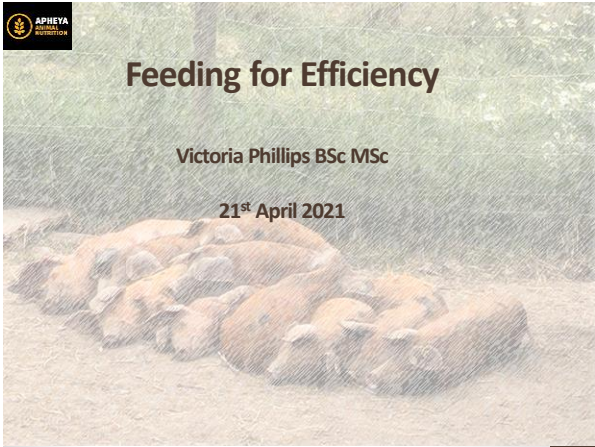




Feeding for Efficiency

Victoria Phillips BSc MSc

21st April 2021



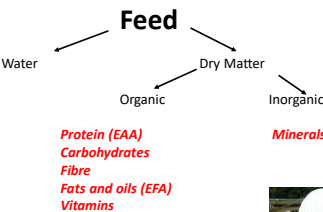
1

Agenda

- Key nutrients in pig nutrition
- Factors affecting feed intake
- Feeding for carcass composition



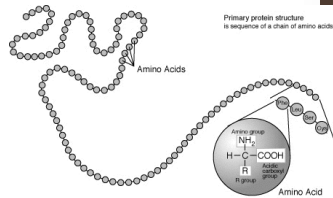
2



3

Protein

- Building Blocks of muscle, tissues, hair and skin
- Also used in metabolic processes , particularly cell reproduction and as enzymes
- Chain of amino acids which give unique properties



4

Amino Acids

- There are 25 amino acids or precursors
- They can be supplied in the diet or synthesised by the animal
- 10 are essential in monogastric diets

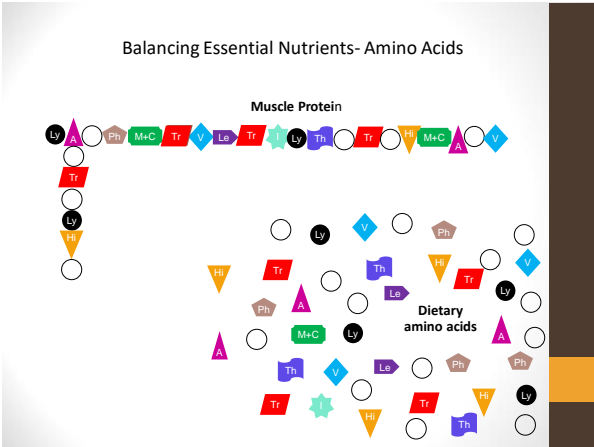
5

Essential Amino Acids

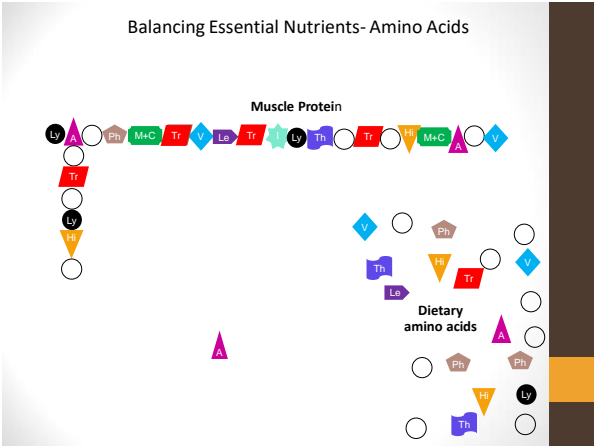
- Cannot be synthesised by mammals by transamination

Essential Amino Acids:	Lysine	Histidine
	Methionine	Leucine
	Threonine	Isoleucine
	Tryptophan	Valine
	Arginine	Phenylalanine

6



7



8

Sources of Protein and Essential Amino Acids

- Soya
- Rapeseed meal
- Fishmeal
- Linseed

Remember, it is illegal to feed

- Animal by-products, with few exceptions (pasteurised milk, eggs)
- Catering waste
- Kitchen scraps

9

Measurements of Energy

Gross energy – the total amount of energy available from a diet

Digestible energy – the gross energy minus the energy lost in faeces (pigs)- DE MJ/kg

Excess energy stored as fat



10

Essential Fatty Acids

They can be supplied in the diet but not synthesised by the animal

Essential Fatty Acids:

Omega 6 fatty acids

Linoleic acid,

Omega 3 fatty acids

Linolenic acid,

EPA Eicosapentaenoic acid

DHA Docosahexaenoic acid

11

Essential Fatty Acids

- Deficiencies results in growth and development retardation, increased susceptibility to bacterial infections, and sterility
- Sources of essential fatty acids: soya oil, sunflower oil, rapeseed oil, linseed, fish oil.



12

Vitamins

- An organic constituent of the diet which is required in small amounts but is essential to the life and well-being of an animal

Minerals

- Inorganic constituents of the diet, of which some are considered to be essential. This is defined as the emergence of deficiency symptoms when an animal is fed a diet deficient in the mineral

13

Vitamins	Minerals
Vitamin A	Calcium
Vitamin D3	Phosphorus
Vitamin E	Sodium chloride
Vitamin C	Magnesium
B Vitamins: B1, B2, B6, B12, biotin, folic acid, pantothenic acid	Trace elements: Zinc, Iodine, Manganese, Copper, Selenium, Cobalt, Iron
Vitamin K	Potassium

14

Zinc

- Essential in the protein of hair, skin, hoof and wool, and also in immune/reproduction system
- Deficiencies: parakeratosis – scabs on skin (pigs), foot abnormalities, reduced growth



15

Factors affecting Feed Intake



16

Factors affecting Feed Intake

- Metabolic Factors
- Digestive Factors
- Availability of feed
- Animal Health

17

Feed Intake in Pigs

- Metabolic Controls : to meet energy, and protein requirements
- Digestive Controls not usually in place – dry sows require gut fill due to low requirements but high gut capacity
- Environmental Controls: In housed animals, well controlled environments mean these are not usually factors. For outdoor pigs, temperature will affect feed intake
- Flavours can be added to young animals' diets
- Animal Health: Ill or injured animals will not be able to compete for feed

18

Lower Critical Temperatures

The environmental temperature below which heat production is increased

Animal	State	Feeding level	LCT
Growing Pig	40kg	Ad lib On straw	14°C (19°C on concrete)
Sow	Adult	Maintenance On straw	22°C

19

Pigs and Poultry

- Pigs will 'choose' to eat to satisfy their energy and protein requirements and will reduce the protein content of their selected diet as their protein requirements decrease with increasing liveweight

20

2 Diets are provided and the pigs can choose how much of each to eat;

Group no	Protein Content 1	Content 2	Food intake kg/day	Proportions of 1 and 2	Overall Protein content of diet %
1	12.5	17.4	1.106	29:71	16.0
2	12.5	21.3	1.013	6:94	20.8
3	12.5	26.7	1.055	44:56	20.4
4	17.4	21.3	1.028	31:69	20.2
5	17.4	26.7	1.076	66:34	20.5
6	21.3	26.7	1.054	98:2	21.8

21

Feed Conversion Ratios

“A measure of an animals efficiency in converting feed mass into increasing body mass”

Food eaten (g)
Liveweight gain (g)

Example: A 20kg pig eating 852g feed per day, and gaining 630g body weight per day will have FCR of $852/630 = 1.35$

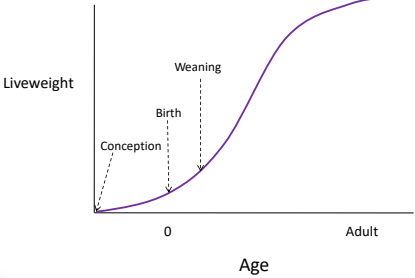
22

Practical feeding

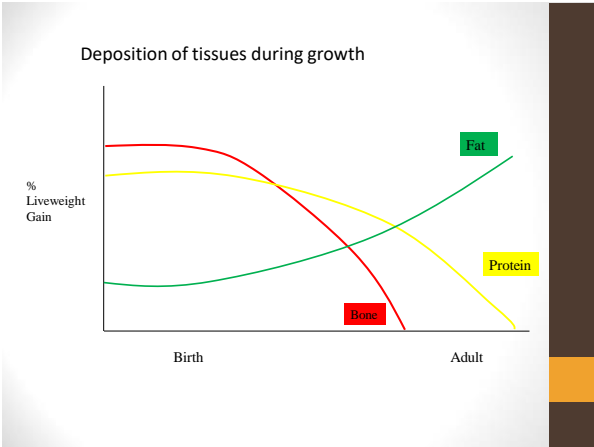
Age of animal	Feeding	Approx Quantity Kg/day	FCR
Piglets up to 12kg	Piglets receiving mothers milk, need a highly digestible 'creep' feed.	0.25	1.3
12kg – 15kg	Link feed	0.5	1.3
15-30kg	Weaner feed	1.0	1.8
30-60kg	Grower feed	1.5	2.3
60-90kg	Finisher and Withdrawal feed,	2-2.5	3.5
60-100kg	Finisher and withdrawal	2-2.5	3.5
Dry Sow	Dry Sows require gut fill, eg sugar beet	2-2.5	-
Lactating sow	Lactating Sow feed	6	-
All pigs except dry sows are fed ad-lib. A Pig will eat 4% of its bodyweight per day			

23

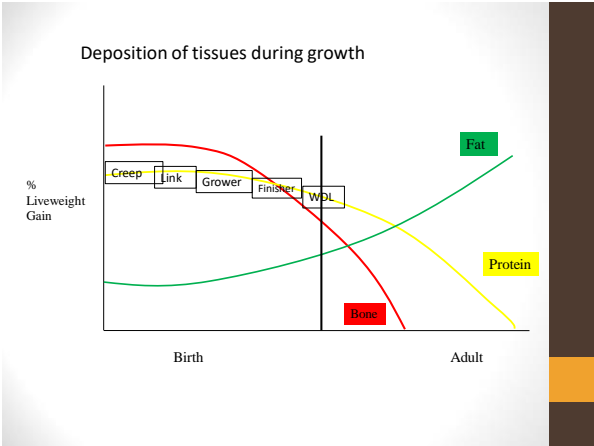
Growth



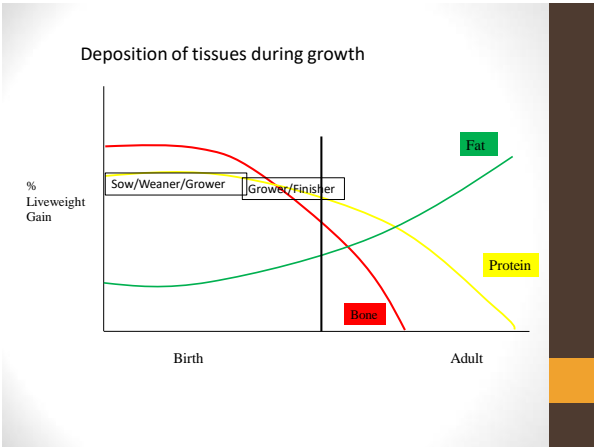
24



25



26



27

Lysine:DE Ratio (Pigs)

- When determining the ideal ratio of lysine:DE, consideration must be given to genetics, environment and market price.

28

Age of animal	Feeding	Lysine: DE ratio	Total Lysine%	Total Energy MJ DE
Piglets up to 12kg	Piglets receiving mothers milk, need a highly digestible 'creep' feed.	1.0	1.6	16
12kg – 15kg	Link feed	1.0	1.5	15
15-30kg	Weaner feed	1.0	1.4	14
30-60kg	Grower feed	0.8	1.05	13.3
60-90kg	Finisher and Withdrawal feed,	0.7	0.9	12.8
60-100kg	Finisher and withdrawal	0.7	0.9	12.8

29

Carcass Composition can be manipulated by

- Limiting Energy during growth
- Slaughtering at an early stage of maturity
- Using later maturing animals
- Genetic selection of animals
- Sex (uncastrated boars, gilts, castrated boars)

30



31
