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MEAT QUALITY AND CAECAL CONTENT CHARACTERISTICS OF RABBIT ACCORDING TO DIETARY CONTENT AND BOTANICAL ORIGIN OF STARCH

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ABSTRACT : The research was carried out to study the influence of diets differing in contents and botanical origin of starch on fattening and slaughtering performance of rabbits. Four pelleted diets (LSM, LSW, HSM, HSW) were prepared according to a 2 X 2 factorial scheme: two starch contents (23 *vs* 28% DM) and two botanical origins (wheat *vs* maize). Before being slaughtered, 4 groups of 24 Hyla hybrid male rabbits from 50 to 90 days of age were fed ad libitum on the above diets. High starch diets decreased the feed intake (g 104.1 *vs* 111.5 ; P < 0.05 and g 109.8 *vs* 123.6 ; P < 0.01, respectively for periods of 51-70 d and 71-90 d) and determined a more favourable (P< 0.05) feed conversion (2.729 *vs* 3.071 and 3.801 *vs* 4.020 respectively for periods of 51-70 d and 71-90 d). In the first period (51-70 d), the liveweight gain showed an important trend (P = 0.16) for LS groups in comparison to HS groups (g 38.1 *vs* 36.3). An opposite trend was shown in the period of 71-90 d (g 28.9 *vs* 30.7 for groups HS and LS, respectively). In fact, liveweight at 90 d was similar (g 2755 *vs* 2757 for groups LS and HS, respectively) in the groups feeding different starch levels. The diets did not significantly affect slaughtering yields (hot carcass weight g 1705 *vs* 1714 and reference carcass weight g 1352 *vs* 1352 for groups LS and HS, respectively), chemical and nutritional characteristics of meat (crude protein 22.3% *vs* 22.2 and ether extract 3.0% *vs* 3.1 for groups LS and HS, respectively), and acidic composition of intramuscular fat. No significant differences were observed in the caecal content parameters (VFA mml/l 66.5 *vs* 66.4 for groups LS and HS, respectively), except for a lower caecal starch level (1.6% *vs* 2.0% DM ; P < 0.05) in the group fed the diet with wheat and 23% of starch. No other botanical effect was significant.

RÉSUMÉ : Qualité de la viande et caractéristiques du contenu caecal du lapin en fonction de la concentration et de l'origine botanique de l'amidon dans l'aliment
Cette recherche a pour but d'étudier l'influence d'aliments contenant de l'amidon en quantité et d'origine botanique différentes, sur les performances d'engraissement et d'abattage des lapins. Quatre aliments granulés (LSM, LSW, HSM, HSW) ont été préparés suivant un schéma factoriel 2 x 2 : deux quantités d'amidon (23 *vs* 28 % MS) et deux origines botaniques (blé et maïs). Quatre groupes de 24 mâles Hyla âgés ont été nourris *ad libitum* avec les aliments précités de 50 à 90 jours, puis ont été abattus. Les aliments riches en amidon ont fait diminuer la consommation (104g *vs* 111,5g ; P<0.05 et 109,8g *vs* 123,6g ; P<0.01, respectivement pour les périodes 51-70 jours et 71-90 jours) et ont provoqué un meilleur (P<0,05) indice de consommation (2,729 *vs* 3,071 et 3,801 *vs* 4,020 respectivement pour les périodes 51-70 jours et 71-90 jours). Dans la première période (51-70 jours) le gain de poids tend a augmenter (P = 0,16) pour les groupes LS comparé aux groupes HS (38,1g *vs* 36,3g) ; l'inverse est observé pour la période 71-90 jours (28,9g *vs* 30,7g pour les groupes HS et LS respectivement). De fait, pour les groupes recevant un taux d'amidon différent, les poids vifs à 90 jours étaient proches (2755g *vs* 2757g pour les groupes LS et HS respectivement). Les régimes n'ont pas significativement affecté les caractéristiques à l'abattage (poids de la carcasse chaude : 1705 *vs* 1714 ; poids de la carcasse de référence : 1325 *vs* 1352g pour les groupes LS et HS, respectivement), les caractéristiques chimiques et nutritionnelles de la viande (protéines brutes : 22,3 *vs* 22,2% ; matières grasses : 3,0 *vs* 3,1% pour les groupes LS et HS respectivement), ni la composition en acides gras intramusculaires. Les paramètres du contenu caecal n'ont pas montré de différences significatives (VFA 66,5 *vs* 66,4 mml/l pour les groupes LS et HS respectivement) excepté dans le groupe «23% amidon de blé» pour lequel le contenu d'amidon caecal était le plus bas (1,6 *vs* 2,0% MS ; P<0,05). Aucun autre effet significatif de l'origine botanique de l'amidon n'a été détecté.

INTRODUCTION

Dietary fibre, being largely undigested, does not contribute much to dietary energy content although it plays a very important role as bulky material. Fibre gives the rations their actual bulk, which influences the normal peristaltic movements of the intestinal tract. Because of this role, the fibre component of rabbit diets has to be sufficiently represented, even if this undoubtedly leads to a reduction of the digestible energy content of the diet. Energy levels of rabbit diets may be improved by reducing fibre and increasing starch content. This leads to a modification of the non-structural and parietal carbohydrates ratio which alters the normal activity of the digestive tract, especially of the caecum. CHEEKE and PATTON (1980) proposed that if diets high in starch were associated with low fibre levels, carbohydrate overload of the hindgut might occur, provoking enteritis. MORISSE *et al.* (1985) suppose that a diet rich in fermentable carbohydrates (for example starch) my be necessary not only to produce a sufficient quantity of VFA but also to keep the caecal content acid. Others (DE BLAS *et al.*, 1986 ; LEBAS, 1989 ; PARIGI-BINI *et al.*, 1990) report that the starch content of diet is probably not involved in causing enteric disorders. Disagreement among the authors on this point arises from the incomplete knowledge of starch ileal digestibility in young rabbits. Many observations were obtained after the slaughtering of young animals, due to the impossibility to using ileal cannulas, because of the small gut size (GIDENNE, 1996). In 38-and 49-day-old rabbits fed a diet with 25%

starch, BLAS *et al.* (1994) recorded respectively 12.9 and 6.3% starch in the ileum content. Ileal starch digestibility in adult cannulated rabbits ranges between 93 and 99% (GIDENNE, 1992 ; Merino and CARABAÑO, 1992), and is not far short of faecal digestibility (98-100%). In young rabbits amylase secretion is known to reach its complete activity after 6 weeks of age ; Blas *et al.* (1990) observed higher starch digestibility at the end of the fattening period (11 weeks) than at 5 and 8 weeks. Such differences were less marked with the diet containing barley rather than maize, whose starch is less fermentable. GIDENNE and PEREZ (1993a) also observed higher digestibility of barley starch compared with maize. Moreover, the differences, albeit more evident (97.8 *vs* 94.5%) at the age of 4 weeks, proved statistically significant ($P<0.05$) also at 10 weeks. The relations between starch content and productive performance of growing rabbits are not yet well known and only a few references are available (DE BLAS *et al.*, 1986 ; PARIGI-BINI *et al.*, 1990 ; BLAS e*t al.*, 1994 ; GIDENNE and JEHL, 1996).

The aim of this work is to verify the effect of diets differing in starch content and botanical origin with no change in ADF and ADL on the productive performance of growing rabbits slaughtered at 90 days of age ; in a previous paper (NIZZA *et al.* 1997) the same effect was studied in younger animals, which were slaughtered at 70 days.

MATERIALS AND METHODS

Animals.

The trial was carried out in the spring using 96 Hyla hybrid male rabbits. They were weaned at 33 days of age and divided in 4 groups (n = 24) according to a 2 X 2 factorial scheme: two starch levels, 23 (LS) *vs* 28% (HS) and two different starch botanical origins, maize (M) *vs* wheat (W). The animals were housed in pairs in 48 cages (cm 25 x 35) with automatic watering and a hopper trough. The trial was conducted inside a forced well ventilated shed. During the whole experimental period the temperature ranged between 16 and 20°C, and the light: dark cycle was 12h : 12h.

After weaning, till 45 days of age the animals received the same diet as the mother. Subsequently, there was a 5-day adaptation period to the experimental diets. These were given till 90 days of age, when the animals were slaughtered. Liveweight of each animal was determined at 33, 50, 70 and 90 days of age and individual gains were obtained ; food intake was recorded in each cage (rabbit pair). If in the cage a rabbit died, half of the feed intake registered in the cage up to the rabbit's death, was attributed to the live rabbit. At 90 days of age the animals were slaughtered after fasting for 12 hours with access to water only. Prior to jugulation, electrical stunning with 100 V and 0.3 A was performed.

Forty rabbits (10 from each group) were used for slaughtering observations and sampling. The full gastrointestinal tract, bladder with urine, skin and fore and hindlegs (legs cut at carpal and metacarpal articulations) were weighed at slaughtering. The caecum was isolated and its content was divided into two parts after pH measurement with an Orion EA 940 pH meter: the first was used for starch content determination ; the second was diluted 1:1 with 0.1 N sulphuric acid and kept frozen at -18 °C until analysis to determine ammonia (UV method-Boehringer) and volatile fatty acids (VFA) content (Perkin Elmer 8410 gas chromatograph with packed column 80/120 Carbopack B-DA/4% Carbowax 20M, W 6ft x 2mm id).

On the commercial carcass (without blood, digestive tract, bladder, skin and distal part of legs) the weight was determined immediately after slaughtering (hot carcass weight) and after 24 hours of refrigeration at 4°C (cold carcass weight). The head, liver, heart, lungs with trachea and thymus, kidneys without their perirenal fat, were removed to obtain the reference carcass (BLASCO *et al.*, 1992) and, after removal of the separable fat, the hind legs were isolated as suggested by PARIGI-BINI *et al.* (1992a). The rest of the carcass was packed inside a polyethylene bag and placed in a bain-marie at 80 °C for 2.5 hours (BLASCO *et al.*, 1992) in order to determine the muscle/bone ratio. The muscular tissue of the hind legs was minced, homogenised and lyophilised in order to determine in duplicate: water, fat and ash contents ; protein was estimated by the difference from 100 (the value ascribed to proteins also includes all the substances in the muscle and not determined, like glycogen, nucleic acids, etc.). A sample of hind leg intramuscular fat was methylated to determine its fatty acid composition (Perkin Elmer 8410 gas chromatograph with packed column 3% SP 2310, 2% SP 2300, 100/120 Chromosorb WA, W 6ft x 2mm id).

Diets

The following 4 diets were obtained: LSM (23.0% starch of maize), LSW (23.1% starch of wheat), HSM (28.1% starch of maize) and HSW (28.0% starch of wheat). Their components and chemical composition are reported in Table 1. The diets were formulated utilising a computer program. This procedure determined the use of many different feeds, ensuring not only exact percentages of the starch and acid detergent fibre (ADF) content, but also the diet's aminoacidic balance. The LSM diet reached 23% in starch, because the corn germ meal utilised was particularly rich in starch. The five percentage points of starch lost in LSM and LSW were

Table 1 : Ingredients and chemical composition of diets

		Diets			
		LSM	**LSW**	**HSM**	**HSW**
Ingredients					
Corn	%	20.00	-	40.20	-
Corn germ meal	"	20.43	-	-	-
Wheat	"	-	20.10	-	25.33
Wheat middling flour	"	-	10.00	-	18.40
Wheat middling	"	-	15.00	-	-
Soybean meal	"	10.36	8.43	13.03	9.93
Dehydrated lucerne meal	"	22.22	22.64	11.07	23.77
Wheat straw	"	6.50	6.07	14.87	10.83
Sunflower meal	"	9.33	5.00	13.33	5.23
Beet pulp	"	5.00	6.77	2.00	2.00
Molasses	"	2.00	2.00	1.00	1.00
Carob bean germ	"	1.00	1.00	1.00	1.00
Limestone	"	1.43	1.43	1.70	0.84
Monocalcium phosphate	"	0.37	0.20	0.63	0.50
Sodium bicarbonate	"	0.10	0.10	0.10	0.10
Vitamin-mineral supplement*	"	1.00	1.00	1.00	1.00
Salt	"	0.19	0.19	-	-
DL-methionine	"	0.07	0.07	0.07	0.07
Chemical composition					
Dry matter	%	89.5	89.7	89.7	89.4
Crude protein	% DM	18.5	18.7	18.8	18.8
Ether extract	"	3.3	3.5	3.3	3.4
Crude fibre	"	14.8	14.9	15.0	14.9
Ash	"	8.5	8.4	8.5	8.0
N-free extract	"	54.9	54.5	54.4	54.9
NDF	"	31.3	31.1	30.0	30.1
Hemicellulose	"	12.1	11.9	10.7	11.0
ADF	"	19.2	19.2	19.3	19.1
Cellulose	"	14.5	14.7	14.8	14.7
ADL	"	4.3	4.1	4.1	4.0
Starch	"	23.0	23.1	28.1	28.0
Ca**	"	1.2	1.2	1.2	1.1
P **	"	0.6	0.6	0.6	0.6
Gross energy	MJ/kg DM	18.16	18.27	18.26	18.33
Digestible energy	"	12.42	12.50	12.45	12.77
Digestible protein	g/kgDM	143.7	147.2	150.8	152.4

(*)Vitamin-mineral supplement per kg: Vit. A 25,000 IU ; Vit. D 3,000 IU ; Vit. E 100 mg ; Vit. B_1 5 mg ; Vit. B_2 14 mg ; D-pantothenic acid 25 mg ; Vit. B_6 10 mg ; Vit. B_{12} 0.04 mg ; Vit. PP 80 mg ; Vit. H 0.3 mg ; Folic acid 2 mg ; Vit. K 8 mg ; choline 1300 mg ; Fe 160 mg ; I 2.5 mg ; Co 0.6 mg ; Cu 40 mg ; Mn 120 mg ; Zn 120 mg ; Se 0.2 mg.

** Calculated value

replaced by digestible fibre (hemicellulose + pectic substances).

Chemical analysis of the diets followed the method of the Association of Official Analytical Chemists (1984) for dry matter (DM), ash, ether extract (EE), crude protein (CP) and crude fibre (CF), and Van Soest *et al.* (1991) for fibre fractions (NDF, ADF and acid detergent lignin (ADL)). Starch was determined with enzymatic-colorimetric procedure by Aman and Hesselmann (1984). Gross energy was determined by adiabatic bomb calorimetry PARR. Digestible energy and protein were measured during in vivo digestibility trials according to PEREZ *et al.* (1996).

Statistical analysis.

The results were compared with ANOVA considering starch level, its botanical origin and their interaction as the main factors (SAS, 1989).

RESULTS AND DISCUSSION

During the trial 15 animals were lost: 11 of them died between weaning and 50 days ; 4 more rabbits (1 per diet) died during the experimental period (50-90 d). The mortality rate in the experimental groups (11.5 and 4.7%) was similar to the farm average in the same period (12 and 4%). The performance of the rabbits (81) which completed the productive cycle are reported in Table 2. In the first period (51-70 d) rabbits fed HS diets (28% starch) were more inclined to give higher gains (g 38.1 *vs* g 36.3) than the LS groups (23% starch) even if the effect did not reach statistical significance ($P = 0.16$). By contrast, in the following period (71-90 d) the HS group had a more evident trend ($P = 0.17$) in weight gain reduction. Thus in the whole experimental period (50-90 d) liveweight gains were very similar in all the groups. The feed intake of the pairs (cages) was higher in the groups fed LS diets (g 111.5 *vs* 104.1 ; $P < 0.05$ and g 123.6 *vs* 109.9 ; $P<0.01$; respectively for period 51-70 d and 71-90 d). Feed intake/kg of metabolic weight was low in every group, especially in the period of 71-90 d (g 63.3 and 56.1 respectively for groups LS and HS) during which the lowest increases were recorded. In the literature (PARIGI-BINI *et al.* 1990 ; GIDENNE and JEHL, 1996 ; GIDENNE, 1996), from weaning to slaughtering, feeding ingestion values are reported as constantly higher than 70 g/kg$^{0.75}$. The lower feed ingestion observed might be due to the high DE content in the diets (content higher than 12.42 MJ/kg DM). Feed

Table 2 : Fattening performance

		Diets				Probability			Mean square error
		LSM	LSW	HSM	HSW	% starch	Botanical origin	Interaction	
Rabbits	n.	20	21	20	20				
Weight at 33d	g	777	771	775	766	0.90	0.81	0.35	15480
Weight at 50d	"	1416	1414	1417	1415	0.98	0.96	0.92	41551
Weight at 70d	"	2138	2143	2181	2177	0.27	0.52	0.38	74802
Weight at 90d	"	2761	2749	2763	2751	0.89	0.77	0.91	99367
Weight gain 51-70d	"	36.1	36.5	38.2	38.1	0.16	0.88	0.22	55.6
Weight 71-90d	"	31.2	30.3	29.1	28.7	0.17	0.86	0.30	61.4
Measure	n	12	12	12	12				
Feed intake 51-70 d	g	110.2	112.8	104.5	103.7	< 0.05	0.69	< 0.05	76.8
Feed intake 71-90 d	"	124.3	122.9	110.7	109.0	< 0.01	0.48	0.18	116.6
Feed conversion 51-70 d		3.053	3.090	2.736	2.722	0.05	0.85	0.10	0.12
Feed conversion 71-90 d		3.984	4.056	3.804	3.798	< 0.05	0.87	< 0.05	0.07

Table 3 : Caecal content characteristics

		Diets				Probability			Mean square error
		LSM	LSW	HSM	HSW	% starch	Botanical origin	Interaction	
Rabbits	n.	10	10	10	10				
Starch	%DM	1.9	1.3	2.2	1.8	< 0.05	< 0.01	0.25	0.098
PH		5.97	5.90	5.88	5.89	0.67	0.54	0.11	0.085
Ammonia N	mg/l	97.5	98.6	97.7	98.4	0.48	0.30	0.56	10.40
Total VFA	mmol/l	66.1	67.0	65.4	67.4	0.30	0.12	0.21	38.66
Acetic ac.	% VFA	70.9	68.8	71.4	67.8	0.25	0.13	0.10	27.03
Propionic ac.	"	7.2	8.0	7.3	8.2	0.63	0.12	0.73	10.82
Butyric ac.	"	21.9	23.2	21.3	24.0	0.43	0.14	0.09	12.67

conversion was significantly more favourable in the groups with HS diets which showed lower intake, according to the findings of PARIGI-BINI *et al.* (1990). However, GIDENNE and JEHL (1996) reported a similar feed conversion in rabbits fed on diets varying in starch and digestible fibre content. Starch origin did not affect feed intake or conversion. A significant interaction ($P<0.05$) was observed for a feed intake of 51-70 d for a feed conversion of 71-90 d. Especially rabbits fed on wheat diet showed a higher feed intake with 23% of starch and a lower intake with 28% of starch. For the same rabbits a better ICA (3.178) was recorded with 28% of starch and a worse ICA (4.056) with 23% of starch was recorded again.

The characteristics of the caecal content are reported in Table 3. Starch caecal content, albeit rather low (1.3-2.2% DM), increased with its level in the diet ($P<0.05$) and when maize was utilised ($P<0.01$). These values are lower than that (4.3%) reported by BLAS *et al.* (1994) in 49-day-old rabbits fed with a diet containing maize and 24.8% of starch. The same authors also detected higher values (6.3%) in 38-day-old rabbits. Our results confirm those of GIDENNE and PEREZ (1993b) who utilised a diet with maize and 29% of starch in adult rabbits, obtaining similar starch levels in faeces (1.04% DM). No other parameter of caecum content was affected by the starch percentage in the diets, probably because of the small differences in their structural carbohydrates level. On the other hand, BELLIER and GIDENNE (1996) in rabbits fed on very different diets in starch (23.0 *vs* 39.6%) and in structural carbohydrates, observed for caecal content significant differences only in pH (6.45 and 6.03, respectively for control and low fibre groups) and acetate molar proportion (mmol/mol 866 and 812, respectively, for control and low fibre groups). No significant interaction was noted.

The most important slaughtering data are reported in Table 4, none of which is significantly influenced by dietary starch content and origin. Similar results were obtained by DI LELLA *et al.* (1996), NIZZA *et al.* (1995) and PARIGI-BINI *et al.* (1992a). By contrast, slaughtering parameters and chemical composition of the carcass, as reported in the literature, are influenced by diets when they have very different energy concentrations and structural carbohydrates content.

Table 4 : Dressing percentage, incidence of organs at slaughtering and chemical composition of hindleg muscles

		Diets				Probability			Mean square error
		LSM	LSW	HSM	HSW	% starch	Botanical origin	Interaction	
Rabbits	n	10	10	10	10				
Live weight at slaughtering (X)	g	2720	2715	2735	2732	0.34	0.48	0.33	52499
Hot carcass weight	"	1710	1700	1723	1705	0.36	0.29	0.59	19614
Commercial carcass weight (Y)	"	1659	1651	1657	1654	0.39	0.27	0.18	19196
Hot dressing percentage	% of X	62.9	62.6	63.0	62.4	0.92	0.39	0.11	2.71
Cold dressing percentage	"	61.0	60.8	60.9	60.6	0.77	0.62	0.72	2.63
Gastrointestinal tract	"	16.4	16.6	16.1	16.7	0.84	0.54	0.10	3.44
Skin	"	13.8	13.9	13.9	14.0	0.76	0.68	0.66	1.00
Reference carcass	% of Y	82.1	81.3	81.9	81.4	0.93	0.16	0.15	1.77
Head	"	7.9	8.2	7.9	8.1	0.78	0.06	0.44	0.26
Liver	"	7.1	7.6	7.3	7.6	0.82	0.32	0.33	1.47
Reference carcass weight (Z)	g	1362	1342	1357	1347	0.58	0.44	0.28	13709
Separable fat	% of Z	3.0	3.2	2.6	2.8	0.08	0.16	0.86	0.66
Meat	"	86.4	86.2	86.8	86.4	0.27	0.18	0.39	0.50
Bone	"	10.6	10.6	10.6	10.8	0.38	0.54	0.50	0.26
Meat to bone ratio		8.2	8.1	8.2	8.0	0.33	0.46	0.48	0.14
Chemical composition of hindleg muscles									
Water	%	73.4	73.6	73.7	73.2	0.96	0.68	< 0.05	0.57
Crude protein	"	22.4	22.3	22.3	22.2	0.34	0.36	0.87	0.18
Ether extract	"	3.0	2.9	2.8	3.4	0.64	0.23	< 0.05	0.46
Ash	"	1.2	1.2	1.3	1.2	0.12	0.10	0.56	0.12

Table 5 : Fatty acid (FA) composition of hindleg intramuscular fat

		Diets				Probability			Mean square error
		LSM	LSW	HSM	HSW	% starch	Botanical origin	Interaction s	
Rabbits	n.	10	10	10	10				
Caprilic	% of total FA	0.21	0.21	0.19	0.18	0.10	0.35	0.24	0.018
Capric	"	0.28	0.26	0.27	0.27	0.99	0.82	0.39	0.020
Lauric	"	0.34	0.37	0.36	0.40	0.30	0.36	0.71	0.050
Myristic	"	3.18	3.36	3.50	3.58	0.72	0.78	0.22	0.344
Myristoleic	"	0.53	0.52	0.88	0.91	< 0.05	0.90	0.09	0.186
Pentadecanoic	"	0.48	0.47	0.50	0.49	0.77	0.69	0.90	0.013
Palmitic	"	31.65	31.00	31.56	31.70	0.83	0.91	0.08	3.766
Palmitoleic	"	7.11	7.06	8.17	8.20	0.08	0.90	0.09	1.853
Heptadecanoic	"	0.54	0.57	0.59	0.60	0.34	0.92	0.58	0.076
Heptadecenoic	"	0.48	0.49	0.46	0.48	0.71	0.48	0.77	0.057
Stearic	"	7.16	7.20	6.40	6.65	0.13	0.76	0.46	2.205
Oleic	"	24.21	24.49	24.59	24.10	0.58	0.88	0.11	2.711
Linoleic	"	17.23	17.30	16.18	15.98	0.27	0.79	0.10	3.044
Linolenic	"	3.40	3.60	3.12	3.33	0.43	0.68	0.81	0.349
Arachidonic	"	3.20	3.10	3.23	3.13	0.90	0.56	0.73	0.393
Saturated FA	"	43.84	43.44	43.37	43.87	0.87	0.88	0.12	5.01
Monounsaturated FA	"	32.33	32.56	34.10	33.69	0.14	0.85	0.11	4.27
Polyunsaturated FA	"	23.83	24.00	22.53	22.42	0.11	0.88	0.15	3.93
Unsaturated FA	"	56.16	56.56	56.63	56.13	0.92	0.96	0.09	4.42
Unsaturated/Saturate		1.28	1.30	1.31	1.28	0.96	0.95	0.10	0.386

Fatty acid composition of the intramuscular fat was similar in the four groups (Table 5) ; only myristoleic acid increased in rabbits fed with HS diets. Many parameters (for example palmitic, polyunsaturated FA) The fat incidence in the carcass, though not statistically significant (P = 0.08), was found to be higher in rabbits of LS groups, probably because they ingested more dry matter and more DE than rabbits of HS groups. The diets did not affect the characteristics and chemical composition of hind legs. A significant interaction (P<0.05) was observed only for water contents and meat ether extract failed to be statistically significant because of their variability within the group and the small number of observations made. No significant effect emerged from the interaction. Our results are substantially similar to the findings of other authors (OUHAYOUN and LEBAS, 1987 ; PARIGI-BINI *et al.* 1992b) and they confirm the high unsaturated level of rabbit intramuscular fat. While the high monounsaturated and polyunsaturated FA content of rabbit fat enhances the dietetic characteristics of rabbit meat, it can also adversely affect fat and meat preservation.

CONCLUSION

The use of diets with 28% starch did not improve the growing rate, slaughtering yield, chemical or nutritive characteristics of rabbit meat. The increase in dietary starch from 23 to 28% failed to modify parameters of caecal fermentation in 90-day-old rabbits. The main starch dietary sources (wheat or maize) did not determine major differences in the caecal characteristics content, although maize increased the caecum starch level.

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