

# There's more to pulses as feed ingredient than protein

*Dr. Eduardo Beltranena, Monogastrics Research Scientist, Alberta Agriculture and Forestry*

I continue to encounter producers and pulse growers who believe protein is the reason field pea, faba bean, split lentil or even sporadically chickpea are included in feed rations. But there is more to pulses as feed ingredient than protein provision. The protein requirement of domestic livestock and poultry are relatively small compared with their energy requirement, even for young animals that require high protein feeds (20-25%). So where does the feed energy come from? Pigs and poultry primarily derive energy from burning feed starch and fat. Although cereal grains are the primary source of starch in feed rations (55-60% starch), pulses are not far behind (40-45% starch). In fact, pulses generally price in least-cost formulated rations sooner than cereal grains and supplemental protein sources like soybean meal and canola meal. **Pulses contribute both starch and protein**, not mostly one or the other. That to me, is important for a pig or poultry producer who is also a crop grower. Even though he may look at the crop and feed business separately, I give great importance to what his rotational pulse crop is that year. Subject to feed inclusion rate, pulse crops can produce the most pork, broiler meat or egg cartons per planted area unless the crop has greater return directed to human food. Cereals and oilseeds grown by the producer the same year are also relevant, as they have complementary feed value to pulses for their starch and protein/fat content, respectively. If planting only canola or cereal grain that year because of a preset crop rotation, the producer will end up buying feed wheat, barley or both or sourcing imported soybean meal from a broker without considering meat or egg output per unit of land.

How does complementary nutrient feed value play out for pulses? Cereal grains (wheat, barley) are the primary source of starch for pigs and poultry. Simple cereal starch is digested promptly, whereas more complex pulse starch is digested slowly along the entire intestine. Including both cereal grain(s) and pulses in rations, animals benefit from longer, more even starch digestion and uptake of glucose into the bloodstream that is in better synchrony with protein and fat digestion. Pulses have a good content of protein (20-30%), but it is the content of certain amino acids (individual links in protein chains) that nutritionists mainly care about. Pulses are a good source of lysine, but are relatively low in sulfur amino acids (methionine and cysteine). In contrast, protein meals like canola have a high content of sulfur amino acids thus complement pulses and cereal grains when included in feed. Fat contributes about 2.25 times more energy than starch to feed. Pulses are low fat legumes so contribute little fat to the diet. Cereal grains and solvent-extracted meals like canola meal and soybean meal are also low in fat content. Hence little fat is provided by cereals, pulses and protein meals. Pigs and poultry have an even lower fat than protein requirement. They can synthesize fat from excess starch or protein except for a few essential fatty acids (linoleic acid, linolenic acid) that must be supplied by canola or flax oil.

I hope the above helps to not narrow, but amplify your perspective about the feeding value of pulses in pig and poultry rations. Nutritionists value pulses about twice as much for their starch as for their protein content. At high feed inclusion rates, the combined profitability of pulse crops converted into meat or eggs can be greater than cereals and canola individually unless harvested for greater return as human food.