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## 7.22 PHYSICAL PROPERTIES OF ALTERNATIVE BEDDING MATERIALS FOR DAIRY CATTLE

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**Abstract:** Housing system can affect dairy cow's welfare and performance and the type of bedding used can also affect comfort and hygiene level of the animals. A wide range of different materials can be used in bedding for dairy cattle but their physical proprieties must be analyzed to evaluate their potential. *Miscanthus* can be considered as alternative materials to be used for bedding. *Miscanthus* is a woody grass that requires low input and straw are easily find in many regions. Thus, both materials can be alternatives in order to reduce costs of bedding. Therefore, the aim of this study was to investigate the physical properties of *Miscanthus* in comparison to straw, as affordable alternatives to be used as bedding material in housing systems for dairy cows. Particle size, bulk density, porosity, water holding capacity from *Miscanthus* and straw were measured experimentally in the lab of the Department of Agriculture, Food, Environment and Forestry (DAGRI) of the University of Florence. Particle size was determined by applying 50 g of material (*Miscanthus* and straw) on a shaker with six sieves during 5 min. The mean particle size influences the material mass and the resistance to compaction. Bulk density can be defined as the ratio of weight to volume and is given in kg/m<sup>3</sup>. This information is important in order to quantify volumes of products with irregular shapes. Bulk density of *Miscanthus* and straw was determined according to the ASABE Standard S269.4 DEC 91. One of the biggest producers' worries is related to the amount of water in bedding because it can affect microbial activity, thermal insulation, gases emissions, odor emissions and friability. Thus, to determine the water holding capacity and porosity of bedding materials samples Australian Standards were used. Based on these physical properties results, it is expected to demonstrate the good potential to use *Miscanthus* as viable alternatives to straw as a bedding material for dairy cattle.

**Keywords:** bulk density, dairy cows, *Miscanthus*, porosity, straw, water holding capacity