

Influence of light on labelling of wheat stem lignins using [U¹⁴C] phenylalanine or [O¹⁴CH₃] sinapic acid

P Barthes¹, L Gorrichon², JP Jouany¹, JM Besle¹

¹ INRA Theix, Unité Digestion Microbienne, 63122 Saint-Genès-Champanelle;
² Université Paul Sabatier, Laboratoire de Synthèse et Physicochimie Organique, 118, route de Narbonne, 31062 Toulouse Cedex, France

In order to investigate the fate of lignin during cell wall ruminal degradation, we studied the synthesis of uniformly and specifically labelled ¹⁴C lignin in the dark or in the light.

Batches of 5 wheat-straw upper internodes (flowery stage) were labelled for 90 h uptake period by the cut stem procedure with 2 MBq of either [U-¹⁴C] phenylalanine (phe*) or [O-¹⁴CH₃] sinapic acid (sin*), in the dark or in the light (photoperiods of 12 h). After drying at 50 °C, the lower half of the internode was ground. Cell walls were prepared, deproteinised (pronase), treated by NaOH to remove esterified phenolic acids and oxidised by alkaline nitrobenzene; the aldehydes were analysed by HPLC and the radioactivity of the fractions measured by liquid scintillation (Agosin *et al*, 1982).

With phe* as a precursor, vanillin (V) and syringaldehyde (S) were both labelled in similar proportions (table I), with a slight increasing effect of darkness conditions. With sin*, the incor-

poration was higher in the dark. S was considerably more labelled than V, especially in the dark, but the differences were less than those observed by Terashima *et al* (1979). These authors worked with *Eucalyptus*, left 72 h in the dark before incorporation. The effect of light may be important in membrane permeability for guaiacyl precursors (Grand; quoted by Terashima *et al*, 1979).

In conclusion, ¹⁴C labelling of wheat straw lignin with phe* or with sin* gives, especially in the dark, lignins either labelled on the 2 main monomers or more specifically on the S units. They are useful for studying the fate of lignin during cell wall degradation.

Agosin E, Odier E, Gaudillère M, Monties B (1982) CR Journ Intern Étude Groupe Polyphenols. *Bull Liaison* 11, 187-195

Terashima N, Okada M, Tomimura Y (1979) *Mokizai Gakkaishi* 25, 422-426

Table I. Labelling of lignin nuclei after phe* or sin* incorporation.

| Treatment | Phe* Light | Phe* Dark | Sin* Light | Sin* Dark |
|-------------------------|------------|-----------|------------|-----------|
| Vanillin KBq/mmol | 49.58 | 69.56 | 68.82 | 94.72 |
| Syringaldehyde KBq/mmol | 51.8 | 58.46 | 247.9 | 398.49 |
| S/V | 1.04 | 0.84 | 3.6 | 4.2 |