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Will additional straw bedding in buildings housing cattle and pigs reduce ammonia emissions?

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Buildings housing livestock are the second largest source of ammonia (NH_3) emissions from UK agriculture. In the UK *c.* 42% of NH_3 emissions from buildings are from those in which cattle and pigs are bedded on straw. Additional straw may reduce NH_3 emission by reducing airflow across surfaces soiled by urine, and by immobilization of ammonium–N. This study quantified the effects of increasing straw use on NH_3 emission from buildings housing cattle or pigs. The extra straw was applied in increments of up to 100%, either over the entire floor or targeted to the areas where most excreta were deposited. An increase of 33% straw, broadcast over the entire floor, reduced NH_3 emission from cattle by 50%, but greater addition did not give any further significant reduction. However, for pigs only the broadcast addition of 100% more straw reduced NH_3 emission and then by only *c.* 20%. Targeted use of an additional 33% straw reduced emission from cattle by 22%, compared with broadcasting the same quantity of straw, but further additions of targeted straw use did not increase abatement. When the straw was targeted in the pig buildings there was no benefit from using additional straw.

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Automatic extraction of lean-tissue contours for beef quality grading

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In evaluating beef quality, proper extraction of the boundary of lean-tissue from the section of beef rib is the crucial first step. In this research, image-processing algorithms have been developed to automatically extract the boundary of the lean-tissue in a robust way as human expert does. Algorithms include automatic threshold determination using Rényi entropy for beef-cut segmentation and contour modification, along with binary morphological approaches. The algorithms were applied to 36 beef-cut samples and successfully demonstrated contour extraction with average percentage error of 2.63% and average pixel distance error of 2.51 pixels when compared to results from a human expert. The algorithms developed were applied to the mobile processing unit as a supplementary grading device.

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Discrete element simulations of the influence of fertiliser physical properties on the spread pattern from spinning disc spreaders

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This paper describes a sensitivity study of the flow of granular fertiliser particles on a spinning disc using a discrete element model. The aim was to get a qualitative insight in the influences of individual physical properties of the particles (such as friction coefficient, restitution, and shape) as well as their bulk behaviour on the resulting spread pattern. The results show that certain particle properties, particularly friction coefficients, have a large influence on the spread pattern, and hence should examined carefully in the process of producing granular fertilisers, perhaps by particle coating, or taken into account when applying the fertiliser in the field. Other properties, such as particle stiffness hardly affect the results. Furthermore, it was shown that the friction coefficient and shape of a particle strongly interfere in their particular influence on the spread pattern. Overall, the discrete element model could provide a powerful instrument for the manufacturers in the development of new kinds of spreaders and fertilisers.