

# A to Z of fibre sources

(forages and high-fibre-by-products) and their expected feed values

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Under drought conditions, when forage availability is limited, alternative fibre options may need to be considered. The fibre sources in the tables on the following pages may be suitable for dairy stock provided they are supplemented with high-energy feeds and protein sources as part of a balanced diet.

Fibre source	Expected composition† (mean with range of values in brackets)				Nutritive value or digestibility (Subjective Score L/M/H)	Effective fibre value (Subjective Score L/M/H)	Maximum daily consumption (% DM intake)	Comment/risk
	Dry matter (%)	Metabolisable energy (MJ/kg DM)	Crude protein (% of DM)	Neutral detergent fibre (% of DM)				
Alfalfa cubes	91 (89.6-92.3)	na	18.8 (15.5-22.1)	44 (36.9-50.3)	Medium	Medium	70	Processed through feed miller? = seek vendor dec re fitness for purpose

## Fibre source

In drought conditions you might be forced to consider using feeds you have never used before. This table lists typical feed values for 51 different feeds – including a number of high-fibre by-products.

## Dry matter (DM)

This column notes the DM value of the feed – expressed as a percentage. Pay particular attention to the range. How would you establish exactly what you were getting?

## Metabolisable energy (ME)

The values here are averages too – again, pay attention to the range. Where does this fit in with other feed you are offering. How many megajoules of ME per kg DM do you need to achieve your production and body condition targets?

## Crude protein (CP)

Crude protein requirements vary according to stage of lactation and range from 16-18% in early lactation, dropping to 11-12% during the dry period.

## Neutral detergent fibre (NDF)

Averages and typical range presented here. Remember, the suggested ideal NDF level for total dry matter intake is 40%. A dietary NDF level less than 30% is high risk for acidosis.

## Nutritive value or digestibility

The shading flag levels – low values may be unpalatable.

## Effective fibre value

This refers to the ability of a feed to stimulate chewing activity and the production of saliva.

## Maximum daily consumption

The figures here represent the percentage this feed should represent out of the total dry matter intake. Make sure you get the balance right.

## Comments/risk

Often the comments explain the maximum daily consumption recommendations. See an adviser to check your assumptions and calculations, particularly with fibre products you are not used to handling

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	Dry matter* (%)	Metabolisable energy** (MJ/kg DM)	Crude protein* (% of DM)				
Alfalfa cubes	91 (89.6-92.3)	na	18.8 (15.5-22.1)	44 (36.9-50.3)	Medium	70	Processed through feed miller? = seek vendor dec re fitness for purpose
Almond hulls	90 (88-92)	10 (8.5-10.5)	5 (4-6)	35 (30-45)	Medium	10	Feed value varies according to proportions of outer hull and inner husk. Higher NDF generally relates to higher proportion of outer hull and higher levels of ADF. Product is generally milled to increase density but this further reduces effective fibre level
Barley hay	87 (79.9-91.1)	8.8	8.6	60	Medium	50	Potential residue risks (insecticides, herbicides, fungicides)
Barley straw	89 (73.4-93.6)	6.5 (2.2-8.5)	2.8 (0.2-28.8)	77 (54.7-87.3)	Low	30	Potential residue risks (insecticides, herbicides, fungicides)
Brewers grains	32 (13.9-93.0)	10.5 (7.7-11.9)	21.9 (16.9-35.2)	55 (41.6-61.6)	High	30	High moisture content - storage requires care, potential mycotoxins.
Canola hay	85 (61.3-93.5)	10.4 (7.4-13.0)	16.8 (8.6-27.2)	38 (25.4-53.1)	Low	50	Risk of sulphur toxicity. Potential residue risk (insecticides, herbicides, fungicides)
Canola silage	47 (24.8-75.7)	10.5 (7.4-12.4)	18.1 (10.3-26.0)	38 (25.6-52.2)	Low	50	Risk of sulphur toxicity. Potential residue risks (insecticides, herbicides, fungicides)
Cardboard	93	0.5	0.8	95	Nil	10	Glue, ink, staples or other metal items. Acids? Sulphides? Difficulty in processing for feeding.
Chickpea gradings	90	10.8	10.5	55	Med-High	10	Whole seed is poorly digested. Potential residue risks (insecticides, herbicides, fungicides)
Citrus pulp (wet)	20 (17-21)	12.5	7.5	23.0	High	12.5	Good intake characteristics, but when removed from diet can lead to feed rejection. Limonin in seeds (lemon and grapefruit) is toxic to young animals and can make the feed unpalatable to older stock. Poorly stored fresh material can mould easily leading to mycotoxin contamination. High feed levels can lead to milk taint.
Copra meal	90	12.0	20.0	52	High	15	Aflatoxin risk (Note: Check with your processor regarding any feeding restrictions)
Corrugated cardboard boxes	93	0.5	0.4	92	Nil	10	Glue, ink, staples or other metal items. Acids? Sulphides? Difficulty in processing for feeding.
Cottonseed hulls	91 (88.7-92.7)	na	8.2 (4.5-12.0)	80 (70.7-88.8)	Low	10	Palatable but low feed value. Potential residue risk (insecticides, herbicides, fungicides). May be GM.
Cottonseed hulls - ensiled	88	2.8	6.1	90	Low	10	Palatable but low feed value. Potential residue risk (insecticides, herbicides, fungicides). May be GM.
Cottonseed hulls - pellets	93	6.0	5.8	84	Low	10	Palatable but low feed value. Potential residue risks (insecticides, herbicides, fungicides). May be GM.
Distillers grains (dried)	92	13.6	26.9	29	High	20	Check oil/fat level as high inclusion levels can reduce milk fat %. Very dark product with a burnt smell is likely to be overheated and so protein availability will be low. Potential mycotoxins
Distillers grains (wet)	27 (14.2-40.4)	13.6	29.7 (16.7-42.7)	29 (17.9-39.2)	High	20	Check oil/fat level as high inclusion levels can reduce milk fat %. Potential mycotoxins.
Grape marc - raw	55 (19.6-93.9)	6.5 (2.3-12.1)	12.2 (5.4-18.5)	48 (20.3-60.6)	Low	10	Wide range of nutrient specs. 6-10% oil. High tannins tend to bind much of the protein. Chemical residues risk (fungicides), also heavy metals. Whole seeds will be largely indigestible.
Grape marc - pressed	50	10	13	33	Low	10	Excess alcohol removed by distillation compared to raw grape marc from wine industry. Chemical residues risk (fungicides), also heavy metals. Whole seeds will be largely indigestible. Protein availability is low in overheated product.
Grape marc silage - raw	36 (28.1-46.4)	8.1 (4.3-11.1)	17.9 (11.7-23.3)	na	Low	10	Wide range of nutrient specs. 6-10% oil. High tannins tend to bind much of the protein. High chemical residues risk (fungicides), also heavy metals. Whole seeds will be largely indigestible.
Hominy (corn)	89	15.4	13.1	23	High	30	Potential residue risks (insecticides, herbicides, fungicides)
Lablab hay	90	8.4	13.5	57	Medium	50	Potential residue risks (insecticides, herbicides, fungicides)

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Fibre source	Expected composition† (mean with range of values in brackets)			Nutritive value or digestibility (Subjective Score L/M/H)	Effective fibre value (Subjective Score L/M/H)	Maximum daily consumption# (% DM intake)	Comment/risk	
	Dry matter* (%)	Metabolisable energy* (MJ/kg DM)	Crude protein* (% of DM)					Neutral detergent fibre* (% of DM)
Millet hay	80	8.5 (5.5-10.6)	8.7 (2.5-23.3)	66 (48.3-80.1)	Medium	High	40	Nitrate poisoning in stressed plants. Potential residue risks (insecticides, herbicides, fungicides)
Millet silage	41	9.7 (8.5-11.6)	14.4 (5.9-26.6)	58 (44.0-65.0)	Medium	High	50	Nitrate poisoning in stressed plants. Potential residue risks (insecticides, herbicides, fungicides)
Millrun (wheat)	90	11.3	16.4	36.7	High	Low?	30	Consists of wheat bran, endosperm and screenings. Variable nutritive value according to the production plant. Useful source of digestible fibre, but low in effective fibre. Limited supply.
Newspaper	93	0.5	0.4	89	Nil	Low	10	Glue, ink, staples or other metal items. Acids? Sulphides? Difficulty in processing for feeding.
Oat hay	90 (84.5-93.2)	8.3 (7.4-9.5)	7.1 (4.0-11.5)	62 (51.6-79.2)	Medium	High	40	Potential residue risks (insecticides, herbicides, fungicides)
Oat hulls	92 (88.7-94.3)	na	6.2 (3.5-8.9)	70 (57.2-81.9)	Low	Low	10	Potential residue risks (insecticides, herbicides, fungicides)
Oat straw	89	6.2 (4.3-10.0)	2.8 (0.1-11.9)	73 (54.5-78.8)	Low	High	30	Potential residue risks (insecticides, herbicides, fungicides)
Palm kernel extract (PKE) meal	94 (91.5-96.2)	11.1 (9.3-12.4)	15.7 (14.8-16.3)	65 (55.4-74.2)	Med-High	Low	30	Small particle size = low effective fibre value. 8-10% oil. Standard laboratory analysis will not accurately assess nutritive value. Potential residue and aflatoxin risks.
Pangola grass hay	89 (88.5-89.9)	7.6 (7.0-8.4)	7.1 (6.4-7.7)	72 (68.6-74.3)	Medium	High	40	Potential residue risks (insecticides, herbicides, fungicides)
Pea hay	85	9.7 (5.1-11.6)	14.9 4.5-21.6	43 (29.1-70.8)	Medium	High	40	Potential residue risks (insecticides, herbicides, fungicides)
Peanut hay	90	8.7	7.3	na	Medium	High	35	Aflatoxin risk. Potential residue risks (insecticides, herbicides, fungicides)
Peanut shells	90 (87.2-92.0)	1.6 (1.1-2.1)	5.8 (4.7-6.8)	86 (84.6-87.2)	Low	Medium	10	Aflatoxin risk. Potential residue risks (insecticides, herbicides, fungicides)
Rhodes grass hay	90	7.3	13.3	74	Medium	High	50	Potential residue risks (insecticides, herbicides, fungicides)
Rice bran	91 (88.6-92.6)	na	14.6 (10.9-18.4)	29 (17.8-40.6)	Medium	Low	10	Potential residue risks (insecticides, herbicides, fungicides)
Rice hulls	93	na	na	85	Low	Low	10	Can be abrasive and cause impaction. Potential residue risks (insecticides, herbicides, fungicides)
Rice pollard	90	13	13	24-28	High	Low	5	High ME largely due to high oil content (15-20%). Low effective fibre. Very limited supply.
Rice straw	85 (52.2-93.5)	6.7 (5.3-8.9)	4.0 (1.9-5.0)	63 (53.4-68.5)	Low	High	10	Palatability and intake issues. Potential residue risks (insecticides, herbicides, fungicides)
Sawdust - hardwood	na	na	1.6	91	Nil	Low	10	Splinters and/or impaction problems. Pesticide/chemical residues.
Sorghum hay	78 (48.1-93.4)	8.4 (6.4-10.4)	9.8 (2.1-18.2)	64 (45.3-75.8)	Med-High	High	30	Cyanide poisoning. Potential residue risks (insecticides, herbicides, fungicides)
Sorghum silage	36 (25.6-45.3)	8.6 (3.2-10.7)	9.4 (2.1-18.2)	58 (43.6-79.1)	Med-High	High	30	Cyanide poisoning. Potential residue risks (insecticides, herbicides, fungicides)
Soybean hay	92	na	15.8 (9.5-22.1)	52 (41.9-62.1)	Medium	High	35	Potential residue risks (insecticides, herbicides, fungicides)
Soybean silage	na	8.8	15.2	53	Medium	High	35	Potential residue risks (insecticides, herbicides, fungicides)
Sugar cane bagasse, dry	93	na	2.7 (1.7-3.6)	80 (67.1-92.3)	Medium	Low	30	Potential residue risks (insecticides, herbicides, fungicides)
Sugar cane silage	68 (37.7-97.9)	7.5 (3.0-9.5)	4.3	61	Medium	High	40	Alcoholic poisoning risk. Potential residue risks (insecticides, herbicides, fungicides)
Sugar cane top hay	93 (90.8-95.7)	7.5 (3.0-9.5)	6.5 (3.2-9.8)	67 (56.9-77.3)	Medium	High	40	Potential residue risks (insecticides, herbicides, fungicides)
Triticale straw	90 (62.7-95.7)	6.2 (4.1-9.0)	2.8 (0.7-6.7)	67 (50.1-86.5)	Low	High	30	Potential residue risks (insecticides, herbicides, fungicides)
Wheat bran	90 (88.3-91.0)	na	17.4 (15.6-19.3)	41 (32.8-49.2)	Med-High	Low	20	Potential residue risks (insecticides, herbicides, fungicides)
Wheat straw	92 (64.7-96.7)	5.1 (3.8-9.3)	2.8 (0.2-8.8)	73 (53.6-86.2)	Low	High	30	Potential residue risks (insecticides, herbicides, fungicides) Possible gossypol poisoning
Whole cottonseed	94 (92.5-96.4)	13.3 (11.4-15.1)	23 (15.4-28.3)	55 (42.8-72.1)	High	Medium	20	Potential residue risks (insecticides, herbicides, fungicides). May be GM

† The expected composition of fibre sources has been collated from FeedTest, Dairy One, Penn State, Feed Plus and other databases.

# Maximum daily intake is depends upon nutrient value, age of cow and stage of lactation.

\* Nutritive values of feeds can be highly variable and there is no substitute for actual sampling and testing of the feed in question.

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