

Rations for intensively finishing cattle

Independent nutritionist David Hendy recently formulated an intensive finishing ration for a beef producer wanting to replace purchased protein with his own home-grown protein crop.

Protein is a critical nutrient in all beef cattle diets and ensuring animals receive adequate amounts is important. It plays a vital role in keeping the rumen bugs working well and therefore optimises overall ration utilisation as well as nutrient supply.

There are a number of feeds available that are rich in protein, including maize, barley or wheat distillers' grains, soya bean meal, rapeseed meal, sunflower meal, lupins, molasses and distillers-based liquid feeds containing urea and peas and beans.

The beef producer who David was working with wanted to replace purchased soya bean meal with home-grown peas and beans. Not only do they provide a valuable source of protein and energy for ruminant rations, they are also beneficial in crop rotations for their ability to fix nitrogen in the soil.

Although predominantly included in rations as a protein source, peas and beans also provide a good supply of energy and starch. However, this can vary considerably so it is recommended they are always analysed before inclusion.

Peas have a reasonably high crude protein level of 24% (in dry matter (DM)) with a moderately high starch content of 47% (DM), but a digestible fibre level of approximately 19% (DM) neutral detergent fibre (NDF). Beans are higher in crude protein at 29% (DM) but generally contain slightly less starch at 43% (DM). Both have reasonably high metabolisable energy levels with peas at 12.8 MJ/kgDM and beans at 13.8MJ/kg DM.

The relative costs of protein from soya versus peas and beans is shown in Table 1. The figures demonstrate that, based on the current prices, beans are the cheapest form of protein available



Table 1: Costs for peas, beans and HiPro soya, DM basis

Protein source	Cost/tonne (£)	Cost/tonne DM (£)	Cost/100g CP (p)
Peas	129.30	150.35	6.3
Beans	137.70	159.73	5.5
HiPro soya	326	370.45	7.1

The ration David formulated and its nutritional analysis are shown in Tables 2 and 3. The mix was fed *ad libitum* (*ad lib*) in hoppers with *ad lib* straw made available from racks.

Table 2: *Adlib* cereal mix with peas and beans

Mix inclusion rates	kg/tonne, fresh weight	Ratio in ration (%)
Rolled barley	430	43.0
Rolled wheat	215	21.5
Peas and beans	150	15.0
Sugar beet pulp	135	13.5
Molasses	50	5.0
Minerals	10	1.0
Limestone flour	10	1.0

Table 3: Nutritional composition of mix, DM basis

Nutritional component	Nutritional values (% in DM, unless otherwise stated)
Dry matter (% DM in FW)	85.2
Metabolisable energy (ME), MJ/kg DM	12.6
Crude protein (CP)	13.6
Neutral detergent fibre (NDF)	18.3
Oil	1.7
Starch	46.3
Sugars	9.0

Peas and beans contain high levels of phosphorus and magnesium and relatively low levels of calcium, therefore careful consideration should be given to mineral supplementation to prevent calcium being locked up by phosphorus and magnesium. The use of high-calcium minerals including limestone flour can help alleviate these problems, however, if in doubt, seek professional nutritional advice.

For more information see the Better Returns Manual [Feeding Growing and Finishing Cattle for Better Returns](#) and [The Mini Feeds Directory](#).

The beef ration calculator allows producers to calculate the cost, energy and protein density of simple cattle rations. This tool is available on the AHDB Beef & Lamb [website](#).