Sainfoin as a replacement of alfalfa : nutritive value and performances in the rabbit

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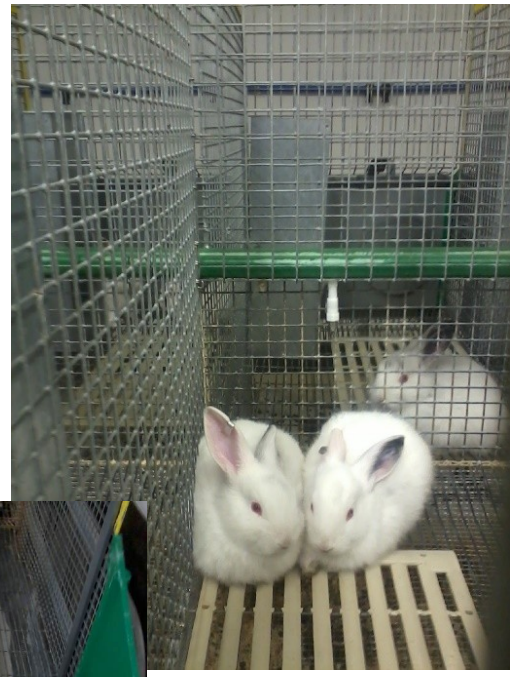
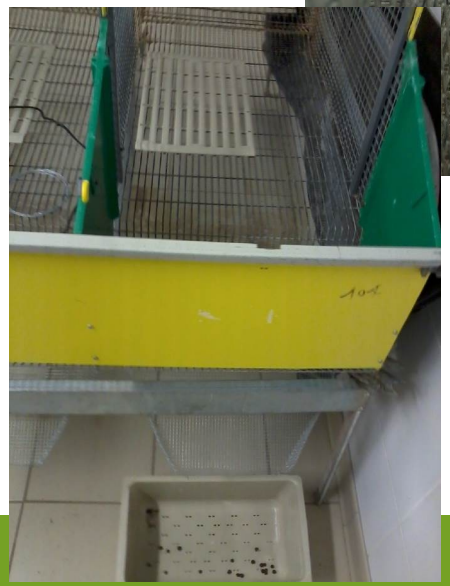
OBJECTIVE :
nutritive value of dehydrated pelleted sainfoin for the growing rabbit

Trial in metabolism cages in Toulouse Veterinary school





- 32 rabbits, at weaning (28d) , in 2 groups of 8 cages (2 rab./cage):

  Two complete pelleted feeds

  –with 40% sainfoin (group S), **PERLY variety**

  –or with 40% alfalfa (control, group C),

  Ad libitum, from 28 to 63 d old (trial end)

Measures

•weekly= live weight and feed intake

- Daily: health status
- Fecal digestibility :

One period of 4 days total collection of feces (42-46d.old)

Results

Experimental diets

Ingredients (%)	Control C	Sainfoin S
Sainfoin* dehydrated	-	39.6
Alfalfa	40.0	24.0
Wheat bran	7.0	4.2
Wheat	16.0	9.6
Beet Pulp	10.0	6.0
Wheat straw	8.0	4.8
Soja bean meal	6.0	3.6
Sunflower meal	11.9	7.1
Minerals + vitamins	1.1	1.1

Chemical composition (g/kg)	C	S
Dry matter	910	901
	159	167
rude protein		
	364	371
NDF		
	199	**234**
ADF		
	43	**84**
DL		
Total Tannins (%TA)[1]	1.03	1.82

* PERLY variety (delivered as big pellets)

[1] equivalent tannic acid (spectro) (4.92 for dehydrated sainfoin)

Recall : diets are formulated for a nutritive value trial
=> not balanced for nutrients (not "iso")

Performances	Groups			RMSE	P value
	Control N=8x2		Sainfoin N=8x2		
Live weight at 28d, g	624		635	69	0.43
Final live weight (63 d), g	2492		2392	150	0.099
Weight gain (g/d)	40.2	-5%	**38.2**	2.0	**0.06**
Feed intake (g/d)	116.5	+3%	**121.5**	8.5	0.005
Feed conversion ratio	2.90	+9%	3.18	0.2	<0.001

"**Sainfoin**" => positive effect on intake = high palatability or more **effect of fibre** level (ADL)
"**Sainfoin**" **tendancy to impair the growth rate, and increase the FCR**

Fecal digestibility

	Groups			
Digestibility (%)	T	S	*RMSE*	*P value*
Organic matter	66.3	66.3	*1.9*	*0.98*
Crude protein	75.3	69.6	*3.1*	***<0.001***
Energy	65.2	65.7	*2.1*	*0.62*
NDF	43.0	42.3	*3.7*	*0.62*
ADF	35.4	36.6	*4.5*	*0.23*
Hemicelluloses (NDF-ADF)	52.6^{ab}	52.8^{a}	*4.7*	*0.35*

"**Sainfoin**": **clear negative impact on protein** digestion (tannins)

Nutritive value of feeds

	Groups			
	T	S	RMSE	P value
Digestible energy concentration, MJ ED/kg	10.49	10.77	*1.26*	*0.070*
Digestible protein concentration (g/kg)	120	116	*3.1*	*0.07*

"**Sainfoin**" incorporation (compared to alfalfa) tended to increase the energetic value (+2.5%), **but negative impact on proteic** value (-4%)

Chemical composition of dehydrated sainfoin
& comparison with a "standard" alfalfa meal

g/ kg	**Sainfoin** dehydrated analysed	Alfalfa dehydrated INRA tables	
Dry matter	891	906	
rude ash	71	104	C
rude protein (N x 6.25)	172	158	C
rude fat	31	25	C
rude fibre (Weende)	198	267	C
DF	372	430	N
	304	306	

Nutritive value ** of dehydrated sainfoin

g/ kg brut	Sainfoin déshydraté**	
Digestible energy	11.21 MJ/kg 2680 kcal / kg	
igestibility of energy, %	68.1	D
Digestible protein, g/kg brut	110	
igestibility of proteins, %	63.8	D

** : **Calculated by difference**, between Control & Sainfoin diet

Nutritive value for the growing rabbit

Nutritive value of dehydrated sainfoin
& comparison with a "standard" alfalfa meal

g/ kg	Sainfoin dehydrated calculated		Alfalfa dehydrated INRA Table
igestible energy	11.21	+40% ??	7.41
Digestibility of protein, %	63.7	+15%	58.0
Digestible proteins, g/kg	110		92

Nutritive value for the growing rabbit

To be confirmed : regression method, with moderate incorporation rates

Conclusions for Sainfoin "PERLY variety"

- High palatability, to be confirmed with iso-nutrients diets (iso ADL …)
- **Value for performances :** growth and feed conversion slightly affected, although a disparity on diet chemical composition
- **Chemical composition** with a high interest for the growing rabbit :

  Rich in ADL: 12% => 1.5 higher than alfalfa meal,

  Good lignocellulose source (⇔ to alfalfa)

  High content in digestible protein (11 vs 9% for alfalfa)
- **Nutritive value :**

  High energetic value, to be confirmed

Perspectives

- **Trial on performances :** growth & FCR values, with isonutritive diets and progressive incorporation of sainfoin

- **Confirmation** of the high energetic value (non-iso diets with moderate and progressive incorporation of sainfoin)

- **Health value of sainfoin : pest control ?**
  - Mortality + morbidity : in conventionnal conditions conventionnelles (& numerous rabbits)
  - Anthelminthic role ? (as found for small ruminants)
  - coccidiostatic role?

Thanks for your attention

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