

5% Non-Organic Ingredients ?

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Feed formulating

- Uses information on :-
- Ingredients available and nutrient content
- Their cost
- The minimum and maximum levels of nutrients required in the formulation
- The minimum and maximum inclusion to be allowed of ingredients

The problems of formulating feed

- The % of each ingredient in the diet must add up to 100% in total
- Protein rich ingredients are usually low in energy and energy rich ingredients are low in protein
- Space must be found for the minerals which contain neither

Resultant formulation

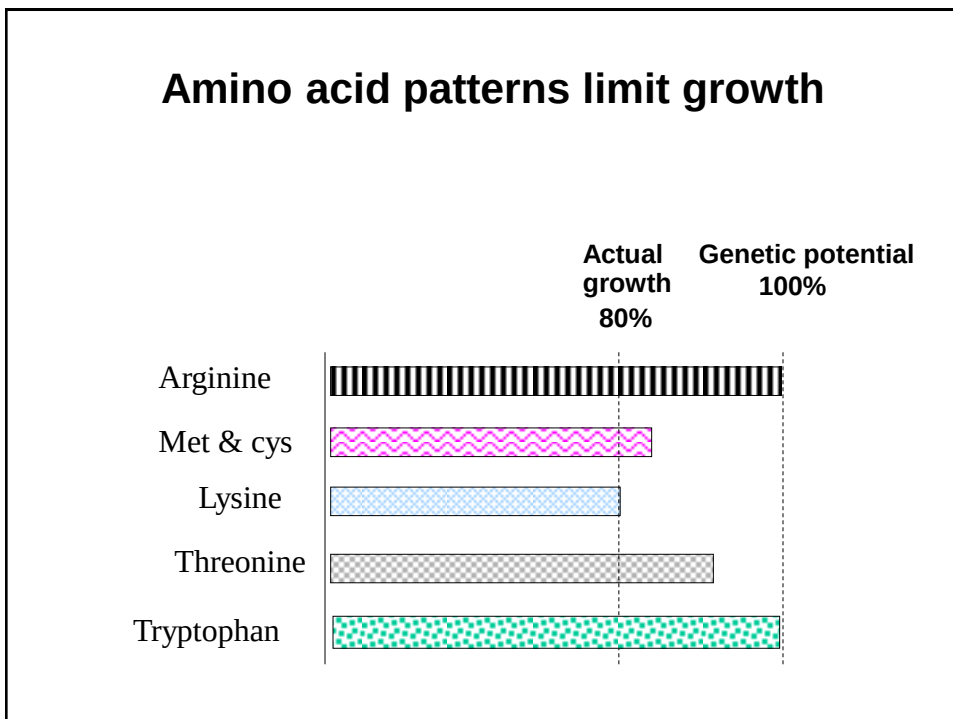
Calculated
diet cost



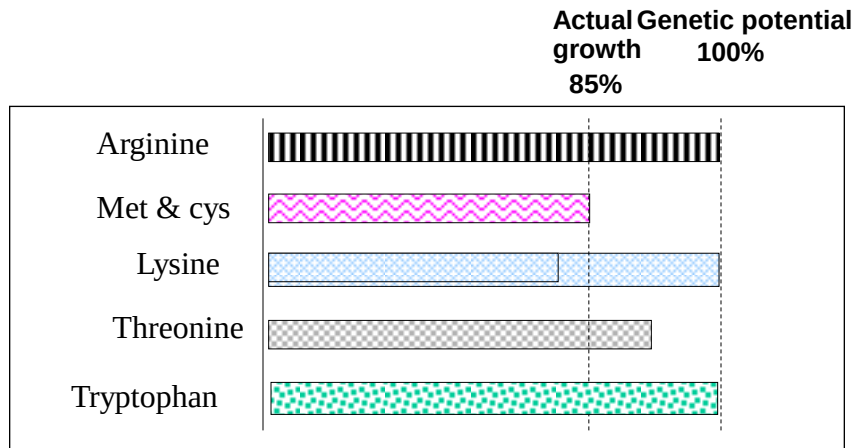
ARR5178WM	Arrive exp. 39 to 80 days				Optimal cost		164.668
Recost	3380.768	Cost difference		0.0	100.0	%	2000.0 Kg
INCLUDED	Name	%	Cost		Minimum	Maximum	Kg
20	MAIZE	15.0	139.0	↓	15.0	.	300.0
56	TRITICALE +6%	41.894234	119.0		.	.	837.885
162	RAPESEED EXP (0	5.0	139.0	↑	.	5.0	100.0
172	SOYA EXTR (48%)	33.147715	200.0		.	.	662.954
246	Sunflower oil	1.073883	555.0		1.0	.	21.478
250	SALT	0.235225	100.0		.	.	4.705
255	SODIUM BICARB.	0.081118	200.0		.	.	1.622
270	LIMESTONE	0.217242	45.0		.	.	4.345
280	DiCalPhos 18%P	2.987434	310.0		.	.	59.749
300	METHIONINE	0.210149	2380.0		.	.	4.203
501	Premix (Arrive)	0.153	0.1	↓	0.153	0.153	3.06

Calculated nutrient analysis				days	Optimal cost			
				ference	0.0	100.0	%	2000.0 Kg
				Minimum	Maximum	Un.cost	Limit	Saving
[VOLUME]	%	100.0	↕	100.0	100.0	1.5807	100.13178	0.2083
CPROTEIN	%	23.954877		.	.	.	.	.
OILB	%	3.850508		.	.	.	.	.
CALCIUM	%	1.0	↓	1.0	1.2	5.344	0.949922	0.2676
PHOS	%	0.986424		.	.	.	.	.
AVPHOS	%	0.62	↓	0.62	.	23.1554	0.56599	1.2506
SODIUM	%	0.15	↓	0.15	.	13.0683	0.127699	0.2914
CHLORIDE	%	0.25	↕	.	0.25	4.181	0.284508	0.1443
MEKG	Kcal/kg	2870.0	↓	2870.0	.	0.0775	2865.6446	0.3376
TYLSINE	%	1.27	↓	1.27	.	44.1771	1.254905	0.6669
METH	%	0.579282		0.545	.	.	.	.
M+C	%	0.999	↓	0.999	.	21.7851	0.964769	0.7457
THREO	%	0.888251		0.82	.	.	.	.
TRYPT	%	0.302237		0.26	.	.	.	.
ARGININE	%	1.581115		1.4	.	.	.	.

Indicator of maximum or minimum constraint operating



Increase amino acid % to maximise growth



The end result of not being able to use pure amino acids in organic diets

- The sulphur containing amino acids, Methionine and Cystine, are always in short supply in organic diets
- The cost of organic diets is increased
- Organic diets have a very imbalanced amino acid profile
- Organic diets result in more nitrogen being excreted into the environment

Protein Rich Ingredients

Ingredient	% Protein	% M+C	% lysine	MJ ME/kg
fishmeal	71	2.64	5.40	14.44
maize gluten	62	2.50	0.99	15.00
Soya 48%	48	1.44	2.98	10.10
sunflower	33	1.29	1.15	7.00
lupins	34	0.75	1.62	9.00
rapemeal	31	1.41	1.67	8.90
field beans	25	0.49	1.61	10.70
linseed	30	1.11	1.11	6.20
field peas	20	0.48	1.47	11.40

Ingredients M + C % into soya protein % equivalents

Ingredient	% protein	% M + C	Soya protein equivalent %
Soya 48%	48	1.44	48
Fishmeal	71	2.64	88
Maize Gluten	62	2.5	83
Sunflower	33	1.29	43
Lupins	34	0.75	25
Rapemeal	31	1.41	47
Field beans	25	0.49	16
Linseed	30	1.11	37
Field peas	20	0.48	16

Ingredients Lysine % into soya protein % equivalents

Ingredient	% protein	% Lysine	Soya protein equivalent %
Soya 48%	48	2.98	48
Fishmeal	71	5.4	87
Maize Gluten	62	0.99	16
Sunflower	33	1.15	19
Lupins	34	1.62	26
Rapemeal	31	1.67	27
Field beans	25	1.61	26
Linseed	30	1.11	18
Field peas	20	1.47	24

Utilising the 10% non-organic ingredients currently allowed

- Methionine and cystine is invariable the nutrient that is first limiting in organic diets
- The best and cheapest source of M + C is Maize gluten (62% protein) , also known as prairie meal and is used to capitalise on the 10% non-organic allowance
- The same principle will apply when non-organic is reduced to 5%

Maize gluten or prairie meal- the positives

- Current inclusion significantly reduces the cost of organic diets
- Meeting diet requirements would be difficult in some diets without it
- This will be even more so when the non-organic % reduced to 5%

Maize gluten or prairie meal – the negatives

- Transported halfway around the world
- Derived from genetically modified maize
- Has a very imbalanced amino acid content
- This results in more nitrogen being excreted by the animal which is bad for the environment
- It also results in more water being consumed with consequent wetter litter and possible welfare problems e.g. foot pad dermatitis

Fishmeal

- An extremely good source of protein
- Has a variable salt content which can limit inclusion
- Fishmeal cannot be used in feed mills also making ruminant feed. (Result of the BSE crisis. Some European mills mixed meat and bone into their fishmeal – very profitable !)

Field beans

- Good source of Lysine
- Very low Methionine + Cystine content
- Contains several anti-nutritive factors
- The most serious is tannins which depress protein utilisation
- Concentrated in seedcoat. If this could be removed, it would also increase protein %

Field peas

- Good source of lysine
- Very poor methionine and cystine content
- Good starch digestibility
- Has a wide range of anti-nutritive factors at relatively low levels
- The ANF content does normally limit the inclusion in commercial diets (5-10%)
- Removal of the seedcoat would greatly increase its feeding value

Sunflower

- The oil is valuable. After extraction, the resulting meal is a very good source of protein
- Relatively free of anti-nutritive factors
- Not grown to any extent in the UK

Lupins

- Potential source of protein, particularly the low alkaloid varieties
- High content of non-starch polysaccharides which cause sticky droppings and wet litter
- Problem can be reduced by the use of enzymes
- Dehulling the seed also greatly increases its feeding value

Is 95% organic diets possible ?

- Yes – provided organic soya is available in volume. Early turkey diets will struggle to have the birds' requirements met
- The cost of organic diets will increase significantly
- The situation would be markedly improved if pure amino acids were approved for the non-organic proportion

Amino acid ingredients

- Currently free methionine, lysine and threonine are not allowed in organic diets
- Methionine is made by a synthetic process whereas lysine and threonine involve a fermentation process (using GM yeast)

The benefits of free amino acids

- Methionine would be of particular benefit to the organic industry
- Reduced use of Maize Gluten
- It would enhance the value of peas and beans significantly by correcting their weakness
- Reduce nitrogen excretion into the environment
- Reduce wet litter and potential welfare problems
- Reduce the cost of organic diets

Summary

- The current 90% organic restriction results in diets which can be criticised on organic grounds.
- The increase to 95% is possible provided organic soya is available but will significantly increase the cost of organic diets
- The approval of methionine as an ingredient would improve the situation nutritionally, financially, environmentally and probably the birds welfare
- Current UK protein rich ingredients alone cannot meet poultry diet requirements
- Dehulling of UK protein rich ingredients would greatly increase their nutritional value by increasing the protein % and reducing anti-nutritive factors