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Djupströbäddar för får - växtnäringsvärde och jämförelse av strömaterial

Deep litter for sheep - plant nutrient value and comparison of bedding materials

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Abstract

Most Swedish sheep are kept on deep litter beds during winter. It is important that the farm nutrient balance is optimized, but the knowledge of plant nutrient content, nitrogen losses and plant nutrient value of sheep deep litter has been very limited.

The aim of the project has been to increase the knowledge about plant nutrient content in sheep deep litter; to study the function of the deep litter during the stable period and during storage in the stable or in heaps outside, to calculate the plant nutrient value of the deep litter in the nutrient cycling on the farm and nutrient losses, and to compare barley straw reed canary grass as bedding material for sheep.

During two winter housing periods at Röbäcksdalen research station in Umeå, Sweden, ewes and ewe lambs were kept in pens that were either bedded with barley straw or reed canary grass. The growth of the ewe lambs was 50 g per day and there was no difference between the bedding materials. The air quality in the stable was good; concentrations of ammonia and carbon dioxide were on average 2.4 and 637 ppm respectively, which indicates that the ventilation was satisfactory. The indoor temperature was somewhat higher than the outdoor temperature (the average difference was 2.6-2.9°C and the range was -18°C to +13°C).

Both reed canary grass and barley straw are suitable as bedding material for sheep, both regarding cleanliness of the beds and composting of the material. The consumption of bedding material was somewhat higher for reed canary grass, to keep the same level of cleanliness. Reed canary grass was also somewhat dustier at handling than straw. The average depth of the beds at the end of the housing periods was 33-35 cm for straw and 36-37 cm for reed canary grass. The average temperature at 85 mm depth was 17°C with no difference between the bedding materials. The different bedding materials did not give different nutrient contents in the deep litter except for potassium, where straw had higher concentration of potassium than reed canary grass. At sampling before and after indoor storage, the average content in one tonne deep litter was 11.2 kg total nitrogen, 3.0 kg ammonium nitrogen, 2.2 kg total phosphorous and 14 kg potassium.

When storing the deep litter in outdoor heaps, May-October, the temperature in the middle of them increased rapidly to 75°C in a couple of days. It then decreased during the summer towards the outdoor temperature in mid-October. Balance calculations show that the dry matter decreased by 55-63%, but the total weight of the manure did not decrease, due to the summer rains. At the end of the storage in heaps the average content in one tonne deep litter was 7.0 kg total nitrogen, 0.8 kg ammonium nitrogen, 1.6 kg total phosphorous and 12 kg potassium.

Manure in deep litter beds with barley straw or reed canary grass lost small amounts of nitrogen during the housing period and indoor storing (10-12%). After four months of storage of the deep litter in the stable the concentrations of different nutrients had not changed significantly. On the other hand, a large part of the nitrogen was lost during storage outdoors in heaps (35-51%). This drastically decreased the nitrogen availability in the manure. A complementary study of deep litter manure from sheep producers in Skåne and Västerbotten confirm that ammonium concentrations were higher in deep litter stored indoors than after outdoor storage.