Fibre content and *in vitro* digestibility of natural forage and supplementary fodder in reindeer.

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Summary: In winter reindeer (*Rangifer tarandus tarandus* L.) feed mainly on lichens, but vascular plants and shrubs are also important. Limited data are available concerning the nutritional value of winter forage plants and supplementary fodder of reindeer in Finland. *In vitro* methods have recently been used to rank forage components in the diet of reindeer.

The nutritional value of fourteen forage species of reindeer was investigated. Neutral detergent fibre (NDF), acid detergent fibre (ADF) and acid detergent ligning (ADL) were analysed according to Goering and Van Soest (1970). Hemicellulose was calculated as the difference of NDF and ADF, and cellulose as the difference of ADF and ADL. *In vitro* dry matter digestibility (dry matter disappearance=IVDMD) values were obtained using the two stage *in vitro* technique (Tilley and Terry 1963). Rumen liquor was obtained from reindeer maintained in captivity on a pelleted diet from free ranging reindeer on late winter and fall pasture, and also from a rumen fistulated sheep maintained on a diet of hay. All reindeer were slaughtered and the experiments were performed within two hours after slaughtering.

The relationship between fibre composition and feed digestibility is well documented. Lignin and lignification of hemicellulose and cellulose are the primary factors causing a decline in digestibility of plant cell walls. The high hemicellulose content of *Cladina* lichens (67.4% in dry matter) was related to the high *in vivo* digestibility of lichens documented earlier by number of researchers. The high content of lignin in the twigs of shrubs (11.3 – 19.9% in DM) and the low content of lignin in other forages (1.0 – 3.2% in DM), except lichens, was also related to their *in vitro* digestibilities.

The *in vitro* digestibility (DMD) of natural forage plants used by reindeer in winter varied from 17.4% to 69.8% when using reindeer inoculum. The IVDMD of lichens (mean=37.8%) was lower than values obtained from whole animal feeding trials (range=53% to 75%). Green leaves of *Deschampsia flexuosa,* the most important winter green forage plant of reindeer, had the highest (69.8%) *in vitro* digestibility of natural winter feeds used by reindeer. The IVDMD of cured leaves of *D. flexuosa* was considerably lower (41.2%). The IVDMD for supplementary fodders varied from 51.4% to 76%. The IVDMD of hay (dried grasses and sedges) (51.4%) was similar to that found in *in vivo* feeding trials.

Presence of lichens in the diet of inoculum donor appears to raise the IVDMD of ground lichens, especially of *Cladina* spp. The IVDMD of *Cladina* lichens was 33.3% when using rumen liquor from reindeer at fall pasture, 23.6% when using that from reindeer at late winter pasture, 20.5% when using that from reindeer on a pellet diet and 10.5% when using rumen liquor from sheep maintained on hay. Absence of arboreal lichens and shrubs in the diet of inoculum donor had no effect on the IVDMD of these forage plants.