FEEDING OF LOCAL POPULATION RABBITS : EFFECT OF STRAW ADDITION TO LOW FIBER PELLETED DIETS, ON DIGESTIBILITY, GROWTH PERFORMANCE AND SLAUGHTER YIELD

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Abstract - Two groups of 26 weaned rabbits from the local population were fed during 8 weeks either a balanced pelleted diet (A), either a commercial pelleted diet with low fibre level (diet B : 4.71% crude fibre) plus free access to straw. In each group, 14 rabbits were placed in individual cages and the 12 others in collective cages of 3 rabbits. In addition, the diet's digestibility was controlled with 6 rabbits, 8 weeks old. Digestibility of diet B was the highest for dry matter (76.6 vs 69.5%) and energy (77.1 vs 69.6%). The feeding type had no significant effect on daily growth (22.4 g/d on average) or on daily feed intake (A : 79 g/d ; B: 74 g of pellets + 11 g of straw/day). The pellet's feed conversion ratios were identical for the 2 diets (3.49) but if the straw intake is included, the total feed intake / unit of weight gain is significantly higher (4.05). The final weight was slightly but not significantly higher for A rabbits (1745 g) than for B ones (1658 g). The slaughter yield (hot carcasses) was slightly higher ($P<0.10$) for A rabbits (65.2%) than for B rabbits (64.0%).

INTRODUCTION

Modern rabbit raising was encouraged in Algeria since 1987, but many technical problems are observed. For Algerian rabbit breeders the 2 main problems are the non availibility of improved breeds, and the absence on the local market of good quality pelleted diets (BERCHICHE and LEBAS, 1990). This situation is a great handicap for rabbit production in Algeria. As a matter of fact, at present the production is limited to the rural areas where rabbits of local population (3 kg adult) and poor quality feeds are employed. The object of the present experiment was to study the effective efficiency of this system of production during the fattening period, in comparison with the utilization of a balanced diet.

MATERIAL AND METHODS

This study was conducted in the experimental rabbitry of the University of Tizi-Ouzou (Algeria) in May and June 1995.

Experimental diets

The 2 experimental diets were formulated and manufactured in the local Algerian conditions of production. The main characteristics are summarized on Table 1. The pellets dimensions were 8 mm diameter and 12-14 mm length. Diet A was formulated in respect to growing rabbits requirements according to INRA recommendations (INRA, 1989). Diet B was the commercial diet available on the Algerian market. It was known for its low level of fibre (BERCHICHE and LEBAS, 1990). The 2 diets were offered *ad libitum* to rabbits with free access to water. In addition, local wheat straw was also offered *ad libitum* to rabbits fed diet B.

Table 1 : Composition of experimental diets and chemical analysis

DIETS	PELLETS A	PELLETS B	STRAW
Ingredients proportions (%)			
- Soya meal	21	10	-
- Maize	-	31	-
- Barley	40	-	-
- Wheat bran	11	51.5	-
- Wheat remilling	-	5	-
- Straw	25	-	100
- Minerals & Vitamins	3	2.5	-
- Calculated (1) Dig. Energy (kcal/kg)	2312	2590	700
Chemical composition (% as fed)			
- Dry matter	90.0	89.0	94.4
- Crude protein	16.4	16.1	3.0
- Crude fibre	13.2	4.7	33.3
- Ether extract	1.9	3.8	1.1

(1) Calculated with INRA (1989) digestible energy value of ingredients.

Animals

The 52 rabbits employed in this experiment were purchased at weaning from local breeders. They were divided in 2 homogenous groups according to litter of origin and individual weight. At 35 days, from each group 14 rabbits were placed in individual wire mesh cages and the others in 4 collective wire mesh cages of 3 rabbits. All the cages were placed inside of the university's rabbitry building. In addition 2 x 6 rabbits of the same origin and age were placed in digestibility cages and were fed diet A or B.

Data measured

Rabbit's live weight was measured individually every week, during 8 weeks. Feed intake (pellets and straw) was measured also every week, but only for individually caged rabbits. Digestibility of diets A and B was measured according to the standardized method proposed by PEREZ *et al.* (1995), but with 6 animals per diet. Three days after the end of the experiment, all rabbits were slaughtered in controlled conditions. The data measured were weights of live animal, skin, full digestive tract and hot carcass. The carcass included liver, kineys and head, but not the legs tips.

Statistical analysis

The data were analysed with a variance analysis performed with the SAS package GLM (SAS, 1987) in the INRA Center of Toulouse. For growth performances the initial live weight was employed as covariate and the final live weight for the slaughter data as well. When pertinent, the type of caging was also introduced in the factorial analysis.

RESULTS AND DISCUSSION

Nutritive value of diets

The crude fibre level of diet B was effectively low as it was presupposed (Table 1). The gross composition of diet A was close to the INRA recommendations (INRA, 1989).

Digestibility of dry matter (DM) and energy were significantly lower in diet A than in diet B (Table 2), but differences between nitrogen, crude fibre and lipids digestibilities were not significant. The digestible protein/digestible energy ratio of diet B (48.3 g/1000 kcal) was within the present recommendations but that of diet A was slightly higher (52.2).

Table 2 : Digestibility of pellets A and B.

	DIETS		Residual coef. of variation (%)	Statistical probability P
	Pellets A	Pellets B		
- Dry matter	69.45	76.60	3.99	0.002
- Nitrogen	73.97	77.76	4.33	0.109
- Crude fibre	11.23	16.88	73.73	ns
- Ether extract	53.68	76.99	18.26	0.016
- Energy	69.61	77.05	4.14	0.002

The DM digestibility of the commercial diet B (76.6%) was similar to that obtained some years ago with diets manufactured by the same company (76.6% in 1988 and 82.0% in 1989) , but nitrogen digestibility was lower : 77.7% *vs* 86.9% and 90.4% (BERCHICHE and LEBAS, 1990). This was probably a consequence of a quality variation of milling by-products included in B pellets formulation.

Growth performance

During the experiment 2 rabbits died, one in each group of collectively caged rabbits.

The slight differences between final weights and daily gains were not significant (Table 3). The average daily gain of rabbits of the local population was low (22.4 g/day) when compared with that obtained with the same diets by imported hybrid rabbits : 32-34 g/day (BERCHICHE and LEBAS, 1990).

Table 3 : Growth performance of all rabbits and feed intake of individually caged rabbits.

	DIETS		Residual coef. of variation (%)	Statistical probability P
	Pellets A	Pellets B		
Growth performance				
- Rabbits No	25	25	-	-
- Initial Weight (g)	390	385	20.0	ns
- Final Weight (g)	1687	1598	13.1	ns
- Daily gain (g/d.)	23.16	21.66	17.2	ns
Feed intake and feed conversion ratio (FCR)				
- Rabbits No	14	14	-	-
- Pellets intake (g/d.)	79.8	74.0	20.5	ns
- Total intake (g/d.)	79.8	85.7	19.4	ns
- Pellet's FCR	3.49	3.49	7.7	ns
- Overall FCR	3.49	4.05	7.3	0.0001

The daily intake of straw was 11.4 g in the B group. This value represents 13.7% (± 1.0% from one week to the other) of the total daily intake of this group. According to the fibre content of diet B and straw respectively, this proportion is not great enough to reach the crude fiber level recommendation in the whole daily intake (8.5% vs 13-14%).
As the pellet's daily intake was slightly lower in the B group than in the A group, the total daily intake was slightly but not significantly higher.
The pellet's feed conversion ratio was identical in the 2 groups : 3.489 and 3.488 for A and B respectively. As a consequence of the straw intake, the total feed intake conversion ratio was significantly ($P<0.0001$) higher for the B group: 4.05. It may concluded that the straw intake was without any nutritive value.

Slaughter performance

The slaughter data analysis was performed taking in account the slaughter live weight as covariate. (average 1701 g). This mean slaughter weight represents about 57% of the adult weight of this Algerian local population, a maturity level which is considered suitable for carcass quality (OUHAYOUN *et al.*, 1990).

The slaughter yield of the group A rabbits had a tendency (P = 0.092) to be greater than that of the B group (Table 4). This was the consequence of the smaller weight of the digestive tract in the A group than in the B group : 278 *vs* 296 g (P = 0.064).

Table 4 : Slaughter weight observed and least square means calculated for a common slaughter weight of 1701 g.

	DIETS		Residual coef. of variation (%)	Statistical probability P
	Pellets A	Pellets B		
- Rabbits No	25	25	-	-
- Slaughter Weight (g)	1745	1658	14.4	ns
- Skin (g)	148.7	147.0	14.5	ns
- Dig. Tract full (g)	277.7	296.3	11.5	0.064
- Hot Carcass (g)	1110	1094	3.5	0.158
- Slaughter yield	65.2	64.0	3.6	0.092

It may be noticed that, in this experiment, the skin proportion of live weight was markedly smaller than that observed with hybrid rabbits by OUHAYOUN (1990) at the same degree of maturity : 8.7% *vs* 13.6% of live weight.

CONCLUSION

In our experimental conditions the average daily growth of local rabbits remains low and it was necessary to prolong the fattening period until the age of 13 weeks to obtain a slaughter weight suitable in proportion of the adult weight. For commercial hybrids raised in France, the age at slaughter is only 10 or 11 weeks for the same proportion of the adult weight (OUHAYOUN, 1990).

The utilization of the balanced diet A has induced better results if we add all the statistical tendencies: better growth rate, better slaughter yield, and same pellets feed conversion ratio than diet B + straw. The relative excess of protein was a potential source of digestive troubles (De BLAS *et al.*, 1981) but no special problem was observed.

The addition of straw to diet B had a positive effect on rabbit's viability since we lost only 1 rabbit in this group, the same number than for the A group; but from a nutritional point of view the straw employed had no value. In a previous experiment (BERCHICHE and LEBAS, 1990) we had conclude that the distribution of a limited quantity of straw (10 g /head & /day, for about 80 g of pellets) was not sufficient to meet the fibre proportion of a balanced diet. In the present experiment, the *ad libitum* distribution of straw don't induced a widely greater intake of forage and the overall proportion of fibre remained below the recommendations (LEBAS, 1992).

For this reasons the marketing of a balanced diet must be encouraged in Algeria. But if the low fibre pellets are the only concentrate feed available, the distribution of additional straw may be a practical solution. The price to be paid is a slight increase of the fattening duration, a lower slaughter rate and a greater need of work to distribute straw.

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