INCLUSION OF CRUDE OLIVE CAKE IN GROWING RABBITS DIET: EFFECT ON GROWTH AND SLAUGHTER YIELD.

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ABSTRACT

Two pelleted diets were distributed, during 08 weeks, to two groups of fattening rabbit. The first (control diet) is the only one rabbit feed available on the market and used by breeders. The second (experimental diet) is formulated to contain the minimum of ingredients and the maximum of low-cost by-products available locally in order to come back cheap; it contains 61% of hard wheat bran and 20% of crude olive cake. There was not significant difference on the main parameters of growth and slaughtering. The obtained performances are 24.68 g/d of growth, 77.5 g/d of feed consumption and 24.11 g/d of growth, 87 g/d of feed consumption respectively for the control group and the experimental one. The slaughter yield seems better with rabbits consuming the experimental diet (68.23 % *vs* 66.64).
Crude olive cake can be included in diets of fattening rabbits in total replacement of the alfalfa hay as source of fiber.

Key words: olive-cake, feed, consumption, growth, carcass.

INTRODUCTION

In developing countries, where exists a broad deficit in animal protein, the rabbit is recommended as good alternative and seems to be suitable to solve this lack.
The study of different fodders and by-products, especially the wastes or neglected resources, is very useful for improving rabbit breeding in those countries.

In Algeria, especially in Kabilian region, cultivation of olives has a long-standing tradition.The extraction of oil from olives lets annually a considerable quantities of olive cake (75 000 Tons). Generally, they are thrown in the area not far from the extraction units or around the forest. Then, it constitutes a source of pollution and is to the origin of fire departure.
Olive cake contain a height volume of raw fibre (35–50 $g.kg^{-1}$;SANCOUCY,1985) and can be used in the feeding of rabbits without effect on their health (RUPIC *et al.*1999).

In rabbit formulation, fibre is the second nutrient from an economic view, after the digestible energy.
Alfalfa hay is the traditional source of fiber in rabbits diets in Algeria; often represents more than 30% of the feed. She is imported and comes back very expensive.

This work aimed to evaluate crude olive cake as an untraditional source of feedstuff for complete substitution of alfalfa hay as fiber source in fattening rabbit rations.

MATERIAL AND METHODS

This study was conducted in the rabbitry of center of professional formation of Mechtras (Algeria) in May and June 2003.

Diets

The control diet is the one available on the market and used by the breeder. It contain maize, barley, dehydrated alfalfa, hard wheat bran and Soya meal (table 1). The second, experimental diet, is formulated to cover the nutritional requirements of fattening rabbits according to propositions of DE BLAS and MATEOS (1998) and to contain a maximum of hard wheat bran and olive cake. Olive cake used in this test is harvested in a traditional unit of extraction of olive oil. It has been dried naturally (spread out under the sun during ten days).

Table 1 : Composition of the 2 diets

	Price (DA/kg)	Control diet composition	Expérimental diet composition
• Hard wheat bran	10.00	28	61
• Olive cake	-	-	20
• Soja meal	26.50	3.5	18
• Barley	13.30	23	-
• Maize	13.30	2.7	-
• Dehydrated alfalfa	26.00	41.8	-
• Mineral & Vitamins	150.00	1	1
Final cost of the ratio		**2290 DA/kg**	**1237 DA/kg**
Chemical composition			
• Dry matter (% as fed)		89.05	90.01
• Crude proteins (% DM)		14.3	18
• Crude fibre (% DM)		15.02	15.6
• Digestible energy (kcal / kg MS)[(1)]		2643	2353

[(1)] Valued by method OF MAERTENS *et al.* (1987).

Animals and experimental design

Thirty descended rabbits of the local population (available at the breeders) were utilized. They were born in the central rabbitry which provides new breeders in animals. On the day of weaning (35 days after kindling), rabbits were placed in wire mesh individual cages in flat deck disposition (one level). They were distributed between 2 homogenous groups of 15 each, according to weaning weight and litter origin.
During the 8 weeks of the experiment, rabbits were fed *ad libitum* one of the 2 diets, with a weekly control of live weight and feed consumption. Fresh water was always available.
At the end of the experiment, all rabbits were slaughtered in controlled conditions according to BLASCO and OUHAYOUN (1996). The following weights were measured: raw skin, full digestive tract + other white abdominal organs, hot carcass, liver and kidney fat.

According to local tradition, carcasses were presented with head, thoracic content (heart, lungs,), liver, kidneys and with extremities of the legs and the corresponding skin. Slaughter rate was calculated on hot carcass basis.

Chemical and Statistical analysis

Chemical determinations were made according to AOAC recommendations (1984). Experimental data were analysed with a one way variance analysis on help of the STAT-ITCF version 5 (1991) statistical package. Calculations were done only for rabbits alive at the end of the experiment.

RESULT AND DISCUSSION

Nutritional composition of diets

Experimental diet (table 1) has been formulated to contain 20% of crude olive cake as main source of fibers in total replacement of the alfalfa. Also, the number of raw materials composing this feed had to be reduced to the minimum in order to reduce the price; it is the reason of the inclusion of wheat bran until 61%. These two main ingredients (olive cake and wheat bran) are poor in nitrogen but also in energy, we have been obliged to increase the proportion the Soya meal although this one is costly.
The experimental feed presented a good holding of pellet in spite of the elevated proportion of wheat bran (61%). The olive cake by its content in fat matters (8 to 15% according to SANSOUCY, 1985) would be to the origin.
Protein and fibre levels in the diets (table 1) can be considered as acceptable for rabbit mixed feeds (DE BLAS & MATEOS, 1998). Fiber level is similar in the two diets (15%). Experimental diet seems presents a light deficit in energy.

The price of experimental diet can be evaluated to 12.00 DA (local money) kg^{-1}. It represents only 54% of the commercial feed (control diet) price.

Growth performance

Three rabbits died during the experiment, 2 in the control group and 1 with experimental diet. In the control group, the 2 rabbits died during the first experimental week, most probably in relation with weaning and cage changing stress i.e. without any significant relationship with the feed consumed. In the experimental group, rabbit died with diarrhoea during the 4^{th} experimental weeks.

Average daily growth (table 2) was similar for the 2 groups (experimental and control diets). The average growth rate observed between 5 and 12 weeks (24.4 g/d) was weak. The feed intake was weak in the two groups but significantly higher in the experimental group than in the control group (86.96 *vs* 77.57 g/d). This situation would be caused by the high temperatures recorded in the region at the time of the test (37 °C). According to several authors (CHERICATO *et al.* 1992; COLIN, 1995; DUPERRAY *et al.*1998; …), the high temperatures in fattening reduce the growth by decreasing the feed intake.

Table 2: Average growth performances between weaning and slaughter age

	Control diet	Experimental diet	CV (%)	Signification
• Initial weight (g)	653	653.33	22.9	ns
• Final weight (g)	2035	2039.23	10.6	ns
• Average daily growth (g/d)	24.68	24.11	11.7	ns
• Feed intake (g/d)	77.57	86.96	14.3	*
• Feed conversion ratio	3.38	3.84	17.2	ns

* P<0.05 ; ns : non significant

The average growth rate observed in this experiment is lower than the one observed by BERCHICHE *et al.* (2000) in the similar conditions with a feed containing 56% of hard wheat bran (27 g/d). However, it's equivalent with those generally signalled on the local population (BERCHICHE *et al.* 1996; BERCHICHE and KADI, 2002).

The feed conversion ratio recorded is acceptable; it is similar in the two groups (3.38 and 3.84 respectively in the control group and the experimental group). This improvement would be in large part bound to the reduction of upkeep needs of the rabbits in relation with a lower live weight. It is a direct consequence of the reduction of the growth rate. According to DUPERRAY *et al*. (1998), the hot ambiance can decrease the feed conversion of about 6%.

Slaughter performance

The average slaughter live weight obtained at slaughtering (91 days) is 2037 g (table 3). It represents 68% of the adult weight of this population if this one is 3 kg. This rate is significantly higher degree of maturity than that commonly practised in Europe (50-55%; OUHAYOUN, 1989, DALLE ZOTE, 2000). In relation with this higher maturity, the average slaughter rate, better with the experimental diet (68.23 *vs* 66.64), is slightly higher than that generally observed for hot carcasses (62-65%) with the same presentation (DALLE ZOTTE, 2000). The elevated temperatures recorded during the test would be to the origin; according to COLIN (1995) and DALLE ZOTE (2000), the slaughter rate is the only criteria improved by the heat because of the reduction of the weight of skin and intestines. However, OUHAYOUN and CHERIET (1983) have observed similar values for rabbits submitted to different protein regimen.

Table 3 : Slaughter performances

	Control diet	Experimental diet	S.S	CV (%)
Number of slaughtered rabbits	13	14		
Live weight	2035	2039,23	ns	10 ,6
Skin (g)	193 ,84	208,57	ns	15,1
Full digestive tract (g)	330,38	277,5	*	11,5
Hot carcass weight (g)	1358,84	1365,71	ns	11,9
Liver weight (g)	74,23	61,07	*	18,2
Kidney fat (g)	25,76	23,21	ns	15,7
Slaughter rate (%)	66,64	68,23	*	2,9

* P<0.05 ; ns : non significant

In spite of this elevated rate of the maturity degree, the proportion of the kidney fat remains relatively low in the two groups (1.89% and 1.69% respectively with the control diet and the experimental diet).

CONCLUSIONS

Although the number of rabbits used in this experience is not sufficient to permit any final conclusion, crude olive cake seems to replace the alfalfa like source of fibers. It doesn't seem to influence performances of growth and slaughtering. The diarrhoea noted on the lost rabbit in the experimental group, can have a link with the diet. So before to suggest a wide utilisation of such diet, some new experiments should be conducted, in more common raising conditions.

Olive cake can constitute an alternative to the dehydrated alfalfa, as source of fibers, during the half of the year (October-April) where it is available. The combination of olive cake with wheat bran, cereal by-product which is available in great quantities in Algeria, can permits to reduce considerably the price of feed and, therefore the one of the carcass (currently around 350 DA/kg).

In Algerian conditions of production, the use of the available and low-cost agriculture by-products (olive cake, olive leaves, wheat bran and other cereal by-products, brewer's grains, straw….) is necessary to reduce the price of the feed that is one of the main obstacles to the development of the rabbit raising.

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