# Feeding oilseed meal to livestock

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### Oilseeds and oilseed meals in livestock diets

- According to USDA:
  - Processed soybeans are about 90% of oilseed production in USA
  - Canola is now second largest oilseed crop
  - Sunflower production is rebounding
- Production of oilseeds also creates the coproduct of oilseed meal

### So how do we use the coproducts in livestock diets?



### Oilseed meals

- Soybean, canola and sunflower meals all currently used in livestock diets as protein supplement
- All three meals can be interchangeable as a protein supplement
- What they supply differs based on the species they are fed to

### Ruminant digestive tract (cow, sheep, goat, llama, alpaca, deer)



aplex digestive tract-20 X body length. Chews after fermentation (ruminates). Stomach capacity 54 gal. Total acity 80 gal. 32 teeth.



### Dietary protein for the ruminant

- Rumen degradable protein (RDP)
  - Slowly degraded protein: used by rumen microbes
  - Quickly degraded protein: used by rumen microbes
- Rumen undegradable protein (RUP)
  - Either digested by the animal (same as monogastric animal)
  - Or not digested at all (excreted in feces)



### **Protein profiles**

Meal	CP%	RUP (% of CP) if 50% forage diet	RUP Digestibility (%)
Soybean	46.3	69	93
Canola	37.8	35.8	75
Sunflower	28.4	15.9	90

From: NRC. 2001. Nutrient requirements of dairy cattle. 7th Ed.

The University of Vermont

### Monogastric (simple stomach) animals







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### Protein breakdown in simple stomach animals:

- 3 enzymes that break down protein:
  - Pepsin
  - Trypsin
  - Chymotrypsin
- More important to look at the amino acid profile of the diet for simple stomached animals



### Soybean meal

- Contains trypsin inhibitors and other anti-nutrients
  - Can cause growth depression, enlargement of the pancreas
  - Inactivated by heat treatment (more important for monogastrics, not necessary for ruminants)
- More serious repercussions of overheating
  - Deterioration of protein quality
  - Potential for amino acid to be limiting performance



### Soybean meal

### • Vitamin/Minerals

- High soybean meal content in poultry diets can lead to foot pad dermatitis (Potassium?)
- Soybean/corn diet will be deficient in many vitamins (A, D, E, K, B12, riboflavin, niacin, pantothenic acid) and minerals (sodium, chloride, iron, zinc, copper, manganese, iodine, selenium) unless as supplement(s)

From: NRC. 1998. Nutrient requirements of Swine. 10<sup>th</sup> Ed. NRC. 1994. Nutrient requirements of poultry. 9<sup>th</sup> Ed.



Canola Meal

- Negligible quantities of glucosinolates compared to other rapeseed cultivars
- Potential issue with trimethylamine (TMA) in brownegg yolk attributing to a "fishy" or off-flavor

From: NRC. 1994. Nutrient requirements of poultry. 9<sup>th</sup> Ed.





Sunflower meal

- Lower levels of lysine and threonine, but excellent source of methionine
- Lower RUP level for ruminants, but high CP and RDP provides nitrogen source for rumen microbes
- More residual oil in meal





- Monitor fat content of oilseed meals produced
  - High fat content will lead to issues with rancidity and other potential issues such as milk fat depression, dry matter intake



### Conclusions

- Oilseed meals are an excellent source of protein for most livestock feeds
- Though some secondary compounds can inhibit optimal performance, cultivars, processing and management can mitigate these anti-nutritive components





### **Dietary protein for Ruminants**

