

Expeller soya beans: What's in a name?

By Dr Dave Albin, Insta-Pro International

Soya beans are produced in vast quantities around the world and exported to many countries. Almost always, soya beans, which contain protein, oil and other nutrients, are processed into meal (protein fraction), while the oil is removed and used for other purposes. The commodity version of this process, which uses hexane for complete oil removal, along with toasting to improve the meal and remove most of the residual hexane solvents, results in the production of soya bean meal.

However, mechanical versions of this process exist, and when run properly using the right equipment and processes, superior versions of soya bean meal can be produced. Unfortunately, these mechanical soya meals are often crudely and incorrectly lumped together in one category – expeller meal.

Understanding the difference

It is important to understand that different versions of expeller meals exist and that the underlying process affects the feeding (and economic) value of the final meals. It is often difficult to obtain this information without some digging. Following are some tips to better understand your mechanical soya ingredients – the so-called expeller soya bean meals.

First, it should be quite easy to obtain a proximate analysis on the soya meal. Variations on this group of tests exist, but typically for soya meals, results for at least moisture, oil, protein and fibre should be included. Most laboratories around the world can analyse these, but care should be taken when choosing a lab. The data will be used to make important decisions, so a little probing into their procedures, employee training and quality controls is warranted.

Moisture levels in soya meal

Moisture is a crucial value to understand because it indicates various things about

the process. With mechanical processes that can be used to manufacture high-quality soya meal, such as high-shear dry extrusion and mechanical oil pressing, the amount of moisture remaining in the meal should be relatively low.

Commodity soya bean meal, using the hexane process, will often contain 12% moisture since it is easier for these large companies to sell more water (and fewer nutrients). Well-executed expeller soya meal will contain 5% moisture, or even slightly lower, when the moisture content of the raw soya beans is in the 9 to 11% range. Roughly 50% of the moisture will be flashed off when the procedure is run correctly.

This has major implications. When high-shear dry extrusion is run properly – meaning at high enough temperatures, pressure and shearing forces – many aspects of the meals are improved. First, plant cell walls are ruptured, making digestion and access to nutrients easier.

Secondly, the naturally occurring plant defence mechanisms, known as antinutrients, are deactivated. This also improves digestion, giving animals greater access to the nutrients contained in soya. Therefore, having access to moisture level data can provide you with a lot of information about the quality of the meals.

Residual oil levels

It is important to consider other data as well. Residual oil levels are another key indicator. With any mechanical expeller process, removal of all oil is impossible. There are limits to how much oil can be squeezed out of soya beans with these processes. Conversely, using the hexane process will result in soya bean meal with less than 1% oil remaining.

Understanding what it means to have less residual oil with the right process is important. When initial oil levels in raw soya beans are 18 to 20%, any mechanical

expeller process should reduce the residual oil levels to 6 to 8% or lower. Again, several inferences can be made about the process and the meal quality from these values.

With high-shear dry extrusion – again, a quality approach to processing soya beans – run properly, the amount of energy in the meal that is available for productive purposes increases. It is counter-intuitive at first because oil is energy-rich, but with the right equipment and processes, as more oil is squeezed out, the amount of useful energy and the economic value of the meal improves.

Protein and fibre content

Lastly, the levels for protein and fibre are also important, but can be misleading. The total amount of protein is important for assigning value to mechanical expeller meals, but it is really the digestibility of the amino acids in protein that affects how a particular soya meal fits into an animal diet formulation. This can only be determined accurately with animal feeding studies, but with reduced moisture and residual oil, amino acid digestibility often improves.

Likewise, crude fibre levels can vary by a few percentage points, depending on whether or not the soya beans were dehulled, but even soya meal with higher crude fibre (5% or greater) can have highly digestible amino acids if the right process, such as high-shear dry extrusion, has been used.

It is clear that the category, expeller meal, for soya is woefully inept. Request data and seek help from experts to properly use and value your soya meals. 🌱

For more information, email
Mike Martin at mmartin@insta-pro.com
or visit www.insta-pro.com.