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# Lentil (de Lens culinaris)

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## noms communs

Lentil, dahl rouge [anglais]; lenteja [Spanish]; lentilha [portugais]; lentille [français]; Linse, Erve [allemand]; lenticchia [Italien]; mdengu [Swahili]; Linze [néerlandais]; Mercimek [turque]; Đậu LANG [vietnamien]; عدس [arabe]; [bengali]; Φακή [grec]; [Gujarati]; 렌즈 콩, 렌틸 콩 [Corée]; [Hindi]; עדשה תרבותית [en hébreu]; [Marathi]; [Nepali]; レンズマメ, ヒラマメ [Japonais]; Чечевица пищевая, [russe] обыкновенная Чечевица; [Sinhala]; [Tamil]; 小扁豆 [chinois]

- **Produits** : lentilles de réforme, les lentilles abattus, les lentilles excédentaires, des projections de lentilles, lentilles son, lentilles chuni, les coques de lentilles, lentilles de paille

## Espèce

*Lens culinaris* Medik. [Fabaceae]

## synonymes

*Lentille Ervum* L., *Objectif esculenta* Moench, *Lens* Huth, *lentille Vicia* (L.) Coss. & Germ.

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## La description

Lentil ( *Lens culinaris* . Medik) est une légumineuse cultivée principalement pour ses graines comestibles ( Ford et al . , 2007 ; Bejiga 2006 ). Il est une plante annuelle, buissonnante et herbacée qui peut atteindre 60-75 cm de hauteur. Les tiges sont velues, mince et très ramifiée. Les feuilles sont composées pennées, se terminant par une vrille ou de poils. Les 5 à 16 folioles sont opposées, oblongues à elliptiques, 3-20 mm de long x 2-8 mm de large. Les fleurs papilionacées varient en couleur du blanc au violet et sont supportés sur racemes long axillaires 2-5 cm. Les fruits sont de petites gousses, latéralement comprimés qui contiennent deux ou trois en forme de lentille, gris, vert, brun, pâle graines rouges ou noires, dont la taille dépend du type de cultivar et varie de 2 à 9 mm x 2-3 mm ( ECOCROP 2012 ; Bejiga 2006 ). L'espèce de lentilles *Lens culinaris* a une sous - espèce cultivée ( *Lens culinaris* Medik. Subsp. *Culinaris* ) et 3 sous - espèces sauvages ( Ford et al., 2007 ).

Lentils rang 5 e parmi les grains de légumineuses les plus importantes du monde et sont extrêmement importants dans le régime alimentaire de nombreuses personnes en Inde et au Moyen - Orient ( FAO, 2012 ; Göhl 1982 ). Les lentilles sont un aliment très apprécié en raison de leur bon goût et la qualité nutritionnelle, ce qui les rend trop coûteux pour nourrir le bétail ( Blair, 2008 ). Ils sont mangés cuits, frits, renversé et broyé dans un large éventail de plats (soupes, salades, ragoûts, etc.). Farine de lentille est utilisée pour la pâtisserie, du pain et de l' amidon. Les jeunes gousses et les feuilles sont consommées comme légume ( Bejiga 2006 ). Les lentilles sont une légumineuse de fixation N-qui peut être un ley précieux céréales rotation des cultures ( Lardy et al . , 2009 ; Bejiga 2006 ).

Les produits de lentilles suivantes et sous-produits sont parfois utilisés pour l' alimentation des animaux ( Lardy et al . , 2009 ; Bejiga 2006 ):

- **Lentilles excédentaires** et les **lentilles abattus** impropres à la consommation humaine sont parfois nourrir le bétail en raison de leur faible prix.
- **Des projections de lentilles** sont les sous-produits de nettoyage des graines de lentilles. Elles peuvent consister en entiers et brisés lentilles, céréales, graines de mauvaises herbes, la paille et la poussière ( Stanford et al., 1999 ).

- **Lentil bran** (appelé **chuni** en Inde) ou **lentilles coques** sont les enveloppes extérieures de lentilles résultant des opérations de décorticage.
- **Lentil paille** est le résidu de récolte de lentilles récolte du processus de battage. Il comprend des branches cassées, les murs des gousses et des brochures ( Erskine et al., 1990 ).
- **Usines de lentilles** qui ne peuvent être récoltées peuvent également être utilisés comme fourrage.

## Distribution

Lentils provenaient du Croissant Fertile (Méditerranée orientale dans le golfe Persique), puis répartis en Europe, au Moyen - Orient, Afrique du Nord et de la plaine indo-gangétique. Il est l' un des premiers légumineuses à grains domestiqués et a été cultivé en Syrie , en association avec le blé et l' orge dès 8500 à 7.500 av. Ils sont maintenant cultivés dans la plupart des régions subtropicales et tempérées, notamment dans les régions à faible pluviométrie. La sous - espèce cultivée *Lens culinaris* subsp. *culinaris* est divisé en deux groupes de cultivars: *macrosperma* (grandes graines) les lentilles sont principalement cultivées en Europe, Afrique du Nord et en Amérique, alors que *microsperma* (petites graines) lentilles sont cultivées en Asie, en Egypte et en Ethiopie. Les deux types sont cultivés en Asie occidentale et en Europe du Sud-Est ( Ford et al., 2007 ).

Les lentilles sont cultivées comme culture d'été dans les pays tempérés où les hivers sont froids, et en tant que culture d'hiver dans les régions subtropicales. Sous les tropiques, elles peuvent être cultivées à des altitudes plus élevées ( au- dessus de 1800 m) au cours de la saison froide ( Bejiga 2006 ). Lentils poussent sous une large gamme de températures moyennes (6-27 ° C) , mais ne fait pas bien dans des conditions tropicales humides et chaudes. Gel intense ou prolongée, ainsi que des températures supérieures à 27 ° C sont nuisibles à sa croissance. Lentils bien faire avec en dessous de 750 mm de précipitations annuelles et une période sèche marquée avant la récolte. Certains cultivars peuvent supporter des périodes de sécheresse. Même si elle peut supporter une distribution des précipitations large (300 à 2400 mm), les lentilles ne peuvent pas supporter l' engorgement et doivent être semées à la fin de la saison des pluies dans les régions chaudes, où ils se développeront sur l' humidité résiduelle ( Ford et al . , 2007 ; Bejiga 2006 ). Lentils poussent sur de nombreux types de sol, allant de sable aux sols argileux lourds, ainsi que sur une large gamme de pH (4,5-9), à condition que les sols ne sont pas une solution saline, gorgé d' eau ou soumis à des inondations ( Bejiga 2006 ).

## processus

### graines de lentilles

Les lentilles doivent être grossièrement moulu ou roulé pour une utilisation optimale chez les ruminants ( Lardy et al., 2009 ).

## la gestion des fourrages

Les lentilles sont généralement cultivées en culture pure , mais bien faire lorsqu'il est mélangé avec du blé, moutarde ou ricin. Les lentilles peuvent être intercalés avec des céréales , mais les rotations de petits grains , y compris d' autres légumineuses, *Brassica* espèces (colza, chou), de tournesol ou de pommes de terre doivent être évités car ils sont tous sensibles aux mêmes maladies. Graines de lentilles peuvent être diffusées ou semées en rangées à une profondeur de 1-6 cm. Les lentilles sont généralement pluviale , mais font bien sous irrigation. Les lentilles sont récoltées lorsque les gousses deviennent jaunes. La plante peut être ou réduire, laisser sécher dans le champ, puis battu et vanné arrachées à la main. Lorsque la récolte se fait mécaniquement, la plante est coupée à une teneur en humidité plus élevée pour éviter l' éclatement de la graine. Fourchettes de rendement de graines de lentilles de 0,4 à 4 t / ha. Le rendement en fourrage frais peut aller jusqu'à 7 t / ha ( Bejiga 2006 ).

## citation Fiche technique

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# Lentil (Lens culinaris)

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## Nutritional attributes

### Surplus and cull lentil seeds

Lentils are a source of protein and energy and thus considered as a nutrient-dense and versatile feed (Lardy et al., 2009). Their protein content is about 27% DM and their starch content is about 48% DM, values which are slightly higher and slightly lower, respectively, than those of field peas (Feedipedia, 2012). The fibre content is low in food-grade lentils (ADF 5-6% DM, Ning Wang et al., 2006) but feed-grade lentils may content fibre-rich residues (hulls, etc.) that increase the fibre content. Like other legume grains, lentils are low in sulphur amino acids and tryptophan (Feedipedia, 2012; Ning Wang et al., 2006) and should therefore be supplemented with other protein sources when they are intended for monogastrics (Castell et al., 1990).

### Lentil screenings

Lentil screenings contain diverse materials (other grains, weeds, dust, etc.) in addition to lentils, so their composition is extremely variable depending on the relative proportions of seeds and foreign material. Lentil screenings of good quality can be a useful protein- and energy-rich feed since the price can be competitive (Lardy et al., 2009; Stanford et al., 1999).

### Lentil bran (hulls, chuni)

Lentil bran contains more fibre than the seeds and screenings but its composition can vary extensively as it depends on the respective amounts of envelopes and kernel fragments.

### Lentil straw

Lentil straw, like other legume crop residues, is rich in fibre (ADF more than 30% DM) and poor in protein (less than 10% DM) though of a better quality than straws of small grain cereals such as wheat straw (Lardy et al., 2009). Variation in straw quality is largely due to differences in the partition of dry matter between leaf, branch, pod and root tissue in the straw (Erskine et al., 1990). The harvesting method has an important impact on lentil straw quality: manual harvesting followed by threshing on the floor tends to preserve leaves, resulting in a more nutritious leaf-rich straw whereas combine harvesting results in stem-rich straws. In one experiment, hand-harvested lentil straw contained 11% protein and 28% ADF *vs.* 6% protein and 50% ADF for combine-harvested straw (Lopez et al., 2005).

## Potential constraints

### Antinutritional factors

Like many other legume seeds, raw lentils contain antinutritional factors including protease inhibitors, lectins, phytic acid, saponins and tannins, though in moderate amounts (Marquardt et al., 1988; Weder, 1981 cited by Blair, 2007). The deleterious effects of those antinutritional factors may be alleviated through processing, notably heat treatments (Castell et al., 1990).

### Rancidity

Though they have a low oil content, lentil seeds are reported to be prone to rancidity once ground (Castell et al., 1990).

## ruminants

### Lentil straw

Lentil straw tends to be more digestible and palatable for ruminants than cereal straws. Harvesting lentils leaves very few residues in the field, so it is recommended to allow animals to graze in order to salvage those residues (Lardy et al., 2009).

#### Nutritional value

Several studies have concluded that lentil straw has a lower NDF content, a better rumen degradability and a better whole tract digestibility than cereal straws (Sehu et al., 1998; Lopez et al., 2005; Singh et al., 2011). There are few studies on the nutritive value of lentil straw for ruminants. Four studies reported *in vivo* OM digestibility values comprised between 47 and 55% (Dutta et al., 2004; Abreu et al., 1998; Alibes et al., 1990; Sehu et al., 1998). However, a comparison of *in vitro* methods (enzymatic method defined by Aufrère and the two-stage method of Tilley and Terry), resulted in higher values comprised between 54 and 57% (Denek et al., 2004). Such differences may be explained by the variable leaf:stem ratio, which depends on the harvesting method. For instance, using *in vitro* gas production, a stem-rich lentil straw was found to have an ME of 6.7 MJ/kg DM *vs.* 8.3 MJ/kg DM for a leaf-rich lentil straw (Lopez et al., 2005).

#### Animal trials

In Jordan, in Awassi ewe lambs supplemented with concentrate (0.55 kg/head/day), the palatability, nutrient digestibility and weight gain from lentil straw were comparable to those from alfalfa hay, and higher than those from bitter vetch (*Vicia ervilia*) straw or wheat straw (Haddad et al., 2001). In Chile, sheep fed for much of the dry period on lentil straw supplemented with a molasses-urea-minerals mix lost less than 10% of their body weight (Tima et al., 1991). In India, a synergistic interaction with positive effects on the dairy performance of buffaloes and *in vivo* digestibility was observed when lentil straw was combined with urea-treated wheat straw (Dutta et al., 2004). A DM intake of 70 g/kg for lentil straws in sheep has been reported (Abreu et al., 1998).

#### Comparison with other legume straws

Several studies have compared lentil straw with other legume straws. Lentil straw was found to have DM *in sacco* degradability and *in vivo* DM digestibility values higher than those of chickpea straw but lower than those of common vetch (*Vicia sativa*) straw (Sehu et al., 1998). In another study, *in sacco* DM degradability was found to be similar to that of the straws of chickpea (*Cicer arietinum*), faba bean (*Vicia faba*) and purple vetch (*Vicia benghalensis*), but lower than that of the straws of pea, common vetch (*Vicia sativa*) and hairy vetch (*Vicia villosa*) (Bruno-Soares et al., 2000). A study found similar protein and NDF *in sacco* degradability values for lentil straw and common vetch straw but the *in vivo* OM digestibility of lentil straw was lower than that of vetch straw (55% *vs.* 65%) (Abbeddou et al., 2011).

### Lentil bran (hull, chuni)

In India, a trial with cross-bred calves fed lentil chuni and alfalfa hay (2 kg/d each) showed that lentil chuni was a valuable protein and energy supplement (Paliwal et al., 1987). In bulls, rumen fermentation benefited when animals were fed a diet of 50% lentil chuni and 50% wheat bran, compared to one of these two ingredients alone (Gendley et al., 2009).

The *in vitro* DM digestibility of lentil hulls (51%) was found to be lower than that of faba bean hulls (57%) and higher than that of pea hulls (48%) (Mekasha et al., 2002; Mekasha et al., 2003). *In sacco* degradability of DM was lower for poor-quality lentil bran than for lentil screenings (30% *vs.* 49%) (Yalçin et al.,1992).

### Lentil seeds and screenings

Feeding trials in North Dakota suggest that lentil seeds are very palatable and calves fed lentils performed equally to animals fed field peas or chickpeas (Lardy et al., 2009). Lentil screenings were found to have a poor OM digestibility (55%) despite a fairly low NDF content (29% DM) and a high crude protein (23% DM) (Stanford et al., 1999). Organic matter digestibility and DM intake were similar in beef cattle receiving diets containing either lentils, chickpeas or field peas, in replacement of corn and canola meal as the grain component in the diet (Gilbery et al., 2007).

## Pigs

Surplus and cull lentils are valuable feed for pigs as the levels of antinutritional factors are relatively low (Blair, 2007; Castell et al., 1990). The low sulphur amino acid content of lentils should be counterbalanced with another protein source (Blair, 2007). Crude protein and energy digestibility of cull lentils were 72% and 78% respectively (Bell et al., 1986).

Frost and blight-damaged lentils have been successfully fed to growing-finishing pigs in Canada, and shown to be worth using in a cereal grain-based diet as they provided low cost energy and protein (Bell et al., 1986). Lentil seeds could be included in growing-finishing pig diets at up to 40% without hampering animal performance. However, this high inclusion rate had deleterious effects on meat quality and a lower rate (10%) was recommended (Castell et al., 1988). Supplementing the lentil-based diet with methionine (1 g/kg dietary level) resulted in better meat quality even at the 40% lentil inclusion rate (Castell et al., 1990). In starter pigs, lentils may replace soybean meal cost-effectively but the inclusion rate should not exceed 22.5% in the diet as higher levels decreased animal performance and feed conversion efficiency (Landero et al., 2012).

## Poultry

Cull lentils are occasionally available for poultry and benefit from moderate levels of antinutritional factors (Blair, 2008). However the nutritional value of lentils in poultry is lower than that of some other grain legumes such as mung bean (*Vigna radiata*) or chickpea (Wiryawan et al., 1995). The low sulphur amino acids content requires supplementation (Wiryawan, 1997). Lentil seeds have fibre-rich hulls and decorticated lentils have a much higher nutritive value than the whole seeds.

### Broilers

Lentils included at more than 20% in broiler diets decreased growth rate. Processing (heating) did not compensate for this adverse effect (Farhoomand, 2006). Good growth performance was obtained in young broilers fed 40% decorticated lentils supplemented with methionine (Wiryawan, 1997). For broilers, lentils should be used in carefully formulated diets with consideration given to the amino acid balance. A maximum of 10% is suggested, but could be higher with decorticated lentils.

### Layers

The use of lentils in layers diets led to a decrease in egg production even at low inclusion rates (Kiliçalp et al., 1994). Lentils may be used in layer diets because of low-price opportunities, but it is essential to balance the amino acid content of the diet.

## Rabbits

No information found (2012).

## datasheet citation

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## Tables of chemical composition and nutritional value

- Lentil seeds
- Lentil screenings
- Lentil bran
- Lentil pod husks
- Lentil straw

Avg: average or predicted value; SD: standard deviation; Min: minimum value; Max: maximum value; Nb: number of values (samples) used

### Lentil seeds


| Main analysis | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Dry matter | % as fed | 88.3 | 1.2 | 87.1 | 91.0 | 18 |
| Crude protein | % DM | 26.9 | 1.8 | 24.6 | 30.0 | 23 |
| Crude fibre | % DM | 4.9 | 1.1 | 2.9 | 7.7 | 18 |
| NDF | % DM | 13.0 | 6.8 | 8.1 | 27.4 | 11 * |
| ADF | % DM | 6.3 | 1.1 | 3.3 | 6.3 | 10 * |
| Lignin | % DM | 1.6 | | 1.2 | 2.0 | 2 |
| Ether extract | % DM | 1.6 | 1.0 | 0.5 | 5.0 | 19 |
| Ash | % DM | 3.8 | 1.2 | 2.7 | 6.8 | 19 |
| Starch (polarimetry) | % DM | 45.7 | 5.3 | 29.7 | 53.6 | 18 |
| Gross energy | MJ/kg DM | 18.5 | 1.2 | 16.6 | 18.9 | 3 * |

| Minerals | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Calcium | g/kg DM | 1.1 | 0.5 | 0.6 | 2.3 | 9 |
| Phosphorus | g/kg DM | 4.5 | 1.1 | 3.1 | 6.6 | 11 |
| Potassium | g/kg DM | 10.3 | 0.9 | 9.0 | 11.3 | 6 |
| Sodium | g/kg DM | 0.4 | | | | 1 |
| Magnesium | g/kg DM | 1.3 | 0.2 | 1.0 | 1.5 | 6 |
| Manganese | mg/kg DM | 18 | 4 | 14 | 24 | 5 |
| Zinc | mg/kg DM | 38 | 7 | 29 | 44 | 5 |
| Copper | mg/kg DM | 14 | 10 | 8 | 32 | 5 |
| Iron | mg/kg DM | 88 | 22 | 73 | 126 | 5 |

| Amino acids | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Alanine | % protein | 3.9 | 0.7 | 2.4 | 4.3 | 7 |
| Arginine | % protein | 7.3 | 1.4 | 3.9 | 8.8 | 9 |
| Aspartic acid | % protein | 10.9 | 0.7 | 9.9 | 11.5 | 7 |
| Cystine | % protein | 1.2 | 0.2 | 1.0 | 1.5 | 4 |
| Glutamic acid | % protein | 15.3 | 0.6 | 14.7 | 16.3 | 7 |
| wistaria | % protein | 4.0 | 0.2 | 3.8 | 4.4 | 8 |
| Histidine | % protein | 2.6 | 0.7 | 1.3 | 3.8 | 9 |
| Isoleucine | % protein | 4.5 | 0.8 | 3.4 | 6.3 | 8 |
| Leucine | % protein | 7.6 | 1.3 | 6.8 | 10.9 | 9 |
| Lysine | % protein | 6.5 | 0.9 | 4.3 | 8.0 | 11 |
| Methionine | % protein | 0.9 | 0.2 | 0.7 | 1.1 | 5 |
| Phenylalanine | % protein | 5.0 | 0.8 | 4.3 | 6.3 | 5 |
| Proline | % protein | 3.6 | 0.5 | 2.6 | 4.0 | 7 |
| Serine | % protein | 4.2 | 0.7 | 2.9 | 5.1 | 7 |
| Threonine | % protein | 3.5 | 0.6 | 2.5 | 4.5 | 9 |
| Tryptophan | % protein | 0.8 | 0.2 | 0.5 | 1.2 | 7 |
| Tyrosine | % protein | 2.8 | 0.3 | 2.5 | 3.2 | 4 |
| Valine | % protein | 4.6 | 0.6 | 4.0 | 5.4 | 5 |

| Secondary metabolites | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Tannins (eq. tannic acid) | g/kg DM | 6.6 | 2.9 | 1.8 | 11.4 | 7 |
| Tannins, condensed (eq. catechin) | g/kg DM | 1.1 | | | | 1 |

| Ruminant nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| OM digestibility, Ruminant | % | 92.4 | | | | * |
| Energy digestibility, ruminants | % | 90.9 | | | | * |
| OF ruminants | MJ/kg DM | 16.8 | | | | * |
| ME ruminants | MJ/kg DM | 13.5 | | | | * |
| Nitrogen digestibility, ruminants | % | 78.5 | | | | * |
| a (N) | % | 55.9 | | | | 1 |
| b (N) | % | 44.2 | | | | 1 |
| c (N) | h-1 | 0112 | | | | 1 |
| Nitrogen degradability (effective, k=4%) | % | 88 | | | | * |
| Nitrogen degradability (effective, k=6%) | % | 85 | | | | * |

| Pig nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Energy digestibility, growing pig | % | 78.0 | | | | 1 |
| DE growing pig | MJ/kg DM | 14.4 | | | | * |
| DO growing pig | MJ/kg DM | 9.8 | | | | * |
| Nitrogen digestibility, growing pig | % | 72.0 | | | | 1 |

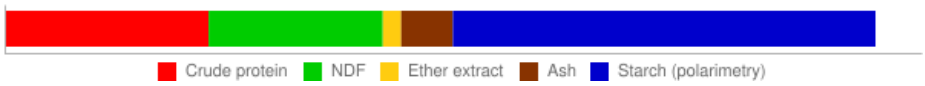
The asterisk * indicates that the average value was obtained by an equation.

### References

Abbeddou and al., 2011 ; AFZ, 2011 ; Bell et al., 1986 ; Bredon et al., 1962 ; Combe et al., 1991 ; Gilbery et al., 2007 ; Grela et al., 1995 ; Kande 1967 ; Khan et al., 1957 ; Landero et al, 2012. ; Ning Wang et al., 2006 ; Ravindran et al., 1994 ; Urbano et al., 1995 ; Woodman 1945

*Last updated on 13/03/2013 11:39:50*

## Lentil screenings




| Main analysis | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Dry matter | % as fed | 89.2 | | 87.9 | 90.4 | 2 |
| Crude protein | % DM | 24.3 | 1.6 | 22.7 | 25.9 | 3 |
| Crude fibre | % DM | 12.4 | | 5.3 | 19.4 | 2 |
| NDF | % DM | 20.9 | | | | * |
| ADF | % DM | 10.9 | | | | * |
| Ether extract | % DM | 2.2 | | 1.7 | 2.6 | 2 |
| Ash | % DM | 6.2 | 3.9 | 3.8 | 10.7 | 3 |
| Starch (polarimetry) | % DM | 50.7 | | | | 1 |
| Gross energy | MJ/kg DM | 18.3 | | | | * |

| Minerals | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Calcium | g/kg DM | 2.0 | | | | 1 |
| Phosphorus | g/kg DM | 4.7 | | | | 1 |

| Secondary metabolites | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Tannins, condensed (eq. catechin) | g/kg DM | 14.0 | | | | 1 |

| Ruminant nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| OM digestibility, Ruminant | % | 90.1 | | | | * |
| Energy digestibility, ruminants | % | 88.0 | | | | * |
| OF ruminants | MJ/kg DM | 16.1 | | | | * |
| ME ruminants | MJ/kg DM | 12.8 | | | | * |
| Nitrogen digestibility, ruminants | % | 78.0 | | | | * |
| a (N) | % | 35.6 | | | | 1 |
| b (N) | % | 53.1 | | | | 1 |
| c (N) | h-1 | 0056 | | | | 1 |
| Nitrogen degradability (effective, k=4%) | % | 66 | | | | * |
| Nitrogen degradability (effective, k=6%) | % | 61 | | | | * |

| Poultry nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| AMEn cockerel | MJ/kg DM | 6.8 | | | | 1 |

The asterisk * indicates that the average value was obtained by an equation.

### References

AFZ, 2011 ; Stanford et al., 1999 ; Yalcin et al., 1992 ; Yalcin et al. 1994

*Last updated on 13/03/2013 11:40:59*

## Lentil bran

Note the extreme variation in crude fibre.


| Main analysis | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Dry matter | % as fed | 88.9 | 1.9 | 87.6 | 91.1 | 3 |
| Crude protein | % DM | 19.3 | 4.2 | 15.0 | 26.4 | 6 |
| Crude fibre | % DM | 21.8 | 12.2 | 8.4 | 32.2 | 3 |
| NDF | % DM | 50.3 | 2.3 | 48.6 | 53.0 | 3 |
| ADF | % DM | 40.3 | 7.2 | 35.9 | 48.6 | 3 |
| Lignin | % DM | 7.4 | | | | 1 |
| Ether extract | % DM | 1.1 | 0.3 | 0.6 | 1.4 | 5 |
| Ash | % DM | 5.6 | 2.6 | 2.8 | 9.8 | 5 |
| Gross energy | MJ/kg DM | 18.6 | | 17.0 | 18.7 | 2 * |

| Minerals | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Calcium | g/kg DM | 6.2 | 1.7 | 5.1 | 8.2 | 3 |
| Phosphorus | g/kg DM | 3.7 | 1.7 | 2.2 | 5.6 | 3 |

| Ruminant nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| a (N) | % | 41.5 | | 27.5 | 55.5 | 2 |
| b (N) | % | 35.1 | | 30.6 | 39.5 | 2 |
| c (N) | h-1 | 0024 | | 0013 | 0035 | 2 |
| Nitrogen degradability (effective, k=4%) | % | 55 | | 46 | 63 | 2 * |
| Nitrogen degradability (effective, k=6%) | % | 52 | | 42 | 61 | 2 * |

| Pig nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Energy digestibility, growing pig | % | 55.9 | | | | * |
| DE growing pig | MJ/kg DM | 10.4 | | | | * |

| Poultry nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| AMEn cockerel | MJ/kg DM | 3.1 | | | | 1 |

The asterisk * indicates that the average value was obtained by an equation.

### References

Gendley et al., 2009 ; Krishna 1985 ; Mekasha et al., 2002 ; Vargas et al., 1965 ; Yalcin et al., 1992 ; Yalcin et al. 1994

*Last updated on 13/03/2013 11:34:23*

## Lentil pod husks


| Main analysis | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Dry matter | % as fed | 88.0 | | | | 1 |
| Crude protein | % DM | 12.6 | | | | 1 |
| Crude fibre | % DM | 29.0 | | | | 1 |
| Ether extract | % DM | 0.8 | | | | 1 |
| Ash | % DM | 3.5 | | | | 1 |
| Gross energy | MJ/kg DM | 18.7 | | | | * |

| Ruminant nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| OM digestibility, Ruminant | % | 62.0 | | | | 1 |
| Energy digestibility, ruminants | % | 58.1 | | | | * |
| OF ruminants | MJ/kg DM | 10.9 | | | | * |
| ME ruminants | MJ/kg DM | 8.8 | | | | * |
| Nitrogen digestibility, ruminants | % | 11.8 | | | | 1 |

| Pig nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Energy digestibility, growing pig | % | 44.6 | | | | * |

| | | | |
|---|---|---|---|
| DE growing pig | MJ/kg DM | 8.4 | * |

The asterisk * indicates that the average value was obtained by an equation.

References

Woodman, 1945

*Last updated on 13/03/2013 11:47:29*

## Lentil straw


| Main analysis | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Dry matter | % as fed | 92.1 | 1.3 | 90.4 | 93.8 | 6 |
| Crude protein | % DM | 7.0 | 0.8 | 5.8 | 8.6 | 29 |
| Crude fibre | % DM | 34.3 | 5.3 | 29.9 | 41.8 | 4 |
| NDF | % DM | 60.6 | 5.8 | 42.8 | 71.0 | 28 |
| ADF | % DM | 39.8 | 9.4 | 27.1 | 51.3 | 10 |
| Lignin | % DM | 9.7 | 2.9 | 5.9 | 13.3 | 7 |
| Ether extract | % DM | 1.5 | 0.4 | 0.8 | 2.2 | 8 |
| Ash | % DM | 8.9 | 1.8 | 6.0 | 11.2 | 11 |
| Gross energy | MJ/kg DM | 17.9 | | | | * |

| Minerals | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Calcium | g/kg DM | 23.1 | 7.6 | 15.0 | 30.1 | 3 |
| Phosphorus | g/kg DM | 1.4 | 0.4 | 1.1 | 1.9 | 3 |
| Potassium | g/kg DM | 11.5 | | | | 1 |
| Magnesium | g/kg DM | 2.6 | | 2.5 | 2.7 | 2 |
| Manganese | mg/kg DM | 18 | | | | 1 |
| Zinc | mg/kg DM | 16 | | | | 1 |

| Secondary metabolites | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Tannins (eq. tannic acid) | g/kg DM | 19.4 | | | | 1 |
| Tannins, condensed (eq. catechin) | g/kg DM | 4.4 | | | | 1 |

| In vitro digestibility and solubility | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| DM digestibility, pepsin | % | 45.2 | 1.9 | 42.0 | 48.0 | 20 |

| Ruminant nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| OM digestibility, ruminants | % | 55.0 | 4.4 | 46.6 | 55.1 | 4 * |
| Energy digestibility, ruminants | % | 51.6 | | | | * |
| OF ruminants | MJ/kg DM | 9.2 | | | | * |
| ME ruminants | MJ/kg DM | 7.5 | | | | * |
| ME ruminants (gas production) | MJ/kg DM | 7.5 | | 6.7 | 8.3 | 2 |
| Nitrogen digestibility, ruminants | % | 40.4 | | 33.7 | 47.1 | 2 |
| a (N) | % | 48.2 | | | | 1 |
| b (N) | % | 36.2 | | | | 1 |
| c (N) | h-1 | 0090 | | | | 1 |
| Nitrogen degradability (effective, k=4%) | % | 73 | | | | * |
| Nitrogen degradability (effective, k=6%) | % | 70 | | | | * |

| Pig nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Energy digestibility, growing pig | % | 36.2 | | | | * |
| DE growing pig | MJ/kg DM | 6.5 | | | | * |

| Rabbit nutritive values | Unit | Avg | SD | me | Max | Nb |
|---|---|---|---|---|---|---|
| Energy digestibility, rabbit | % | 40.2 | | | | * |
| OF rabbit | MJ/kg DM | 7.2 | | | | * |

The asterisk * indicates that the average value was obtained by an equation.

References

Abbeddou and al., 2011 ; Abreu et al., 1998 ; Alibes et al., 1990 ; Bruno-Soares et al., 2000 ; Denek et al., 2004 ; Dutta et al., 2004 ; Erskine et al., 1990 ; Haddad et al., 2001 ; Lopez et al., 2005 ; Sehu et al., 1998 ; Singh et al., 2011

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All feeds
drilling plants
- Cereal and grass forages
- Legume forages
- Forage trees
- Aquatic plants
- Other forage plants

Plant products/by-products
- Cereal grains and by-products
- Legume seeds and by-products
- Oil plants and by-products
- Fruits and by-products
- Roots, tubers and by-products
- Sugar processing by-products
- Plant oils and fats
- Other plant by-products

Feeds of animal origin
- Animal by-products
- Dairy products/by-products
- Animal fats and oils
- Insects

Other feeds
- Minerals
- Other products

Latin names
Plant and animal families
Plant and animal species

Resources
Broadening horizons
Literature search
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Glossary
External resources
- Literature databases
- Feeds and plants databases
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# Lentil (Lens culinaris)

Description | Nutritional aspects | Nutritional tables | References

## References

Abbeddou, S. ; Rihawi, S. ; Hess, H. D. ; Iniguez, L. ; Mayer, A. C. ; Kreuzer, M., 2011. Nutritional composition of lentil straw, vetch hay, olive leaves, and saltbush leaves and their digestibility as measured in fat-tailed sheep. Small Rumin. Res., 96 (2-3): 126-135

Abreu, J. M. F. ; Bruno Soares, A. M., 1998. Characterization and utilization of rice, legume and rape straws. Options Méditerranéennes. Série B, Etudes et Recherches, 17: 39-51

Alibes, X. ; Tisserand, J. L., 1990. Tables of the nutritive value for ruminants of Mediterranean forages and by-products. Options Méditerranéennes : Série B Etudes et recherches ; numero 4. CIHEAM 152 p.

Bejiga, G., 2006. *Lens culinaris* Medik.. Record from Protabase. Brink, M. & Belay, G. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands

Bell, J. M. ; Keith, M. O., 1986. Nutritional and monetary evaluation of damaged lentils for growing pigs and effect of antibiotic supplements. Can. J. Anim. Sci., 66 (1): 529-536

Blair, R., 2007. Nutrition and feeding of organic pigs. Cabi Series, CABI, Wallingford, UK

Blair, R., 2008. Nutrition and feeding of organic poultry. Cabi Series, CABI, Wallingford, UK

Bredon, R. M. ; Marshall, B., 1962. Chemical composition of some foods and foodstuffs in Uganda. E. Afr. Agric. For. J., 27 (4): 211-219

Bruno-Soares, A. M. ; Abreu, J. M. F. ; Guedes, C. V. M. ; Dias-da-Silva, A. A., 2000. Chemical composition, DM and NDF degradation kinetics in rumen of seven legume straws. Anim. Feed Sci. Technol., 83 (1): 75-80

Castell, A. G. ; Cliplef, R. L., 1988. Live performance, carcass and meat quality characteristics of market pigs self-fed diets containing cull-grade lentils. Can. J. Anim. Sci., 68 (1): 265-273

Castell, A. G. ; Cliplef, R. L., 1990. Methionine supplementation of barley diets containing lentils (*Lens culinaris*) or soybean meal: live performance and carcass responses by gilts fed *ad libitum*. Can. J. Anim. Sci., 70 (1): 329-332

Castell, A. G., 1990. Lentils (Chapter 21). In: Thacker, P. A.; Kirkwood, R. N. (Eds). Nontraditional feed sources for use in swine production. Butterworth-Heinemann Ltd

Choudhury, K. ; Rahman, M. M., 1973. Fatty acids in different pulses produced and consumed in Bangladesh. J. Sci. Food Agric., 24 (4): 471-473

Denek, N. ; Deniz, S., 2004. The determination of digestibility and metabolizable energy levels of some forages commonly used in ruminant nutrition by *in vitro* methods. Turk Veterinerlik ve Hayvanclk Dergisi, 28 (1): 115-122

Dutta, N. ; Sharma, K. ; Naulia, U., 2004. Nutritional evaluation of lentil (*Lens culinaris*) straw and urea treated wheat straw in goats and lactating buffaloes. Asian-Aust. J. Anim. Sci., 17 (11): 1529-1534

Ecocrop, 2012. Ecocrop database. FAO

Erskine, W. ; Rihawi, S. ; Capper, B. S., 1990. Variation in lentil straw quality. Anim. Feed Sci. Technol., 28 (1–2): 61–69

FAO, 2012. FAOSTAT. Food and Agriculture Organization of the United Nations

Farhoomand, P., 2006. Performance and carcass traits of lentil seed fed broilers. Ind. Vet. J., 83 (2): 187-190

Ford, R. ; Rubeena; Redden, R. J. ; Materne, M. ; Taylor, P. W. J., 2007. Lentil. In: Chittarajan, K., Genome Mapping and Molecular Breeding in Plants, 3: 91-108

Gendley, M. ; Singh, P. ; Garg, A., 2002. Performance of crossbred cattle fed chopped green sugarcane tops and supplemented with wheat bran or lentil chuni concentrates. Asian-Aust. J. Anim. Sci., 15 (10): 1422-1427

Gendley, M. ; Singh, P. ; Garg, A. ; Tiwari, S. ; Kumari, K. ; Dutta, G., 2009. The studies on nutrient balances in crossbred cattle bulls fed chopped green sugarcane tops supplemented with some agro industrial by-products. Trop. Anim. Health Prod., 41: 943-949

Gilbery, T. C.; Lardy, G. P.; Soto-Navarro, S. A.; Bauer, M. L.; Anderson, V. L., 2007. Effect of field peas, chickpeas and lentils on rumen fermentation, digestion and microbial protein synthesis in receiving diets for beef cattle. J. Anim. Sci., 85 (11): 3045-3053

Göhl, B., 1982. The feed in the tropics. FAO, Production and Animal Health Division, Rome, Italy

Haddad, S. G. ; Husein, M. Q., 2001. Nutritive value of lentil and vetch straws as compared with alfalfa hay and wheat straw for replacement ewe lambs. Small Rumin. Res., 40 (3): 255–260

Khan, N. A. ; Baker, B. E., 1957. The amino-acid composition of some pakistani pulses. J. Sci. Food Agric., 8: 301-305

Kiliçalp, N.; Benli, Y., 1994. Possibilities of using lentil flour in rations for layers. Animal Research Journal, 4 (1): 47-49

Landero, J. L. ; Beltranena, E. ; Zijlstra, R. T., 2012. The effect of feeding lentil on growth performance and diet nutrient digestibility in starter pigs. Anim. Feed Sci. Technol., 174 (1-2): 108-112

Lardy, G. ; Anderson, V., 2009. Alternative feeds for ruminants. General concepts and recommendations for using

alternative feeds. North Dakota State University Fargo, AS-1182 (Revised) 24 p.

Lopez, S. ; Davies, D. R. ; Giraldez, F. J. ; Dhanoa, M. S. ; Dijkstra, J. ; France, J., 2005. Assessment of nutritive value of cereal and legume straws based on chemical composition and *in vitro* digestibility. J. Sci. Food Agric., 85 (9): 1550-1557

Marquardt, R. R. ; Bell, J. M., 1988. Future potential of pulses for use in animal feeds. In: Summerfield, R.J. (ed.) World Crops: Cool Season Food Legumes. Kluwer, Dordrecht, The Netherlands, pp. 421–444

Mekasha, Y; Tegegne, A; Yami, A; Umunna, N. N., 2002. Evaluation of non-conventional agro-industrial by-products as supplementary feeds for ruminants: *in vitro* and metabolism study with sheep. Small Rumin. Res., 44 (1): 25–35

Mekasha, Y; Tegegne, A; Yami, A; Umunna, N.N.; Nsahlai, I. V., 2003. Effects of supplementation of grass hay with non-conventional agro-industrial by-products on rumen fermentation characteristics and microbial nitrogen supply in rams. Small Rumin. Res., 50: 141-151

Ning Wang; Daun, J. K., 2006. E ects of variety and crude protein content on nutrients and anti-nutrients in lentils (*Lens culinaris*). Food Chem., 95 (3): 493–502

Ørskov, E. R. ; Nakashima, Y. ; Abreu, J. M. F. ; Kibon, A. ; Tuah, A. K., 1992. Data on DM degradability of feedstuffs. Studies at and in association with the Rowett Research Organization, Bucksburn, Aberdeen, UK. Personal Communication

Paliwal, V. K.; Yadav, K. R.; Khirwar, S. S., 1987. Nutritive value of lentil (*Lens esculenta* Moench) chuni for cattle. Short communication. Indian J. Anim. Sci., 57 (9): 1023-1025

Sehu, A. ; Yalçin, S. ; Önol, A. G. ; Koçak, D., 1998. Prediction of dry matter intake and live weight gain in lambs by some characteristics of roughages. Turk. J. Vet. Anim. Sci., 22 (6): 475-483

Singh, Sultan; Kushwaha, B. P. ; Nag, S. K. ; Mishra, A. K. ; Bhattacharya, S. ; Gupta, P. K. ; Singh, A., 2011. *In vitro* methane emission from Indian dry roughages in relation to chemical composition. Current Science, 101 (1): 57-65

SMA, 2008. Beef cow rations and winter feeding guidelines. Saskatchewan Ministry of Agriculture, Production factsheet

Stanford, K. ; Wallins, G. L. ; Lees, B. M. ; Mundel, H. H., 1999. Use of lentil screenings in the diets of early weaned lambs and ewes in the second trimester of pregnancy. Anim. Feed Sci. Technol., 81 (3-4): 249-264

Tima, P. M. ; Parilo, V.J. A. ; Borquez, L. F. ; Giachino, P.G., 1991. The effect of wheat, oat, and lentil straws on dry ewes supplemented with molasses and urea. Agro-Ciencia, 7 (2): 149-153

Tiwari, M. R. ; Khanal, S. ; Shrestha, B. ; Jha, R. K., 2006. Nutritional variation of different feed ingredients and compound feed found in different parts of Nepal. Nepal Agric. Res. J., 7: 75-81

Urbano, G. ; Lopez-Jurado, M. ; Hernandez, J. ; Fernandez, M. ; Moreu, M. C. ; Frias, J. ; Diaz-Pollan, C. ; Prodanov, M. ; Vidal-Valverde, C., 1995. Nutritional assessment of raw, heated and germinated lentils. J. Agric. Food Chem., 43 (7): 1871-1877

Vargas, M .; Urba, R .; January, R .; Báez, H .; Pardo, P .; Visconti, C., 1965. Composition of Chilean food use in livestock and poultry. Santiago. Minister of Agriculture. Veterinary Research Institute.

Weder, J. K. P., 1981. Protease inhibitors in the *Leguminosae*. In: Pothill, R.M. and Raven, P.H. (eds) Advances in Legume Systematics. British Museum of Natural History, London, pp. 533–560

Wiryawan, K. G. ; Dingle, J. G. ; Kumar, A. ; Gaughan, J. B. ; Young, B. A., 1995. True metabolisable energy content of grain legumes : effects of enzyme supplementation. In: Rowe, J.B., Nolan, J.V. (Eds.), Recent Advances in Animal Nutrition in Australia. University of New England, Armidale. p. 196

Wiryawan, K. G., 1997. New vegetable protein for layers. Final report for project UQ-21E, Department of Animal Production, University of Queensland

Woodman, H. E., 1945. The composition and nutritive value of feeding stuffs. United Kingdom. Ministry of Agriculture, Fisheries and Food. Bulletin No. 124

Yalçin, S. ; Ergun, A. ; Colpan, I. ; Kucukersan, K. ; Dikicioglu, T., 1991. The utilization of lentil by-products in laying hens. Doga, Turk Veterinerlik ve Hayvanlk Dergisi, 15 (2): 177-192

Yalçin, S. ; Cetinkaya, N. ; Sehu, A., 1992. Ruminal degradation characteristics of lentil by-products. Veteriner Fakultesi Dergisi, Ankara Universitesi, 39 (3): 404-413

**50 references found**

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