

NorFor recommended laboratory methods for feed analyses

Parameter	Unit	EEC-method	NorFor recommended reference methods
Dry matter (DM) in concentrate	g/kg	71/393/EEC	71/393/EEC
Dry matter (DM) in forage	g/kg		NorFor method for determination of dry matter, September 21, 2007 Available at http://norfor.info/
Ash	g/kg DM	71/250/EEC	71/250/EEC
Organic matter digestibility (OMD)	g/kg OM		Reference method: Sheep in vivo digestibility. Current national laboratory methods (VOS, Tilley & Terry and EFOS) can be used until a common method has been decided.
Crude protein (CP)	g/kg DM	93/28/EEC	93/28/EEC. Acceptable method: Dumas. Crude protein (CP) is defined as 6,25 x total N in fresh sample. Crude protein analysed in an oven dried silage sample should be corrected for loss of ammonia. The correction is set to a <u>standard loss of 60% of ammonia-N in fresh sample</u> , if the loss is not analysed. A table value for ammonia-N in fresh sample is used, if it is not analysed.
Soluble crude protein (sCP)	g/kg CP		Determination of Soluble Crude Protein, November 15, 2006 Available at http://norfor.info/
Ammonia-nitrogen (NH ₃ -N)	g/kg N		Free choice between: <ul style="list-style-type: none"> • MgO-method • Enzyme-method • AutoAnalyzer (Broderick & Kang, 1980)
Crude fat (CFat)	g/kg DM	98/64/EC	98/64/EC
Fatty acids	g/kg CFat		CEN ISO/TS 17764-1:2007 CEN ISO/TS 17764-2:2007 Fatty acids include the sum of C6 – C22.
NDF	g/kg DM		ISO 16472:2006 IDT
iNDF	g/kg NDF		NorFor in sacco standard, September 10, 2007 Available at http://norfor.info/
Starch (ST)	g/kg DM	1999/79/EC	Knudsen (1997). Spectrofotometric method or Plate count method. Available at http://norfor.info/
Fermentation products feed (FPF): Lactic acid, acetic acid, propionic acid, butyric acid, formic acid, ethanol	g/kg DM		Free choice between: <ul style="list-style-type: none"> • HPLC • GC • Titration
Crude fibre (CF)	g/kg DM	92/89/EEC	92/89/EEC
Sugar	g/kg DM	71/250/EEC	71/250/EEC
Calcium (Ca)	g/kg DM	71/250/EEC	71/250/EEC. Acceptable method: ICP
Phosphorus (P)	g/kg DM	71/393/EEC	71/393/EEC. Acceptable method: ICP
Magnesium (Mg)	g/kg DM	73/46/EEC	73/46/EEC. Acceptable method: ICP
Potassium (K)	g/kg DM	71/250/EEC	71/250/EEC. Acceptable method: ICP

Sodium (Na)	g/kg DM	71/250/EEC	71/250/EEC. Acceptable method: ICP
Vitamin A/carotenes	I.E./kg DM mg/kg DM	2000/45/EC	Free choice between: <ul style="list-style-type: none"> • 2000/45/EC • Jensen et al. (1998)
Vitamin E	I.E./kg DM	2000/45/EC	Free choice between: <ul style="list-style-type: none"> • 2000/45/EC • Jensen et al. (1999)

References

Broderick, G. A. & Kang, J. H. 1980. Automated Simultaneous Determination of Ammonia and Total Amino Acids in Ruminal Fluid and In Vitro Media. *Journal of Dairy Science* 63:1101-1111.

Jensen, S.K., Jensen, C., Jakobsen, K., Engberg, R.M., Andersen, J.O., Lauridsen, C., Sørensen, P., Henckel, P., Skibsted, L.H. & Bertelsen, G. 1998. Supplementation of broiler diets with retinol acetate, β -carotene or canthaxanthin: Effect on vitamin and oxidative status of broilers in vivo and meat stability. *Acta Agric. Scand. Sect. A Animal Sci.* (48) 28-37.

Jensen, S.K., Engberg, R.M. & Hedemann, M.S. 1999. All-rac- α -tocopherol acetate is a better vitamin E source than all-rac- α -tocopherol succinate for broilers. *Journal of Nutrition* (129) 1355-1360.

Knudsen, K.E.B., 1997. Carbohydrate and lignin contents of plant material used in animal feeding. *Animal Feed Science Technology* 67, 319 – 338.

ISO 16472:2006 IDT. Animal feeding stuffs - Determination of amylase-treated neutral detergent fibre content (aNDF)

References for EEC methods on the internet:

Vitamins:

http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=32000L0045&model=guichett

Crude ash, calcium, sodium, potassium:

http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31971L0250&model=guichett

Phosphorus:

http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31971L0393&model=guichett

Magnesium:

http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31973L0046&model=guichett

Crude fibre:

http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31992L0089&model=guichett

Crude protein:

http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31993L0028&model=guichett

Crude fat:

http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31998L0064&model=guichett