Evaluation of Yellow Mealworm Meal as a Protein Source in Rabbit Kit Nutrition

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Introduction

Problem (s):

Unsustainable soybean production

- Disrupting local feed markets
- Increase competition
- Reduce productivity

Current intervention(s):

Plant leaf meal

Agro by-products

Limitation(s):

- Poor chemical composition
- Anti-nutrients

Alternative intervention:

Yellow meal worm meal

- Possess 46-60% CP
- Cost-effective
- Reduced environment impact

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Aim of study

To investigate the suitability of yellow mealworm as a protein source in rabbit kit nutrition, with a focus on:

- Litter weights
- Individual kit weights at Parturition, D21 & D32

Methodology

Study location:

Rabbit Unit, Institute of Animal Science (IAS), Prague, Czech Republic

Experimental design

24 Hyplus rabbit does:

- Soybean-based diet (n=13)
- Insect yellow mealworm meal (n=11) rabbits

Lactation period: 32 days

Litter Size: Standardized to 10 kits per doe using cross-fostering

Data collection

Litter weights (weekly)

Average daily weights (at Parturition, D21 & D32)

Statistical analysis

REML Statistica

Random effect: kit

Fixed effects: diet treatment

Co-variate: initial weight

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Table 1. Composition of the experimental diets

Ingredient (g/kg, as feed basis)	Diets	
	SBM	IM
Alfalfa meal	300	300
Soybean meal	130	-
Sunflower meal	50	65
Insect yellow mealworm meal	-	105
Wheat bran	80	110
Sugar beet pulp	20	20
Oats	160	160
Barley	220	220
Rapeseed oil	10	10
Vitamin, mineral and amino acid supplement[1]	10	10
Dicalcium phosphate	7	7
Limestone	10	10
Salt	3	3

Analyzed composition (g/kg, as feed basis)		
Dry matter	888	877
Crude protein	168	169
NDF	318	317
ADF	188	185
ADL	53	54
Ether extract	28	50
Starch	194	183
Asparagine	1.52	1.42
Threonine	0.63	0.64
Serine	0.72	0.71
Glutamine	3.03	2.83
Proline	1.03	1.09
Glycine	0.72	0.78
Alanine	0.74	0.87
Valine	0.75	0.79
Isoleucine	0.66	0.74
Leucine	1.10	1.12
Tyrosine	0.39	0.43
Phenylalanine	0.76	0.72
Histidine	0.36	0.39
Lysine	0.77	0.75
Arginine	0.93	0.87
Cysteine	0.28	0.26
Methionine	0.35	0.36
Ca	10.87	10.13
P	5.27	5.64
Gross Energy (MJ/kg)	120	118
Digestible Energy (MJ/kg)	10.3	10.4

Results

Table 2. Kit performance during the 32-day post-weaning experiment, fed either soybean (SBM) meal or insect meal (IM) as a primary protein source

	SBM	SE	IM	SE	P-value
Rabbit litter weight (g)					
At parturition	656.90	18.23	681.10	27.19	0.456
D21	3569.70	137.42	3551.10	147.02	0.927
D32	7368.00	223.33	7270.80	236.30	0.768
Average daily weight gain (g/day)					
D1 - D21	13.60	0.62	14.00	0.65	0.540
D22 - D32	34.20	1.44	34.20	1.20	0.860
D1 - D32	20.70	0.66	20.90	0.75	0.619

SBM: soybean meal; SE: standard error; IM: insect meal; d: day of lactation

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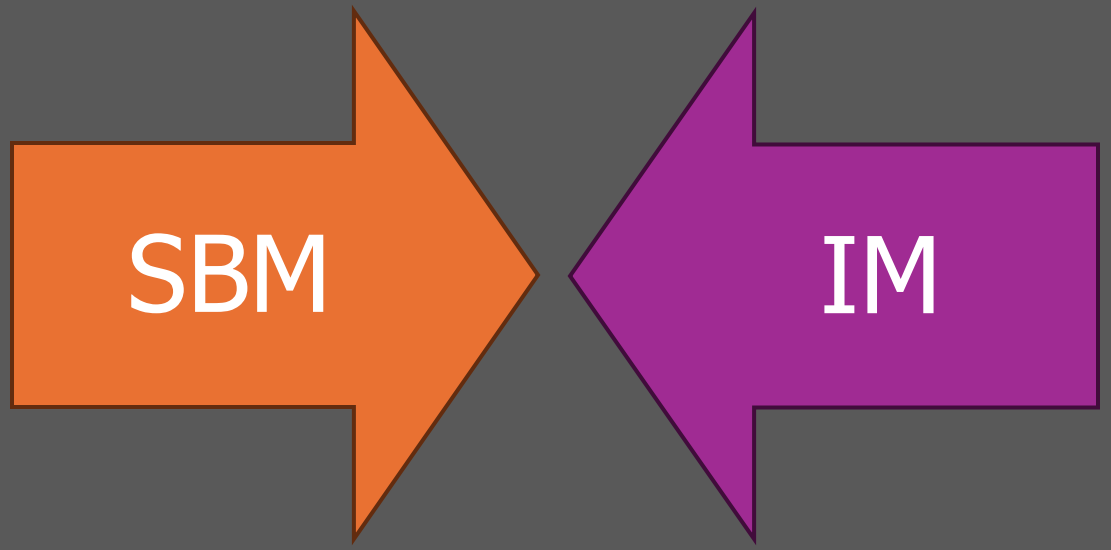
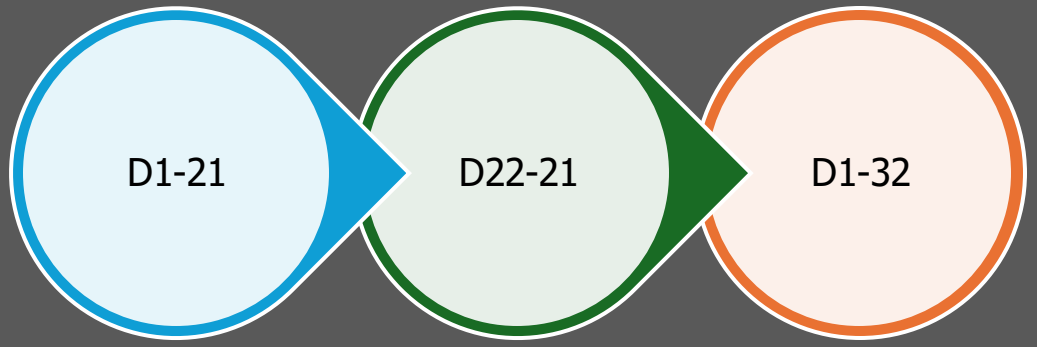
Discussion



Same pattern of change for both dietary treatments



Litter weight and average daily weight gain did not differ between the dietary treatments at different periods

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Conclusion

01

Yellow mealworm meal (IM) is a viable alternative to soybean meal (SBM) in rabbit kit nutrition.

02

Insect Meal supports similar growth performance and litter weights as Soybean Meal.

03

Using IM reduces reliance on environmentally taxing protein sources, promoting sustainability.

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Recommendations

01

Adopt yellow mealworm meal as a sustainable protein source in rabbit nutrition.

02

Conduct further research to optimize inclusion rates and investigate long-term effects on rabbit health, carcass characteristics and meat quality.

03

Educate rabbit farmers and veterinarians on the benefits and use of yellow mealworm meal in rabbit diets.

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Animal Physiology Behaviour

SCAN ME