

Protein sources for beef and sheep rations



Providing the correct quantity and quality of protein in ruminant feeds is essential to achieve optimum growth rates and health of the animal. Soya bean is the most commonly used protein source as it is a high quality protein. However, it cannot be grown in the UK and increasingly we are looking for more sustainable proteins that can also achieve good results. This factsheet identifies some of the other sources of protein that are available in the UK and also provides some example rations to illustrate how they can be used.

When formulating any ration it is important to get your silage analysed to avoid under or over supplying protein.

Types of protein available in the UK

Soya bean meal – a high protein meal remaining after the hulls and oil have been removed from soya beans. It is probably the best vegetable protein source available and large quantities are imported into the UK every year. It is ideal for all livestock, but is particularly valuable for very young animals or for ewes in late pregnancy and early lactation. It is relatively high in digestible undegradable protein (DUP) so helps to meet metabolisable protein needs in highly productive animals. **Hi-pro soya contains 47% protein and 13.6MJ/kgDM.**

Protected soya – soya bean meal that has been treated to improve the level of DUP. **Typically 48% protein and 13.3 MJ/kgDM. Used to improve DUP levels for ewes or young ruminants.**

Home grown protein alternatives that could be used to replace some or all of the soya bean meal in cattle and sheep diets:

Rapeseed meal – the high protein meal remaining after the oil has been removed from rape seed. It is widely used in diets for ruminants to supplement low protein forages. It is very useful for growing cattle, suckler cows and sheep. **Rapeseed meal contains 34% protein and 12.1MJ/kgDM.**

Wheat distiller's dark grains (WDDG) – there are two sources of WDDG, from grain fermentation in alcohol distilleries or from bio-ethanol plants. The latter is a relatively new product in the UK but as bio-ethanol production increases there will be increasing amounts on the market for use in livestock diets. A high energy and high protein feed suitable for all ruminants. The protein is partly degradable. **WDDG contains 30% protein and 13.7MJ/kgDM. Check copper content before feeding to sheep.**



Beans – a good source of energy (starch) and rumen degradable protein. Useful in ewe and cattle rations. **Beans contain 26% protein and 13.3MJ/kgDM.**

Example rations

(All assume a base diet of ad-lib baled silage of 40% DM (dry matter), 10.6MJ/kgDM, 13% CP (crude protein))

1. Twin bearing Welsh Mule ewes – 65kg liveweight and body condition score 3

Kg/head/day	Weeks before lambing				
	8	6	4	2	1
Silage	3	3	2.7	2.5	2.4
Home mix	-	-	0.25	0.5	0.65

Finishing lambs to grow at 150 to 200 g/day

Ad-lib silage (about 1.5kg) plus 0.5 kg of a 14% protein mix

Growing cattle (300kg liveweight to grow at 1 kg/day)

Ad-lib silage (about 11 kg) plus 3.5 kg 12% protein home mix

Finishing cattle (525kg liveweight to grow at 1.5kg/day)

Ad-lib silage (about 16kg) plus 7 kg of cereal mix (11% CP)

Possible mixes - examples shown in grams per animal per day

	Ewes 18%		Lambs 14%	Growing cattle 12%	Finishing cattle 11%
	1	2			
Barley	625	475	600	800	725
Oats	100	100	200		200
SBP	-				
WDDG	-	400		100	
Hi-pro soya	150				
Rapeseed meal	100		175	75	
Beans	-				50
Minerals	25	25	25	25	25
ME MJ/kgDM*	12.6	12.8	12.4	12.7	12.6

* Metabolisable energy - Megajoules/kilogram Dry Matter

SBP Sugar beet pulp
WDDG Wheat distillers' dark grains

Pregnant ewes mix 1: A traditional mix of proteins – soya to provide high quality DUP and rape to provide rumen degradable protein. Suitable for prolific ewes in the run up to lambing.

Pregnant ewes mix 2: Using highly palatable WDDGS to provide protein and high energy. Lower protein quality than mix 1 but suitable for most ewe types.

Lamb mix: Using cereals (barley and oats) to provide starch to complement the grass silage but some rumen degradable protein to help balance protein requirements for those lambs that need to grow and finish.

Growing cattle mix: A good supply of starch from the barley and a mix of proteins from WDDGS and rape to help maximise forage utilisation.

Finishing cattle mix: On good quality silage, finishing cattle do not generally need additional protein so rolled cereals are usually adequate. A small amount of rumen degradable protein (e.g. beans) may be needed on low protein forages.

Many animal feed by-products have a low level of calcium and high level of phosphorus so it is always advisable to provide a balanced mineral supplement to avoid any imbalances or deficiencies.