

## ABSTRACTS

*Symposium on The Development of Sheep Production Systems in Hot Arid Zones with Special Reference to Kuwait "Towards Efficient Sheep Production" - State of Kuwait, (April 20 - 22, 1998)*

### **Anatomy of *Cenchrus ciliaris*, *Chloris gayana* and *Zea mays* Plant Parts in Relation to Digestion and Chewed Particle Characteristics**

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In order to understand more clearly some of the anatomical characteristics of C<sub>4</sub> forages which may be important in relation to digestibility and particle breakdown during eating by sheep, different parts of three C<sub>4</sub> forages were examined for the thickness of the cell walls, the proportion of different cell types and for in vitro digestibility when milled and chopped and for neutral detergent fibre and lignin. Particles produced by sheep when eating different parts of three species were described in terms of volume and exposed surface area and in terms of cells and volume and surface area of cell wall. The three species were: *Cenchrus ciliaris* L., *Chloris gayana* Kunth, and *Zea mays* L. In addition, early harvesting was compared with later harvesting. Plants were grown in identical conditions in a heated glasshouse in each of two years. A randomised block design was used, with two blocks. The walls of the cells categorised as thick-walled were thickest in leaf blade midribs, leaf sheaths, and stems of *Z. mays* and thinnest in the leaf blades and leaf sheaths of *C. ciliaris* and *C. gayana*. The plant parts with the thickest outer walls of epidermal cells were the leaf blade midribs and leaf sheaths of *Z. mays* and stems of *C. ciliaris*. The plant parts with the lowest proportion of thick-walled cells were the leaf blades and stems of *Z. mays* and those with the highest proportion of thick-walled cells were the stems and leaf blades of *C. ciliaris*. The leaf blades, excluding the midribs, and the stems and leaf sheaths of *Z. mays* were all rather high in digestibility when milled and moderately low in neutral detergent fibre and lignin; the digestibility of the stems, however, was low when they were chopped rather than milled. The plant parts which were chewed to the smallest particle size during eating, and which produced particles with the largest proportion of total cell wall area exposed on the outside of the particle, were the leaf blades and sheaths.