HYDROLYSIS OF CELL WALL POLYSACCHARIDES

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Plant cell walls (fibre) are very important nutrients for humans and animals. However, there is no generally accepted method for their isolation and determination (Harris et al. 1988). For many years, fibre was measured as crude fibre, which gives a poor recovery of plant cell wall polysaccharides and lignin. More recently, neutral detergent solution has been used to give a better recovery of cell wall polysaccharides and lignin, although it fails to recover water soluble polysaccharides. Hydrolysis and separation of polysaccharide monomers is preferable in studies designed to define nutritional roles of constituent monomers. However, conditions of hydrolysis are not well defined because components of cell wall polysaccharides differ in chemical and physical properties (Hoebler et al. 1989). In the present study samples of mature annual legume were hydrolysed with trifluoroacetic acid (TFA) (Choct and Annison, 1991), sulphuric acid A (SA) (Harris et al. 1988) and sulphuric acid B (SB) (Hoebler et al. 1989), after which they were converted to alditol acetates and quantified by gas chromatography.

TFA released more arabinose, xylose and galactose, and much less glucose than sulphuric acid.

Treatment	Arabinose	Xylose	Mannose	Galactose	Glucose
			% of DM		
TFA	3.27	4.83	0.80	2.30	4.30
SA	1.57	2.63	trace	1.80	23.88
SB	1.91	2.39	0.63	1.61	20.04
SEM	0.160	0.311	0.032	0.216	0.206

Our results indicate that cellulosic polysaccharides require hydrolysis with sulphuric acid and hemicellulosic polysaccharides require hydrolysis with trifluoroacetic acid. For the complete determination of cell wall polysaccharides in feedstuffs analyses both TFA and sulphuric acid should be used.

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