and pancreas weight.

## MATERIAL AND METHODS

In the experiment in total 208 ROSS 308 male broiler chickens were used. The experiment period was from 10<sup>th</sup> to 38<sup>th</sup> day of age. On the beginning, the groups were set up with similar live body weight of broilers without significant differences. Four dietary treatments were used: Positive control (without raw full-fat soybean) and three experimental groups with rising content (4%, 8% and 12%) of raw full-fat soybean. Broilers were fed by grower diets based on wheat, SBM and corn. All diets (Table 1) were formulated to be isocaloric and isonitrogenic (20.5 % CP; 12.7 MJ ME/kg). Each treatment had four replicates with 13 broilers. Broilers were individually weighed on the digital scale with 0.1 g accuracy always in the morning on the 10<sup>th</sup>, 17<sup>th</sup>, 24<sup>th</sup>, 31<sup>st</sup> and 38<sup>th</sup> d during the experimental period. Feed conversion was determined by individually feed mixture weighing for each cage (replication). The pancreases were removed manually after the broilers were killed at an average of three individual cocks from each replication and they were weighed on the digital scale with 0.1 g accuracy.

Table 1 Composition of experimental diets

	C	RFFS4	RFFS8	RFFS12
Wheat	390.8	390.8	390.8	390.8
Maize	250.0	250.0	250.0	250.0
Soybean meal <sup>1</sup>	273.0	240.2	207.4	174.6
<b>Raw full-fat soybean<sup>2</sup></b>	<b>0</b>	<b>40</b>	<b>80</b>	<b>120</b>
Soybean oil	45	37.8	30.6	23.4
L-Lysine HCl	3.0	3.0	3.0	3.0
L-Threonine	1.0	1.0	1.0	1.0
DL-Methionine	2.7	2.7	2.7	2.7
Limestone	14.5	14.5	14.5	14.5
Monocalcium phosphate	12.5	12.5	12.5	12.5
Sodium chloride	2.0	2.0	2.0	2.0
Sodium carbonate	2.5	2.5	2.5	2.5
Premix <sup>3</sup>	3.0	3.0	3.0	3.0

<sup>1</sup> soybean meal contains 6.7 TI

<sup>2</sup> full-fat soybean contains 13.2 TI

<sup>3</sup> premix provided per kg diet: retinol 13 500.00 IU, cholecalciferol 499.80 IU, alpha tocopherol 35.10 mg, menadione 3.00 mg, thiamine 2.25 mg, riboflavin 6.00 mg, pyridoxine 5.10 mg, cobalamin 0.02 mg, calcium pantothenate 11.01 mg, niacin 32.49 mg, folic acid 1.50 mg, biotin 0.26 mg, betain 45.00 mg, choline chloride 250.20 mg, Fe 75.00 mg, Cu 15.00 mg, Mn 115.20 mg, Zn 108.00 mg, Se 0.30 mg, I 1.05 mg, Co 0.25 mg

Table 2 Live body weight of broilers

Groups	BW (g)				
	10. day	17. day	24. day	31. day	38. day
C	291 ± 3.8 <sup>a</sup>	665 ± 9.5 <sup>a</sup>	1146 ± 22.9 <sup>a</sup>	1823 ± 36.0 <sup>a</sup>	2443 ± 56.3 <sup>a</sup>
RFFS4	287 ± 4.2 <sup>a</sup>	639 ± 8.9 <sup>a</sup>	1078 ± 25.1 <sup>a,b</sup>	1722 ± 30.2 <sup>a,b</sup>	2306 ± 41.2 <sup>a,b</sup>
RFFS8	286 ± 4.1 <sup>a</sup>	625 ± 8.7 <sup>a,b</sup>	1090 ± 19.2 <sup>a,b</sup>	1677 ± 33.2 <sup>a,b</sup>	2296 ± 38.3 <sup>a,b</sup>
RFFS12	289 ± 3.6 <sup>a</sup>	585 ± 7.2 <sup>b</sup>	1039 ± 13.9 <sup>b</sup>	1603 ± 26.0 <sup>b</sup>	2158 ± 37.9 <sup>b</sup>

Different superscripts (a, b) indicate statistical significant difference between groups (P<0.05)

Table 4 The effect of raw full fat soybean on pancreas weight

	C	RFFS4	RFFS8	RFFS12
Weight of pancreas (g)	5.56 ± 0.25 <sup>b</sup>	7.68 ± 0.39 <sup>a</sup>	7.65 ± 0.28 <sup>a</sup>	9.00 ± 0.41 <sup>a</sup>
% of pancreas from body weight	0.23 ± 0.01 <sup>a</sup>	0.33 ± 0.05 <sup>a,b</sup>	0.33 ± 0.01 <sup>a,b</sup>	0.41 ± 0.01 <sup>b</sup>

Different superscripts (a, b) indicate statistical significant difference between groups (P<0.05)

Table 3 Feed conversion ratio

Groups	FCR (kg/kg)
C	1.69 ± 0.04 <sup>a</sup>
RFFS4	1.73 ± 0.07 <sup>a,b</sup>
RFFS8	1.76 ± 0.08 <sup>a,b</sup>
RFFS12	1.90 ± 0.05 <sup>b</sup>

Different superscripts (a, b) indicate statistical significant difference between groups (P<0.05)

## RESULTS

Live body weight (Table 2) and FCR (Table 4) were depressed when RFFS (group RFFS4, RFFS8 and RFFS12) was fed compared group C with feeding of SBM. Broilers performance decreased with increasing dietary levels of RFFS. Significantly (P<0.05) lower body weight had the group RFFS12 from the 17<sup>th</sup> day of age till the end of the experiment (38<sup>th</sup> day). Groups RFFS4 and RFFS8 had lower body weight during the whole experiment compare to group C, but without significant difference. The BW and FCR of group RFFS12 was significantly impaired (P<0.05) in comparison to the control group (C) (BW 2157.8 g vs 2442.5; FCR 1.90 g/kg vs 1.69 g/kg). Groups RFFS4 and RFFS8 achieved lower BW and deteriorated FCR compared to control group, but without significant difference (P<0.05).

Pancreatic weight increased significantly (P<0.05) as a response to presence of RFFS in the broiler diets (Table 4). The pancreas weight of RFFS4, RFFS8 and RFFS12 was increased by 38, 38, and 62%, respectively, in comparison to C. When the weight of pancreas have been compared to live body weight of broilers on the end of the experiment (38 day), significantly (P<0.05) smaller pancreas had group RFFS12 compare to C group.

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