Sub-Saharan Africa Feed Composition Database
nutritive values

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Why a feed database?

Livestock often represent a major asset for smallholder farmers across the developing world. With an increasing demand for animal products led by growing populations, urbanisation and dietary changes, feed has become a constraint for farmers to improve livestock production. However, while feed quality often remains low, demand and prices of feed keep rising. This reinforces the need for more efficient feed production and use. The aim of this database is to enable extension, development and research agents to design scientifically-based and best-cost rations for meat, dairy and draught animals of small-scale African farmers. As their livestock assets are healthier and better nourished, these farmers become more food-secure and are able to increase their income from animal products.

Data sources

Concentrate feeds and agro-industrial by-products (49)
Fodder trees and shrubs (216)
Food crops: cereals & legumes, green (27)
Food crops: cereals & legumes, residues (39)
Food crops: others (18)
Food crops: roots & tubers (8)
Herbaceous forages (158)
Mineral supplements (8)
Other less common feed (43)

Figure 2: Feed types

The nutritional data on livestock feeds made available through 'SSA Feeds' was generated at the Animal Nutrition/Analytical Services Laboratories of the International Livestock Centre for Africa (ILCA) and the International Livestock Research Institute (ILRI) in Addis Ababa, Ethiopia. The laboratory analyses were performed as described by Osuji et al. (1993) and Ogubai and Sereke (1997).

The initial data set used in this software is the same as used by Anindo et al. (1994). However, this data set was modified extensively to exclude duplicate entries and extreme cases of outliers. All feeds were classified into nine 'Feed types' (Figure 2). Plant names were identified, whenever possible, using the checklist of names given by Terrell et al. (1986). The initial data set is frequently revised as new data is added. Therefore the nutritive values obtained through this software may differ substantially from those provided by Anindo et al. (1994).

Creating a database

In October 2011, SLP formally released the enhanced version of the sub-Saharan Africa Feeds database – a user friendly searchable database containing information on the nutritive values of 20,913 samples of 566 of the major feeds used in 15 countries in sub-Saharan Africa (SSA). The database is freely available both on the web (Figure 1)—where it can be downloaded, or on CD (at ILRI –Ethiopia). This is the first time that such a large amount of data on common feeds for livestock in the tropics has been made publically available in this way.
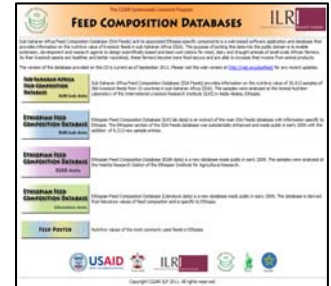
Figure 1: Home page of the feed database.

This useful information tool was created as a joint effort of SLP, the International Livestock Research Institute (ILRI), the Ethiopian Institute of Agricultural Research (EIAR), the Ethiopian Ministry of Agriculture (MoA), Texas A&M University and the Ethiopian Sanitary & Phytosanitary Standards and Livestock & Meat Marketing Program (SPS-LMM) with funding from USAID. The information can now be used to improve the feed formulation to support livestock development in Ethiopia and throughout SSA. A poster has also been compiled on the nutritive values of the most commonly used feeds in Ethiopia to disseminate the information widely in Ethiopia.
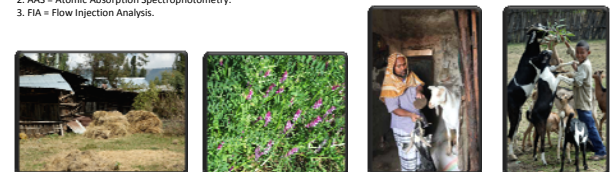
Included variables

'SSA Feeds' provides data on the following nutritional values:

Variable	Variable name	Unit	Method
DM[1]	Dry Matter	% Dried Basis	105ºC, 12 hours overnight
OM	Organic Matter	% of DM	500ºC, 12 hours overnight
ADF	Acid Detergent Fiber	% of DM	van Soest and Robertson (1985)
NDF	Neutral Detergent Fiber	% of DM	van Soest and Robertson (1985)
ADL	Acid Detergent Lignin	% of DM	van Soest and Robertson (1985)
CP	Crude Protein	% of DM	Kjeldhal, N × 6.25
IVDMD	In Vitro Dry Matter Digestibility	% of DM	Tilley and Terry (1963)
ME	Metabolizable Energy	Mcal/kg DM	Modified NRC (1996, 2000, 2001)
NEm	Net Energy for maintenance	Mcal/kg DM	NRC (1996, 2000, 2001)
NEg	Net Energy for gain	Mcal/kg DM	NRC (1996, 2000, 2001)
NEl	Net Energy for lactation	Mcal/kg DM	NRC (1996, 2000, 2001)
Ca	Calcium	% of DM	AAS[2] (Harris 1970)
P	Phosphorus	% of DM	FIA[3] (Harris 1970)
Cu	Copper	ppm[4], DM	AAS (Harris 1970)
Fe	Iron	ppm, DM	AAS (Harris 1970)
K	Potassium	% of DM	AAS (Harris 1970)
Mg	Magnesium	% of DM	AAS (Harris 1970)
Mn	Manganese	ppm, DM	AAS (Harris 1970)
Na	Sodium	ppm, DM	AAS (Harris 1970)
Zn	Zinc	ppm, DM	AAS (Harris 1970)

1. DM of the feeds as they are used in the farm.
2. AAS = Atomic Absorption Spectrophotometry.
3. FIA = Flow Injection Analysis.

Potential results

After selecting the type of feed (Figure 3), results are given either per sample of the same feed and crop type (Figure 4), as a summary of all the samples of the same plant part (Figure 5) or they can be exported as a csv table.

Figure 3: Example of feed within a feed type.

Figure 5: Example of summary results sample of same crop type and plant part.

Figure 4: Example of results per sample of same feed and crop type.

References

Anindo DO, Said AN and Lahlou-Kassi A. 1994. Chemical composition and nutritive value of feedstuffs for ruminant livestock in sub-Saharan Africa. ILCA (International Livestock Centre for Africa), Addis Ababa, Ethiopia. 539 pp. Harris LH. 1970. Nutrition research techniques for domestic and wild animals. Volume 1. Animal Science Department, Utah State University, Logan, Utah, USA. 86 pp. Jenet A. 2004. Long-term and carry over effects of feeding level performance and energy partitioning of Boran (Bos indicus)and Boran x Holstein dairy cattle. PhD thesis. Swiss Federal Institute of Technology, Zurich, Switzerland. 105 pp. NRC (National Research Council). 1996. Nutrient requirements of beef cattle. Seventh revised edition. NRC, National Academic Press, Washington, DC, USA. 242 pp. NRC (National Research Council). 2000. Nutrient requirements of beef cattle. Update 2000. NRC, National Academic Press, Washington, DC, USA. 232 pp. NRC (National Research Council). 2001. Nutrient requirements of dairy cattle. Seventh revised edition. NRC, National Academic Press, Washington, DC, USA. 381 pp. Ogubai M and Sereke BS. 1997. Analytical methods for feeds, animal excrements and animal tissues. Nutrition Laboratory, ILRI (International Livestock Research Institute), Addis Ababa, Ethiopia. 90 pp. Osuji PO, Nsahlai IV and Khalili H. 1993. Feed evaluation. ILCA Manual. ILCA (International Livestock Centre for Africa), Addis Ababa, Ethiopia. Osuji PO, Saarisalo EM, Tegegne A and Umunna NN. 2005. Undernutrition of dairy cattle in smallholder production systems in East Africa. In: Ayantunde AA, Fernández-Rivera S and McCrabb G (eds), Coping with feed scarcity in smallholder livestock systems in developing countries. Animal Sciences Group, UR, Wageningen, the Netherlands; University of Reading, Reading, UK; Swiss Federal Institute of Technology, Zurich, Switzerland; and ILRI (International Livestock Research Institute), Nairobi, Kenya. pp. 97–120. Terrell EE, Hill SR, Wiersema JH and Rice WR. 1986. A checklist of names for 3000 vascular plants of economic importance. Agriculture Handbook 505. US Department of Agriculture, USA. 244 pp. van Soest PJ. 2002. Nutritional ecology of the ruminant. O&B Books, Corvallis, Oregon, USA. 374 pp. van Soest PJ and Robertson JB. 1985. Analysis of forages and fibrous feeds. A laboratory manual for animal science 613. Corneli University, Ithaca, New York, USA. 202 pp.