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MacKay et al.

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[54] **METHOD OF ALTERING LIGNIN IN TREES**

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[52] **U.S. Cl.** **800/200**; 800/205; 800/230; 800/DIG. 51; 800/DIG. 49; 536/23.6; 47/58

[58] **Field of Search** 800/200, 205, 800/DIG. 51, DIG. 49, 230; 47/58; 536/23.6

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,687,741	8/1987	Farrell et al.	435/189
5,122,466	6/1992	Stomp et al.	435/172.3
5,451,514	9/1995	Boudet et al.	435/172.3

FOREIGN PATENT DOCUMENTS

WO93/24638 12/1993 WIPO .
WO95/27790 10/1995 WIPO .

OTHER PUBLICATIONS

King and Stansfield. Dictionary of Genetics. Oxford University Press, 1985, p. 269.

J. J. MacKay et al.; genetic analysis of cinnamyl alcohol dehydrogenase in loblolly pine: single gene inheritance, molecular characterization and evolution, *Mol. Gen. Genet.* 247:537-545 (1995).

C. Halpin et al.; Manipulation of lignin quality by down-regulation of cinnamyl alcohol dehydrogenase, *The Plant Journal* 6(3):339-350 (1994).

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[57] **ABSTRACT**

Methods of providing and breeding trees having more easily extractable lignin due to the presence of a cinnamyl alcohol dehydrogenase (Cad) null gene are presented.

19 Claims, 12 Drawing Sheets