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EXAMINATION OF CRUDE FIBER'S DIGESTIBILITY IN RABBIT NUTRITION

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Introduction

Several authors agree on the level /14-16 %/ of crude fiber in rabbit feed while on its digestibility opinions are different. Some claim that it has only animal health and ballast effect /Lebas, 1979, Hoover, 1972, Holdas, 1979, Gippert, 1981/ while others /Parker, 1976/ considering volatile fatty acids arising in ceacum underline some significant energy carrier properties. So fiber digestibility can be a important fact. /Pascual, 1980, Besedina, 1969/ This work has aimed to examine these guestions more fully.

Materials and methods

In vivo experiments has been done with New-Zealand white rabbits. The compositions of feeds are shown in Table 1.

Table 1. Compositions of feeds

N a m e	Exp. feed 1. %	Exp. feed 2. %	Traditional /Control/ %
Wheat	10	18	19
Oat	10	10	10
Bran	10	15	10
Soya 47	12	10	6
Dried beet pulp	32	-	14
Dried alfalfa meal	21	-	12
Dried grass meal	-	42	24
Premix	5	5	5

The most important dates of feeding experiments are shown in Table 2.

Table 2. Dates of feeding experiments

Date	Compared groups	Nb. of rabbits	Length of. time /days/	Starting age /days/	Starting weight /g/
20.11.80.	Exp.1-Co.	6-6	55	33	928-944
21.01.81.	Exp.1-Co.	6-6	48	33	762-736
08.04.81.	Exp.2-Co.	6-6	55	33	860-823
17.11.81.	Exp.1-Exp.2-Co.	5-5-5	24	49	1498-1470-1455

In vivo fiber digestibility of dried beet pulp, alfalfa meal and grass meal has been also determined.
All the feed used and the collected feaces have been analysed by Wendee method; a detergent method by van Soest and an enzymatic method by Jones-Hayward have been used to feed determination.

Results

The nutritiv materials of feeds are shown in Table 3. the fiber digestibilities are shown in Table 4. Basic materials fiber digestibilities are shown in Table 5. while different kind of fiber analysis are shown in Table 6. Fattening experiments results are shown in Table 7.

Table 3. Feed nutritiv materials results /by standard analysis/

N a m e	Dry matter %	Crude protein %	Crude fiber %	ME /calculated/ Kjoule/kg
Exp.feed 1.	90,7	18,1	14,1	6,62
Exp.feed 2.	90,6	19,0	14,5	5,93
Traditional /plant/ feed	90,5	18,2	14,5	6,75
Dried beet pulp	90,0	11,6	18,0	9,15
Dried alfalfa meal	90,5	18,1	28,8	5,80
Dried grass meal	91,0	15,1	28,1	5,43

Table 4.

Fiber digestibilities in per cent
/avarages, with deviation/

D a t e	20.11.80.	21.01.81.	08.04.81.	17.11.81.
Exp.feed 1.	59,5±2,82	62,0±3,0	-	59,0±2,36
Exp.feed 2.	-	-	37,6±2,7	42,9±2,82
Traditional feed	40,7±2,69	45,1±2,74	51,9±1,66	48,8±4,2

Table 5. Fiber digestibility of basic materials

N a m e	Dried beetp pulp	Dried alfalfa meal	Dried grass meal
Fiber digest. /%/	70,6	34,3	29,5

Table 6. Van Soest and enzymatic analysis results

Name	NDF %	ADF %	ADL %	Hemicell. %	Cellulose %	Enzymatic digestibility %
Exp.feed 1.	32,3	14,7	2,2	17,6	12,5	81,7
Exp.feed 2.	33,0	15,5	3,6	17,5	11,9	73,9
Traditio-nal	31,8	14,4	3,3	17,4	11,1	77,7
Dried beet pulp	41,2	20,4	2,1	20,8	18,3	79,3
Dried alfal-fa meal	41,8	27,5	5,8	14,3	21,7	65,2
Dried grass meal	43,7	29,4	6,6	14,3	22,8	58,5

Table 7. Results of fattening experiments

Name / Date	20.11. 1980. Exp.1.	20.11. 1980. Co.	01.21. 1981. Exp.1.	01.21. 1981. Co.	04.08. 1981. Exp.2.	04.08. 1981. Co.	11.17. 1981. Exp.1.	11.17. 1981. Exp.2.	11.17. 1981. Co.
Starting weight /g/	928	944	762	736	860	823	1498	1470	1455
Final weight /g/	2857	2438	2532	2268	2652	2788	2400	2160	2243
Average consumption /g/	120	127	126	130	142	146	142	152	144
Average daily weight-increase /g/	34,7	27,2	37,0	31,9	32,6	35,7	37,2	28,8	32,5
Feed conversion	3,49	3,76	3,44	4,14	4,44	4,10	3,88	5,30	4,43

Conversation

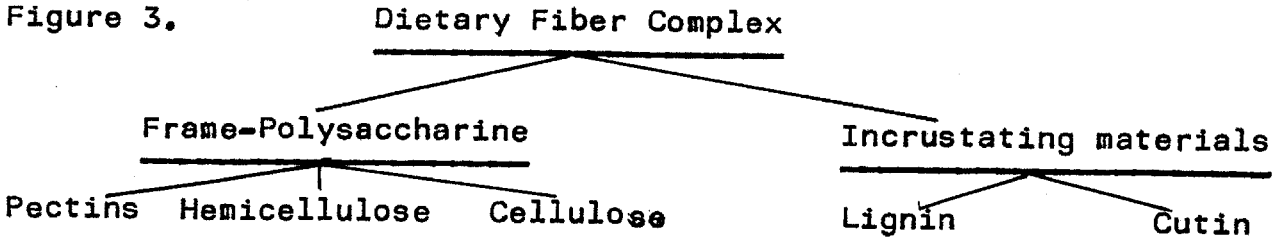
On the basis of Table 7. it can be stated that the best fattening results can be achieved by the feed containing high level dried beet pulp.
Probability levels of fattening experiment results has been checked by t - probe are shown in Table 8.

Table 8. Probability levels of fattening experiment results

Name / Date	1980. 11.21. Exp.1-Co	1981. 01.21. Exp.1-Co	1981. 04.08. Exp.2-Co	1981. 11.17. Exp.1-Co	1981. 11.17. Exp.2-Co	1981. 11.17. Exp-1-Exp.2.
Weight-increase	$P < 0,05$	$P < 0,2$	not significant	not significant	not significant	$P < 0,05$
Feed conversion	$P < 0,001$	$P < 0,05$	not significant	$P < 0,2$	$P < 0,02$	$P < 0,00$

Between fiber digestibility and weight-increase there is a close correlation /Figure 1./
There is also a close correlation between in vivo fiber digestibility and in vitro en ymatic fiber digestibility /Figure 2./
Using van Soest method Dietary Fiber Complex can be reduced to following components. /Figure 3./

Figure 3.



Between in vivo fiber digestibility and ADL content there is a connection with closed negative correlation /Figure 4./

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Conclusions

1./ On the basis of examinations it has been stated that besides animal health and ballast effect has energy carrier properties for the more digestibility the fiber has been, the better fattening results have been achieved.

2./ The best fiber carrier is the dried beet pulp.

3./ For the Dietary Fiber Complex extends the concept of fiber it is offered to introduce the van Soest method parallel to Wendee analysis.

4./ To estimate and check fiber digestibility the enzymatic method is offered.

Summary

Author has presumed that the fiber has - besides a ballast and animal health effect - energy carrier property because of significant fiber digestibility capatity of ceacum.
Fiber digestibility has been measured in vivo utilising and fattening experiments with two experimental, one classical /plant/ feed and some fiber carrier basic material.
Fiber digestibility checking has been controlled in vitro experiments with some leatest detergent and enzymatic analytical method.
It has been stated that the dried beet pulp has the most favourable digestibility /70,6 %/ while the dried alfalfa meal and the dried grass meal have far less one /34,3 % and 29,5 % respectively/.
So the experimental rabbit feed containing high level dried beet pulp has far bigger fiber digestibility /avarage 60 %/ than the feed containing grass meal /avarage 40,2 %/.
The results of fattening experiments have underline the importrance of fiber digestibility for the best results have been achieved with the feed containing high level dried beet pulp.
In the course of laboratory analysis it has been proved that crude fiber analysis of Wendee is not suitable for quality analysis examinations so enzymatic and van Soest method are offered to be introduced with it.

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R É S U M É

L' auteur supposa, que dans la nutrition du lapin la "Cellulose brutte", au delá de son role de lest et ses effets nutritifs - grace á la significatice capacité digestive du caecum, envers les constituants membrannaires - forme une importante source d'énegie.

Au cours des essais in vivo de l' utilisation des aliments et d' engraissage, pour vérifier la digestibilité des constituants membrannires, il effectua des comparaisons entre deux fourrages en expériences, un fourrage de formule classique et entre plusieurs importantes matiéres premiéres á grande teneur en constituants menbrannaires. Il examina les effets de divers fourrages mélangés, sur les résultats de l' engraissement.

En ses expérieces in vitro, il vérifia l' utilité des plusieurs nouvelles méthodes enzymatiques et détergentes, pour déterminer la mesure de la digestibilité des constituants membrannaires. Il constata, que ce sont les puldes de betteraves déshytratées, qui possédent les plus favorables qualités de digestibilité /70,6 %/, tandis que ces valeurs chez la farine de luzerne et des herbages déshydratées étaient significativement plus basses /34,3 % et 29,5 %/. En convenant á cette détermination, le fourrage expérimental, dans lequel le taux des pulpes de betteraves étaient bien plus augmenté, apportait des valeurs de digestibilité remarquablement plus élevées /taux moyen 60 % /, que celui qui contenait seulement que de la farine d' herbage /taux moyen 40,2 %/.

Les résultats des essais d' engraissage affirment l' importance de la digestion des constituants membrannaires, étant donné que dans la production, les meilleurs résultats furent obtenus, avec des rations expérimenteés qui contenaient des pulpes de betteraves.

Enfin, au cours des analyses de la "Cellulose brute", il constata, que la méthode de "Wandee", n' est pas suffisante aux exigences de l' analyse qualitative, á coté d'elle, pour pouvoir suivre et savoir controler - sans doute - les traces de la digestion des constituants membrannaires, qu'il est nécessaire d' élargir dans ce sujet, la gamme des examens, avec les systémes enzymatiques et de "Van Soest".

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Figure 1. Relationship between weight - increase and fiber digestibility

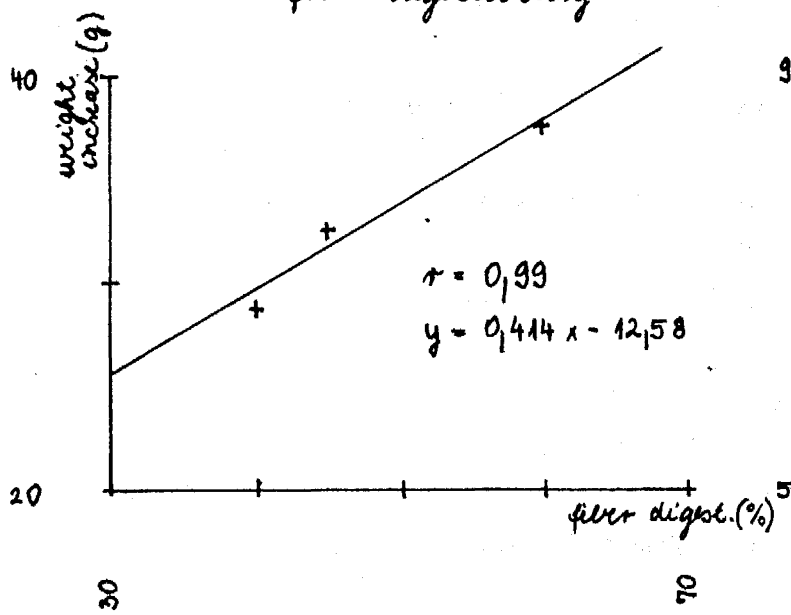

Figure 2. Relationship between in vitro and in vivo fiber digestibility

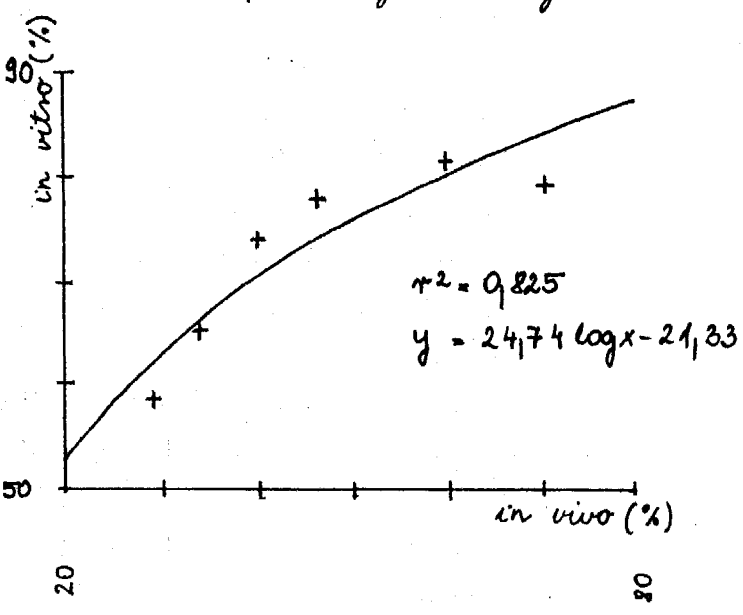

Figure 4. Relationship between ADL content and in vivo fiber digestibility