Both rate and extent of bacterial growth from 8h onwards ranked S>P>M>CW ($P<0.001$). However, the proportion of adherent bacteria from 8 to 24h was higher in P than in the other three media ($P<0.01$), reaching values over 50% at 8 and 24h. The proportion of adherent bacteria for CW, M and S, changed little with time and only increased ($P<0.01$) in S after 24h. Specific enzymatic activity in the fermentation residue (per unit of attached bacteria) against CMC and X was higher in CW than in the other three media at all times ($P<0.01$). However, the greater attachment induced by the supplements showed higher total enzymatic activities (per unit of residual CW) than in CW from 20h onwards ($P<0.05$). There were no differences ($P>0.10$) among the supplemented media in total or specific activity. Addition of carbohydrates reduced specific fibrolytic enzymatic activity, but total activity was increased by a higher bacterial growth. Addition of starch promoted a higher bacterial growth than pectin, but the latter enhanced attachment to cell walls.

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Simultaneous metabolism of glucose and cellobiose in *F. succinogenes* S85 studied by in vivo ^{13}C-NMR. Evidence of glucose 6-phosphate accumulation. A-M Delort[1], C Matheron[1], T Liptaj[2], G Gaudet[3], E Forano[3] (*[1]Laboratoire Synthèse, Electrosynthèse et Etude de systèmes à Interêt Biologique UMR 6504 du CNRS, Université Blaise-Pascal, 63177 Aubière Cedex, France.; [2]Slovak Technical University, Faculty of Chemical Technology, 812 37 Bratislavia, Slovakia; [3] INRA, Station de Recherches sur la Nutrition des Herbivores, Centre de Clermont-Theix, 63122 Saint Genès-Champanelle, France)*

Fibrobacter succinogenes is a strictly anaerobic ruminal bacterium which degrades cellulose to glucose and cellobiose. The two sugars are transported across the cytoplasmic membrane through independent constitutive transporters. Previously, in vivo ^{13}C- and ^{1}H-NMR has been used to investigate *F. succinogenes* S85 metabolism. Futile cycling of glycogen [1] and a new metabolic pathway involving the presence of phosphoketolase and pyruvate formate lyase were found [2].

In this study the kinetics of (1-^{13}C) glucose utilization by resting cells in the presence or the absence of unlabelled cellobiose was monitored by ^{13}C-NMR [3]. The analysis of the percentage of labelling of the metabolites showed that glucose was preferentially used for glycogen storage and energy production, while part of cellobiose was used for cellodextrin synthesis. Both cellobiase and cellobiose-phosphorylase activities were assayed in cell-free extracts and it is suggested that the role of cellobiase is to synthesise cellodextrins while that of cellobiose-phosphorylase is to cleave cellobiose. Glucose 6-phosphate concentration was increased by over three-fold when cells metabolised cellobiose. A possible role for glucose 6-phosphate in the regulation of cellodextrins synthesis is suggested.

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Effect of sterilization by autoclaving of maize and sugarcane bagasse cell walls on chemical and biological susceptibility. I Giraud, G Fonty, JM Besle (*INRA, Station de Recherches sur la Nutrition des Herbivores, Centre de Clermont-Theix, 63122 Saint Genès-Champanelle, France)*

Autoclaving roughages decrease lignin content and changes biodegradability [1]. Since sterilization by autoclaving is a routine process, the aim of this work was to assess if autoclaving affects cell wall composition, bioavailability and, in particular, cell wall-phenolics degradation.

Cell wall residues (CWR) of maize (cv LG11, silage stage) and sugarcane bagasse were prepared [2]. They were autoclaved (120°C, 20min) in quadruplicate with water in Balch tubes, filtered and dried (60°C for 48h). The UV spectrum was measured on the filtrate. Initial CWR and residues were hydrolysed with 1M NaOH (20h, 20°C), then phenolic acids and the saponified residues (SRs) were determined [2]. In addition, the cellulase dry matter digestibility (CDMD) was determined [3]. After autoclaving, losses in dry matter were only 0.9 and 2.2% for maize and sugarcane bagasse CWR respectively (Table 1). The losses in *p*-coumaric acid (PCA) and ferulic acid (FA) were slight and not significant for both substrates. Compared to that of the control, the UV spectrum showed a peak at 280nm and a shoulder at 315nm, corresponding to the solubilization of phenolics. When calculated against a ferulic acid standard, the increase of the absorbance at 280nm corresponded to about 2% of the initial phenolics. Alkali-solubility slightly increased by 1.3 and 1.7% for maize and sugarcane bagasse CWR respectively. The CDMD was 16.1 and 8.4% for maize and sugarcane bagasse CWRs, respectively and only increased by 1.4% for maize CWR.

It was concluded that the solubilization of DM, of phenolics, and the changes in alkali- and in biological susceptibility were very small under the usual conditions of sterilization by autoclaving. It is thus not necessary, at least for the poorly degradable substrates, to use a method such as ethylene oxide, which is non-destructive but less convenient.

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Chemical susceptibility and cellulase digestibility of CWR after autoclaving

		Phenolic acids (g kg^{-1} residue)		*SR (g kg^{-1} residue)*	*CDMD (%)*
		PCA	*FA*		
Maize CWR	initial	25.8 ± 0.3	6.4 ± 0.1	50.2 ± 0.2	16.1 ± 0.3
	autoclaved	26.6 ± 0.1	6.3 ± 0.1	48.9 ± 0.1	17.5 ± 0.1
Bagasse CWR	initial	18.1 ± 0.7	3.3 ± 0.2	67.6 ± 0.2	8.4 ± 0.3
	autoclaved	18.9 ± 0.7	3.8 ± 0.1	65.9 ± 0.1	8.3 ± 0.1