Blue Lupine for White Shrimp?

A step towards sustainable aquaculture feed

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Objectives

Fish and shellfish are the most important animal protein source for human alimentation. Feeds for aquaculture organisms still contain high amounts of fishmeal, which is an expensive and unsustainable source. To reduce fishmeal in aquaculture feeds, and replace it with sustainable local ressources, legumes are tested to serve as protein source for important European aquaculture candidates like white leg shrimp, salmon and sea bass.

Our first task:

Formulating feeds containing lupine for the white leg shrimp and conduct feeding experiments.

Ingredient [g/kg]	*Control*	*L10*	*L20*	*L30*
Fishmeal	250	150	50	0
Shrimpmeal	90	90	90	0
Soybean meal	205	205	205	205
Wheat	398	322	260	193
Fish oil	20	20	20	20
Lecithin - Soy	20	20	20	20
Cholesterol	2	2	2	2
Vit.+ Min.Premix	5	5	5	5
Corn gluten		75	130	220
Lupine		100	200	300
Methionin	5	3	5	10
Lysin		3	8	20
TiO2	5	5	5	5
Calculated comp.				
DM %	90	90	89	87
Ash %	10	8	6	3
GE MJ/kg	18	18	18	18
CP %	37	37	36	36
Lipid %	8	8	8	8
Fibre %	2	2	2	1

Table 1. Feed formulation for white leg shrimp. 10, 20 and 30% lupine meal inclusion diets (L10, L20, L30, respectively).

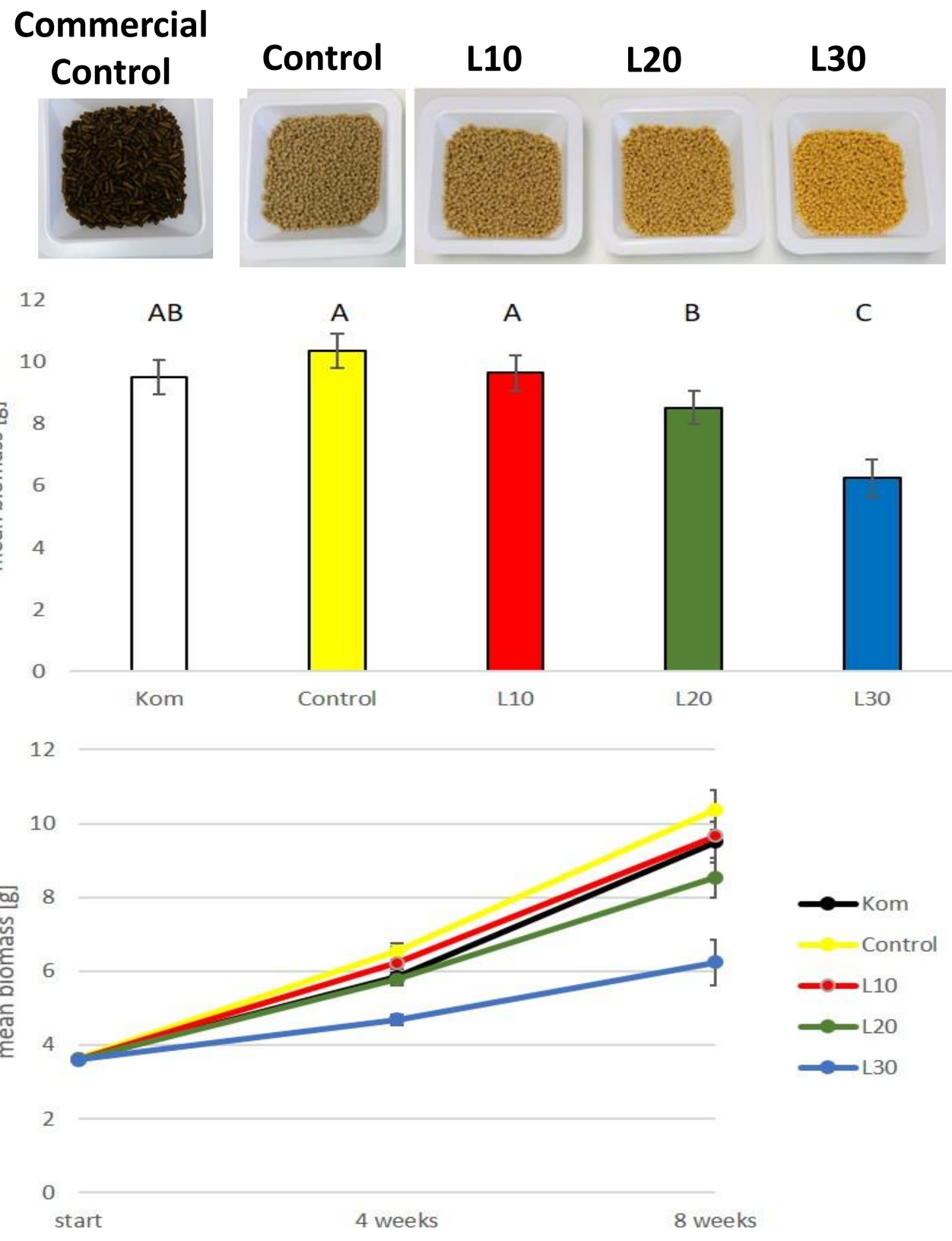

Figure 1. Mean biomass (g) of shrimps after 8 weeks of feeding trial.

Results and Discussion

Overall mean survival rate of the shrimps was 65% without any significant differences between the feeds. The mean biomass of animals fed with high lupine levels (L20, L30) was significantly lower than in control diets and L10 after 8 weeks. Interestingly, colouring of the animals was very different depending on the feed, with a red/brown coloration in lupine fed animals and blue colour in the fishmeal fed animals.

Untreated lupine meal can be used as an alternative protein source up to 10% (-20%) of the feed (= **30-40% of animal protein**).

Outlook

Further metabolic and immunological parameters will give us more detailed information of the consequences of lupine feed on shrimp metabolism on organ and cellular level and hopefully will reveal reasons for the reduced growth.

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