The Mini Feeds Directory

Better Returns Programme

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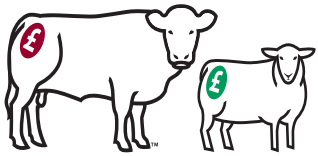

Better Returns Programme

Contents

This guide covers a range of feeds (excluding forages) that are suitable for inclusion in beef and sheep rations. It is not a comprehensive list of all feeds available, but provides a summary of the more common ones.

Feed is a vitally important input to livestock production systems. Not only does it make up the majority of variable costs but it contributes to determining how well animals perform and the profitability of the system. Choosing the right feed will depend on the nutritional requirements of the animals, the facilities available on farm and feed price. Getting better returns from feed relies on providing a well-balanced ration that meets the nutritional needs of the stock. It is dependent on making the right choices about feed purchasing, storage and targeted rationing.

This guide will help farmers to make decisions about the most appropriate feed for different systems, highlighting some of the issues that need to be considered. It includes useful, practical information about storage requirements, palatability, inclusion rates and nutrient composition of feeds suitable for inclusion in rations.

Getting the most out of alternative feeds

As well as the traditional feeds included in beef and sheep rations there is an increasing range of 'alternative feeds' available and worth considering. The term 'alternative feeds' encompasses a huge range of different dry, moist and liquid feeds and blends that tend to be derived from human food and drink manufacturing processes and now biofuel production. These feeds can offer farmers the opportunity to purchase cost-effective feed products for their livestock that will enable high levels of performance to be achieved when included as part of a properly balanced ration. However it is important that a number of factors are taken into consideration:

Part of a balanced ration

Alternative feeds rarely provide a complete feeding solution for beef cattle or sheep and therefore often rely on good quality home grown feeds to provide a well-balanced ration. Alternative feeds can vary in terms of physical form and nutritional analysis depending upon their source. It is advisable to seek the advice of a professional nutritionist when feeding these products.

Dry, moist or liquid feeds

Alternative feeds are generally categorised by their physical form – dry, moist or liquid. Dry feeds tend to be in either a pellet or meal form, with specific handling and storage characteristics depending on their origin. Moist and liquid feeds, as their name suggests, have a lower dry matter content, which means that good storage facilities are required to minimise waste. Blended feeds are also available which incorporate a range of different alternative feeds into a pellet or meal blend. Always ask for the list of ingredients and composition to be sure you know what you are getting.

Storage and minimising waste

Dry feeds have the most flexible storage options with bins, hoppers, floor or trailer, all being suitable.

For longer-term storage of moist feeds, ensiling is required. Clean side and top sheets are recommended, held down by material such as bales that ensure all the sheet is in contact with the feed. Moist feed can be capped with potato slurry or citrus wet press, which will also ward off some vermin. Alternatively, moist feeds may be clamped with forages or mixed with dry feeds for storage as a complete feed, eg grain-beet is a mixture of brewers grains and molassed sugar beet feed. All liquid feeds require storage in either tanks or drums. Poor storage can cause disease problems.

Cost effectiveness

Regardless of feed type, price will be reduced by being able to order and handle large loads. There may also be opportunities to make savings through forward buying, based on a judgement made about price fluctuations throughout the year.

Farm assurance

Most farm assurance schemes stipulate that animals sold as farm assured must have been fed purchased feeds supplied by certified feed companies. Check the details of your own assurance scheme for specific details of feed source assurance specifications.

Formulating diets

Diets should be formulated with the right balance of protein, energy and fibre to ensure sufficient feed utilisation. The majority of the fibre in ruminant diets is provided as forage which is important for optimising rumen function and stability. In all diets, ensure the animals are fed a balanced ration tailored to the breed, type, sex and stage of production.

Using the information in this guide

Information is presented about nutritional and utilisation characteristics of common feed, but these are by no means the only feeds that can or should be fed.

Category

Breaks the feeds down into groups. Ideally the ration would contain feeds from a couple of different categories, although this is not essential, and would depend on the basal forage.

Nutritional notes

Provides key nutritional information about the feed, highlighting any potential problems.

Palatability

Indicates how readily animals will eat the feed.

Upper inclusion rate

A suggested upper limit for inclusion of the feed in a concentrate ration on a dry matter basis. Exceeding this limit may cause rumen instability and potential acidosis problems.

Storage/processing

An indication of whether a feed needs further processing before feeding. This will affect the overall feed cost, and also storage requirements if processing is carried out on-farm.

Bulk density

A guide to how much space will be required for storage per tonne of freshweight.

Typical analysis

A summary of the average key nutrient composition of feeds. This should be used as a guide only to inform decision-making. A declaration of feed analysis should be sought at purchase to ensure correct diet formulation.

Barley

Cereal grain

Appearance

Bulk density

Whole 650kg/m^3
Rolled 370kg/m^3
Crimped 900kg/m^3

Nutritional notes

High in energy, high in starch, low in fibre, low in protein. Should be fed little and often to avoid acidosis, particularly when processed into small particles. When moist, supplementation with vitamin E and selenium is essential.

Palatability

Good

Upper inclusion rate (DM)

Beef 80%
Sheep 80%

Processing

Range of options: dry, moist, whole, rolled and crimped. Dry matters may vary depending on the processing system used. Whole grains are safer for sheep.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
86.0	13.2	12.1	21.1	3.0	59.0	3.0

Wheat

Cereal grain

Appearance

Bulk density

Whole 730kg/m^3
Rolled 420kg/m^3
Crimped 950kg/m^3

Nutritional notes

Very high in energy, very high in starch, very low in fibre, low in protein. Must be supplemented with digestible fibre and fed little and often to avoid acidosis, particularly when processed into small particles. When moist, supplementation with vitamin E and selenium is essential.

Palatability

Good

Upper inclusion rate (DM)

Beef 50%
Sheep 50%

Processing

Range of options: dry, moist, whole, rolled and crimped. Dry matters may vary depending on the processing system used. For sheep it should be fed whole.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
86.0	13.8	12.8	14.0	2.0	69.0	3.5

Triticale

Cereal grain

Appearance

Bulk density

Whole 720kg/m^3
Rolled 410kg/m^3
Crimped 950kg/m^3

Nutritional notes

High in energy, high in starch, low in fibre, low in protein. As with all cereals it should be fed little and often to avoid acidosis (particularly when ground into a meal). When moist, supplementation with Vitamin E is essential.

Palatability

Good

Upper inclusion rate (DM)

Beef 50%
Sheep 50%

Processing

Range of options: dry, moist, whole, rolled and crimped. Dry matters may vary depending on the processing system used.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
86.0	13.4	12.0	13.2	1.9	66.5	4.0

Maize

Cereal grain

Appearance

Bulk density

Whole 750kg/m^3
Crimped 1000kg/m^3

Nutritional notes

Very high in energy, very high in starch, very low in fibre, very low in protein. A percentage of starch in maize passes through the rumen into the hind gut and is digested down the digestive tract, which complements very well in a mixed cereal diet. Very low in minerals.

Palatability

Good

Upper inclusion rate (DM)

Beef 40%
Sheep 20%

Processing

Range of options: dry, moist, whole, rolled and crimped. Dry matters may vary depending on the processing system used.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
86.0	14.3	8.5	12.1	4.3	71.0	2.0

Oats

Cereal grain

Appearance

Bulk density

Whole 500kg/m^3
Rolled 290kg/m^3

Nutritional notes

Moderate in energy, moderate in starch, high in fibre, low in protein. A very safe feed, lower in energy than other cereals making it less suitable for rapid growth rates in finishing rations, but with good levels of unsaturated fat they can produce good carcase composition.

Palatability	Upper inclusion rate (DM)	
Good	Beef 80%	Sheep 80%

Processing

Range of options: dry, moist, whole, rolled and crimped. Can be fed whole to calves up to eight months old, where as all other cereals need processing for calves.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
86.0	12.2	11.0	35.6	5.0	42.0	1.0

If you are using your own or are purchasing grain, be aware low bushel weights can reduce feed level. Disease issues can occur. Grain affected by fusarium or ergot must not be fed, as the mycotoxins produced can seriously affect animals, eg poor production, abortion, kidney failure and even death.

Storage and feeding of roots

Where farm grown roots are a permanent feature, a suitable insulated, air cooled, humidity controlled store could be constructed to avoid losses. Otherwise roots need to be purchased fresh as required, particularly if they are pre-washed as that will reduce their keeping quality. Washed carrots can deteriorate quickly in freezing conditions, and will wilt and shrink rapidly in warm hot conditions. Fodder beet, sugar beet, swedes and parsnips can be stored for several months outdoors in straw bale clamps with moderate losses, but are better in cool, dry, aerobic conditions, for example under a roof in an airy building, not sheeted.

If potatoes are to be kept long term, they are best kept unwashed in cool, dark conditions such as outdoor clamps covered with straw and soil.

In anaerobic conditions, washed roots can be mixed with clamped silage or brewers grains, (minimum two parts brewers grains to one part roots). They can also be chopped and clamped with a range of other absorbent feeds, eg sugar beet pulp, malt pellets, wheat feed, soya hulls, dried citrus pulp etc, and/or forages, all on a four parts washed roots to one part absorbent material. Make sure there is no soil contamination.

Potatoes

Vegetable

Appearance

Bulk density

645kg/m^3

Nutritional notes

High in energy, high in starch, low in fibre, low in protein. Soil contamination can be a problem and sprouted, green or rotten potatoes should not be fed. It takes 4.5–5kg of potatoes to replace 1kg of barley.

Palatability	Upper inclusion rate (DM)	
Very good	Beef 40%	Sheep 40%

Processing

Chopping essential for cattle to avoid choking. Sheep need good teeth.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
20.5	13.5	11.0	13.3	0.2	62.0	8.0

Fodder Beet

Vegetable

Appearance

Bulk density

540kg/m^3

Nutritional notes

High in energy with moderate sugar and good fibre levels, but fairly low in protein. Can replace rolled barley on a 5:1 dry matter ratio (5kg of fodder beet to 1kg barley). The tops can be fed but should be wilted first, and as with all roots avoid soil contamination as much as possible. Can be grazed in situ by sheep.

Palatability	Upper inclusion rate (DM)	
Very good	Beef 70%	Sheep 70%

Processing

Whole or chopped.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
18.0	12.1	7.0	17.5	0.8	2.0	65.0

Sugar Beet

Vegetable

Appearance

Bulk density

540kg/m^3

Nutritional notes

High in energy and sugar and good fibre levels, but fairly low in protein. Can replace rolled barley on a 4.5:1 on a dry matter ratio (4.5kg of fodder beet to 1kg barley). Can be very hard so can be difficult for some stock to eat. The tops can be fed but should be wilted first, and as with all roots, avoid soil contamination as much as possible.

Palatability	Upper inclusion rate (DM)	
Very good	Beef 70%	Sheep 70%

Processing

Whole or chopped.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
23.0	12.3	6.0	13.6	0.4	3.0	69.0

Swedes

Vegetable

Appearance

Bulk density

555kg/m^3

Nutritional notes

High in energy, high in sugar, moderate in fibre, very low in protein. Very high in energy but low in dry matter. It takes roughly 7kg of swedes to replace 1kg of barley due to their low dry matter, (10–12% DM) but they can also be used as a forage replacer. Can be grazed in situ by sheep.

Palatability	Upper inclusion rate (DM)	
Very Good	Beef 60%	Sheep 90%

Processing

Whole or chopped (chopping can reduce risk of choking).

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
10.5	13.8	9.4	14.5	0.5	1.0	59.1

Parsnips

Vegetable

Appearance

Bulk density

630kg/m^3

Nutritional notes

High in energy, low in sugar, high in fibre, very low in protein. Soil contamination is not generally a problem with parsnips. It takes roughly 5kg of parsnips to replace 1kg of barley on a dry matter basis.

Palatability

Very good

Upper inclusion rate (DM)

Beef 50% Sheep 50%

Processing

Chopped (chopping can reduce risk of choking).

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
15.0	13.0	8.6	14.5	1.9	3.0	8.5

Carrots

Vegetable

Appearance

Bulk density

700kg/m^3

Nutritional notes

High in energy, moderate in sugar, high in fibre, very low in protein. Lower in energy than other roots, with a low dry matter content similar to swedes. Once washed they do not keep for more than a few days. Not to be fed to finishing cattle within the last 100 days before slaughter as it may change the colour of fat due to the high level of carotene.

Palatability

Very good

Upper inclusion rate (DM)

Beef 45% Sheep 25%

Storage/processing

Whole or chopped, (chopping can reduce risk of choking, especially in youngstock), but they do not store well for long periods, particularly in freezing or very hot conditions.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
13.0	12.6	9.5	10.5	1.5	10.2	30.0

Home-grown protein options

High protein feeds generally make up a small proportion of livestock rations but can still represent a major cost. Home-grown options include bi-crop forages with peas, beans, lupins, or combinable peas, beans and lupins (dried stored or crimped), along with high clover content grass swards, hybrid grasses and lucerne.

Blue lupins are slightly lower in protein than other types; for combining they are better suited to the north and west where harvest is late. White lupins are better suited for combining in the south and can be used for foraging and/or mixed with other crops such as triticale. Yellow lupins suit slightly later areas for combining.

Field beans come in autumn and early spring sown varieties. The spring sown varieties are generally higher quality but can have a very late harvest particularly in the north and frequently require desiccating off before combining. Peas have an earlier harvest but can be difficult to combine.

Peas

Pulse

Appearance

Bulk density

760kg/m^3

Nutritional notes

High in protein, moderate in starch, low in fibre. Modern varieties contain less anti-nutritional factors than older ones.

Palatability

Moderate

Upper inclusion rate (DM)

Beef 50%

Sheep 50%

Processing

Flaked, rolled or crimped. Can be fed whole to sheep as long as they are not too dry.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
86.0	12.8	24.0	19.0	2.0	47.0	6.0

Beans

Pulse

Appearance

Bulk density

590kg/m^3

Nutritional notes

High in protein, moderate in starch, low in fibre. Higher in energy than peas.

Palatability

Variable

Upper inclusion rate (DM)

Beef 30% Sheep 30%

Processing

Whole, flaked, rolled, ground or crimped. Can be fed whole to sheep as long as they are not too dry.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
86.0	13.8	29.0	17.0	2.0	43.0	4.0

Lupins

Pulse

Appearance

Bulk density

Meal 375kg/m^3

Nutritional notes

High in undegradable protein, moderate in starch, low in fibre. Can be used to replace soya bean meal.
Blue lupins are lowest in protein and more suited to the north/west of the country where harvest is late. White lupins can be used for silage making mixed with crops such as triticale.

Palatability

Good in modern varieties

Upper inclusion rate (DM)

Beef 30% Sheep 30%

Processing

Flaked, rolled, ground or crimped. Can be fed whole to sheep as long as they are not too dry.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
86.0	14.3	38.0	23.0	6.2	9.0	4.0

Barley Distillers Grains

Meal, crumb or pellet

Appearance

Bulk density

600kg/m³

Nutritional notes

High in fibre, moderate in protein. Lower in energy than other distillers grains. Can contain high levels of copper which make them unsuitable for sheep. Check with suppliers.

Palatability

Good

Upper inclusion rate (DM)

Beef 30% Sheep 30%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
89.0	12.7	26.0	42.0	9.2	3.2	2.0

Wheat Distillers Grains

Meal, crumb or pellet

Appearance

Bulk density

600kg/m³

Nutritional notes

Moderate in fibre, high in protein. Contain good levels of energy, being lower in oil than other distillers grains means they can be included at higher rates in diets. Can contain high levels of copper which make them unsuitable for sheep. Check with suppliers.

Palatability

Good

Upper inclusion rate (DM)

Beef 30% Sheep 30%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
89.0	13.5	32.0	32.0	7.5	4.6	4.0

Maize Distillers Grains

Meal, crumb or pellet

Appearance

Bulk density

Variable 350–600kg/m^3

Nutritional notes

Moderate in fibre, moderate in protein. Home produced product is very high in energy, whereas imported product is lower in energy and more variable. Can contain high levels of copper which makes them unsuitable for sheep. Check with suppliers.

Palatability

Good

Upper inclusion rate (DM)

Beef 30% Sheep 30%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
89.0	14.8	28.0	36.0	11.0	4.5	1.0

Maize Gluten Feed

Meal, crumb or pellet

Appearance

Bulk density

625kg/m^3

Nutritional notes

Moderate in fibre, moderate in protein. Can have very variable composition depending on source. Avoid if they have been overheated in drying process and have a black burnt appearance.

Palatability

Moderate

Upper inclusion rate (DM)

Beef 45% Sheep 45%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
89.0	12.5	21.7	40.0	4.0	21.0	3.0

Wheatfeed

Meal, crumb or pellet

Appearance

Bulk density

Meal 350kg/m^3
Pellets 560kg/m^3

Nutritional notes

High in fibre, moderate in protein. Being relatively low in energy makes it unsuitable for high inclusion in finishing diets, but ideal for youngstock.

Palatability

Moderate

Upper inclusion rate (DM)

Beef 50%
Sheep 50%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
89.0	11.5	17.3	38.0	4.0	27.5	7.0

Malt Pellets

Meal, crumb or pellet

Appearance

Bulk density

Pellets 600kg/m^3

Nutritional notes

High in fibre, moderate in protein. Being relatively low in energy makes it unsuitable for high inclusion in finishing diets, but ideal for youngstock.

Palatability

Moderate

Upper inclusion rate (DM)

Beef 25%
Sheep 25%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
89.0	11.5	23.5	50.0	2.5	15.1	0.4

Moist Wheat Co-Product

Moist meal or crumb

Appearance

Bulk density

925kg/m³

Nutritional notes

High in fibre, moderate in protein. High in energy and can be used as sole concentrate feed in rations containing forage. There are a number of products available, but always check the nutritional analysis and dry matter before buying.

Palatability

Good

Upper inclusion rate (DM)

Beef 50% Sheep 50%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
47.0	13.4	22.0	35.0	7.5	16.5	2.5

Brewers' Grains

Moist meal or crumb

Appearance

Bulk density

930kg/m³

Nutritional notes

High in fibre, moderate in protein. Can be used as a concentrate or a forage extender. Composition and dry matter can be variable depending on source, (can vary between 23–28% dry matter). Suitable for all stock.

Palatability

Good

Upper inclusion rate (DM)

Beef 45% Sheep 45%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
23.0	11.7	24.0	56.5	7.1	5.0	1.5

Pot Ale Syrup

Free flowing liquid

Appearance

Bulk density

1100kg/m^3

Nutritional notes

High in protein, high in energy, low in fibre. Suitable for all stock and aids the digestion of straw and fibrous forages. Very acidic feed (low pH) therefore could further limit intake on acidic silages. It is also high in copper and potassium, so avoid feeding alongside feeds including copper in sheep diets. The high level of potassium may cause scouring if fed at abnormally high levels to cattle.

Palatability	Upper inclusion rate (DM)	
Good	Beef 20%	Sheep 20%

Storage/processing

Can ferment so ensure containers are vented. Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
45.0	14.0	37.0	0.7	0.2	1.0	2.0

Wheat Starch Syrup

Syrup liquid

Appearance

Bulk density

1200kg/m^3

Nutritional notes

High in energy, low in fibre. Suitable for all stock and aids the digestion of straw and fibrous forages, but in general has low dry matter.

Palatability	Upper inclusion rate (DM)	
Good	Beef 25%	Sheep 25%

Storage/processing

Refer to manufacturers for storage and feed guidelines.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
26	14.2	30	1.5	3.5	11.0	2.0

Biscuit Blends

Crumb or meal

Appearance

Bulk density
250kg/m³

Nutritional notes

High in energy, low in fibre, high in oil. Variable composition depending on source, excellent cereal replacer.

Palatability

Very Good

Upper inclusion rate (DM)

Beef 30% Sheep 30%

Storage/processing

Ready to feed. Avoid storing for long periods due to high oil level.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
88.0	15.0	9.5	20.0	11.0	49.0	9.0

Bread

Crumb or meal

Appearance

Bulk density
200kg/m³

Nutritional notes

High in energy, low in fibre. Avoid very high inclusion rates and supplement with digestible and structural fibre.

Palatability

Good

Upper inclusion rate (DM)

Beef 30% Sheep 30%

Storage/processing

Ready to feed. Short shelf life. Ask supplier for storage advice, as can mould easily.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
65.0	14.0	14.0	10.0	3.3	69.0	4.7

Breakfast Cereal Blends

Crumb or meal

Appearance

Bulk density

250kg/m^3

Nutritional notes

High in energy, low in fibre. Variable composition depending on source but an excellent cereal replacer.

Palatability

Very good

Upper inclusion rate (DM)

Beef 30% Sheep 30%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
90.0	14.0	12.0	11.0	2.0	52.0	6.0

Different types of soya bean meal

Soya is predominately grown in North and South America, but is slowly becoming more popular in other parts of the world due to new varieties, plant breeding research and technology, and climatic changes. The oil is partially removed by crushing, which is known as the expeller process, with the remaining oil removed by solvent extraction.

There are three types of soya bean meal available for purchase, Hi-pro soya, Brazilian soya and Argentinean soya. Hi-pro soya is generally the most commonly available and better quality soya bean meal, with a crude protein content between 52–55%. All the types of soya are similar in appearance and available as a meal or in some instances containing some nuts/pellets depending on original source.

Hi-pro Soya Bean Meal

Meal

Appearance

Bulk density
625kg/m^3

Nutritional notes

High in undegradable protein. Variable composition depending on source and extraction process. It only requires a low inclusion, depending on the age and stage of production of the animals eating it. This is the best protein source for ewes in late pregnancy.

Palatability

Good

Upper inclusion rate (DM)

Beef 20% Sheep 30%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
88.0	13.8	52.0	13.0	2.4	4.0	10.0

Rapeseed Meal

Meal

Appearance

Bulk density
660kg/m^3

Nutritional notes

High in protein. Lower in energy than soya bean meal so ideal in growing rations including low protein forage.

Palatability

Moderate

Upper inclusion rate (DM)

Beef 30% Sheep 25%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
88.0	12.1	38.5	36.0	3.5	5	9.5

Linseed

Meal, cake or lozenge

Appearance

Bulk density

600kg/m^3 Linseed Meal
750kg/m^3 Linseed Cake

Nutritional notes

High in undegradable protein. Similar to rapeseed meal but contains some residual oils that can increase coat shine. Picture is of linseed lozenge.

Palatability

Good

Upper inclusion rate (DM)

Beef 20% Sheep 20%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
88.0	13.0	37.0	20.0	8.0	5.5	5.5

Soya Hulls

Pellet or meal

Appearance

Bulk density

500kg/m^3

Nutritional notes

High in fibre. Can be used to supplement cereals and cereal co-products that are low in digestible fibre.

Palatability

Moderate

Upper inclusion rate (DM)

Beef 30% Sheep 15%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
89.0	11.9	12.2	67.5	2.4	5.0	3.0

Palm Kernel Meal

Meal

Appearance

Bulk density

415kg/m^3

Nutritional notes

High in fibre. Can be used to supplement cereals and cereal co-products that are low in fibre.

Palatability

Poor

Upper inclusion rate (DM)

Beef 30% Sheep 10%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
89.0	12.3	18.0	68.0	9.0	4.0	3.0

Sunflower Meal

Pellets with meal

Appearance

Bulk density

600kg/m^3

Nutritional notes

Low in energy, high in protein, high in fibre. It has a role in growing rations as a low quality protein or at very low inclusion rates for finishers. Sometimes available in a Hi-pro version with hulls removed, containing 11.5 MJ ME and 45% crude protein, but the protein is still very degradable.

Palatability

Good

Upper inclusion rate (DM)

Beef 30% Sheep 10%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
88.0	9.5	36.0	47.0	2.5	1.5	6.0

Cane Molasses

Viscous liquid

Appearance

Bulk density

1400kg/m^3

Nutritional notes

High in sugar, low in fibre. Can be used at a variety of inclusion rates as an energy source, protein carrier, aid to palatability, aid to avoiding separation of mixes or as a dust reducer.

Palatability	Upper inclusion rate (DM)	
Very good	Beef 30%	Sheep 30%

Processing

Ready to feed, but always check for its dry matter level as it can vary considerably depending on the blend of 'liquids', (anything from 45% up to 75% dry matter for straight cane molasses).

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
75.0	12.6	6.0	0	0.2	0.0	65.0

Molasses-based and other liquid feeds

There is a huge range of blended liquid feeds available that are more free-flowing than cane molasses. Most are branded products containing cane or beet molasses and other syrup products from the food and drink industry; full nutritional specifications are available from distributors. Products are available to suit a variety of requirements; crude protein level can range from 6% to 60%. Some products are enhanced with minerals and trace elements, some with oil, some are specifically designed to suppress dust and all will help improve palatability.

There are numerous options for on-farm storage from 1000 litre former citrus juice containers, 10–20 tonne specifically made 'liquid' tanks, to large industrial and disused lorry transport tanks.

Can be fed as part of a home-mixed ration or on its own through lick feeders. These feeds are ideal for dampening down dusty meals or encouraging intakes of less palatable forages.

Molassed Sugar Beet Pulp

Pellet, nut or shred

Appearance

Bulk density

Pellets 550kg/m^3
Shreds 250kg/m^3

Nutritional notes

High in metabolised and rumen fermentable energy, with a good fibre level. Well-known rumen conditioner which aids the digestion of other feeds.

Palatability

Very good

Upper inclusion rate (DM)

Beef 50% Sheep 70%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
89.0	12.5	10.0	32.0	1.0	1.0	20.0

Pressed Sugar Beet Pulp

Moist shred

Appearance

Bulk density

1000kg/m^3

Nutritional notes

High in fibre. Used as a forage extender or concentrate replacer and, like dried sugar beet pulp, is a rumen conditioner.

Palatability

Very good

Upper inclusion rate (DM)

Beef 50% Sheep 50%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
28.0	12.7	9.0	42.0	0.3	0.4	5.5

Citrus Pulp

Pellets

Appearance

Bulk density

365kg/m^3

Nutritional notes

High in fibre, very low in protein. Can be used to supplement cereals and cereal co-products that are low in fibre.

Palatability

Variable

Upper inclusion rate (DM)

Beef 40% Sheep 20%

Processing

Ready to feed.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
89.0	12.5	7.0	21.0	2.9	6.5	24

Wet Citrus Pulp

Moist brown/orange coarse porridge

Appearance

Bulk density

1000kg/m^3

Nutritional notes

High in energy, very low in protein, high in fibre. Can be used to extend forage and supplement cereals and cereal co-products that are low in fibre. Introduce gradually.

Palatability

Orange and lemon good, lime and grapefruit moderate.

Upper inclusion rate (DM)

Beef 30% Sheep 20%

Storage/processing

Ready to feed, can be clamped on its own or with an absorbent. If well clamped and sealed can be kept for six months.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
24.0	12.2	6.5	37.0	3.0	0	25.5

Feed Grade Urea

Small prill

Appearance

Bulk density

600kg/m^3

Nutritional notes

A very concentrated source of non-protein nitrogen that can be used by ruminants to make microbial protein. It contains 46% nitrogen, which is equivalent to 287% crude protein. **Must be mixed thoroughly into the rest of the ration**, as it is fatally toxic if ingested in more than very small quantities. Must be fed alongside readily available energy and introduced gradually into the diet and not fed where there is a possibility of feed or ration separation. It is not suitable for animals under three months of age. Rarely used in sheep diets other than in blocks and liquid feeds.

Palatability	Upper inclusion rate (DM)	
Poor	Beef 1%	Sheep 1%

Storage/processing

Store bags in dry conditions. Must be mixed with other feeds. Water soluble and can be stored as a liquor. Can be used as a preservative for moist grain, straw and wholecrop.

Typical analysis (% DM or MJ/kg DM for ME)

DM	ME	CP	NDF	Oil (AH)	Starch	Sugars
99.5	0	287.0	0	0	0	0

Fats and oils

Concentrated source of energy, containing three times as much energy as cereals. They are used to help increase the energy density of the diet. Processing into prills, flakes and granules, and using specific forms of protection with calcium salts, creates a low rumen degradation and rumen solubility. This means the fats and oils arrive in the acidic abomasum and hind gut virtually intact, where the calcium dissolves and the energy is released and readily available for digestion.

Vitamins and minerals (see specialist guidance for specific recommendations)

Major minerals (%) – Calcium (Ca), Phosphorous (P), Magnesium (Mg) and Sodium (Na).
Minor minerals (mg/kg or ppm) – Copper (Cu), Selenium (Se), Iodine (I), Manganese (Mn), Zinc (Zn) and Cobalt (Co).
Vitamins – A, D_3, and E (IU/kg), Vitamin B_{12} (mg/kg). Sometimes other B vitamins are included in supplements, particularly for young calves and lambs, and listed by name eg Thiamine (B_1), Riboflavin (B_2), Niacin (B_3), Pantothenic Acid (B_3) Biotin (B_8), Folic Acid (B_9).

Direct fed microbials

Also called probiotics, and include yeasts and lactic acid bacteria. They may help rumen microbes break down fibre and raise rumen pH, alleviating acidosis.

For more information see
The FEEDS Directory
By Dr. W. N. Ewing

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