

# Use of natural extract of chestnut (Silvafeed ENC<sup>®</sup>) in broiler feeding: effect on growth performance

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**ABSTRACT** - The aim of this research was to study the effect of addition of natural extract of chestnut (*Castanea sativa*) Silvafeed ENC<sup>®</sup> in commercial feed on the growth of broilers. Two hundred and four broiler chicks (Cobb 508) 14 d old male, were randomly assigned to 12 floor pens and fed commercial diet supplemented with 0% (CE0), 0.15% (CE15), 0.20% (CE20) and 0.25% (CE25) of ENC. The ENC addition showed a beneficial effect on weight increases daily feed intake (DFI) and average daily gain (ADG) from 14 to 35 days of age. In the second half of trial the effects were less evident and concluding with a detrimental effect in CE25 group. Feed conversion rate (FCR) appears to be statistically different in the second and fifth weeks of feeding. The inclusion of ENC at 0.20%, (CE20) had significant influences on final weight, DFI and ADG and a favourable influence on FCR in comparison with the other three groups. In conclusion, ENC has been shown to be beneficial at concentrations between 0.15% and 0.20%.

**Key words:** Hydrolysable tannin, Silvafeed ENC, Broilers, Growth performance.

**INTRODUCTION** - In 2006, the EU banned the use of antibiotic growth promoters (AGP) in animal feeding. Many approaches have been proposed in order to replace the AGP and to maximise performance and economic viability. The hydrolysable tannins appear interesting (Graziani *et al.* 2006). From a nutritionist's view point, tannins in animal feeds are a double-edged sword. For a long time, tannins have been considered as antinutritional factors reducing digestibility of crude protein and consequently growth performances in monogastric animals (Mueller-Harvey, 2006) while in ruminant nutrition, the results appear more positive (Mueller-Harvey, 2006; Tabacco *et al.*, 2006). Moreover, tannins have shown anthelmintic properties in ruminants (Min and Hart, 2003) and in birds (Marzoni *et al.*, 2005). In our previous findings (Schiavone *et al.*, 2006) we observed that Silvafeed ENC in broiler feed did not influence the *in vivo* digestibility. The aim of this trial was to study the growth performance of broilers fed with different doses of ENC.

**MATERIAL AND METHODS** - Two hundred and four 1 day-old male Cobb 508 broiler chicks were housed in a standard broiler house and fed ad libitum. In the first two weeks, the heating was provided to keep the room temperature in accordance with standard brooding practices. The trial lasted for 42 days from 14 to 56 d of age. On the 14<sup>th</sup> day, the chicks were weighed and randomly divided into 12 groups of 17 chicks each. Each group was assigned to a floor pen (1.7 m<sup>2</sup>) furnished with rice hulls and wood chip (50:50 w/w) as litter. A commercial diet (ME: 12.34 MJ/kg; crude protein: 20%) was supplemented with 0% (CE0), 0.15% (CE15), 0.20% (CE20) and 0.25% (CE25) of ENC. The diets were assigned to 12 pens according to latin square design. Each chick was identified by wing mark and every week, individual body weight and feed consumption per pen were recorded. Mortality was recorded daily. At the end of the cycle, individual average daily gain (ADG), daily feed intake (DFI), and feed conversion rate (FCR), on a flock basis, were calculated. Data were statistically analysed with ANOVA of SPSS (SPSS Inc., Chicago, IL, USA).

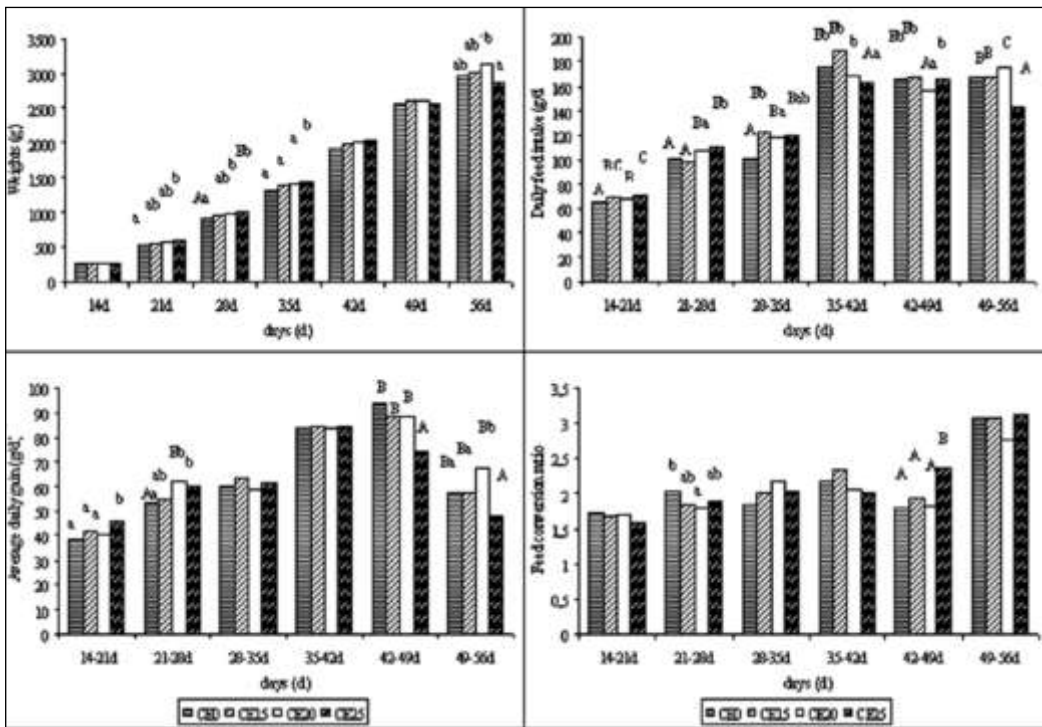
**RESULTS AND CONCLUSIONS** - The weights, DFI, ADG and FCR measured at different ages are shown in figure 1. The addition of ENC showed a positive effect on weight increases in the first three weeks; growth was directly proportional to the concentration of ENC. From the 42<sup>nd</sup> to 49<sup>th</sup> day of age the favorable trend showed by ENC was maintained, but the differences were not significant.

On the 56<sup>th</sup> day CE20 group showed a significant higher weight than CE25 (Fig.1). In the first three weeks, irrespectively to ENC concentration, DFI was higher in the treatment groups than in the control; whereas from day 42 to day 56 the DFI showed a slowing down more evident in the group CE25 than the control, CE15 and CE20 groups; from day 49 to 56 the DFI in CE25 was significantly lower than the other groups.

Similarly, ENC had favorable influences on ADG in the first two weeks, especially for CE20 and CE25, while the effect in CE25 was drastically reversed in the last two weeks.

The effects on FCR were significant only from day 21 to day 28 and from day 42 to 49; during the second week group CE20 showed a more favorable FCR while, due to the reduction of ADG, in the fifth week CE25 showed an unfavorable rate.

Figure 1. Trends of broiler's weights, daily feed intakes, average daily gains and FCR.



A, B, C= $P<0.01$ ; a, b, c=  $P<0.05$ .

As a whole trial, CE20 had significantly positive effects on final weight, DFI and ADG (table 1). Favorable effects were evident also on FCR even though the differences among the four groups were not significant; CE15 and CE20, showed significant differences on DFI in comparison with CE0 and CE25. The highest final weight and more favorable FCR showed in CE20 group could be explained by the positive trend of digestibility observed in our previous study (Schiaivone *et al.*, 2006) and by the fact that ENC could modify the stability of the gastrointestinal microflora improving the competitive exclusion similarly to others plant extracts (de Lange, 2005). In fact, as observed by Li and Song (2004) and Graziani *et al.*, (2006), chestnut natural extract, has antimicrobial effects on different bacterial strains as *E.coli*, *B.subtilis* or *S.enteritidis* and *C. Perfringens* type A. In this trial, the observed FCR were better than the results of Diao and Qi (1999) which ranged from 2.20-2.24 within 0-8 weeks old of broilers and higher than those reviewed by

de Lange (2005). In conclusion, the broilers in this study showed an acceptable growth performance and the supplementation of ENC up to 0.20% appeared to be safety and allowed a beneficial effect on productive traits. Nevertheless, more research is necessary to understand the action of ENC at gastrointestinal tract level.

Table 1. Growth performances of broilers from 14 to 56 d of age.

Group	CE0	CE15	CE20	CE25	SE
Number	51	51	51	51	
Initial weight	263.70	266.60	274.61	272.65	2.54
Final weight	2967.11ab	3024.65ab	3144.70b	2881.46a	25.78
DFI*	128.91A	134.92B	132.28B	128.96A	0.44
ADG*	64.22ab	65.58ab	68.28b	62.40a	0.58
FRC*	2.02	2.09	1.96	2.10	0.02

Means with different letters in the same row differ significantly.

<sup>A, B</sup>= $P < 0.01$ ; <sup>a, b</sup>=  $P < 0.05$ .

\*DFI: daily feed intake; ADG: average daily gain; FRC: feed conversion ratio.

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