

INCORPORATION OF ^{14}C -ACETATE AND ^{14}C -MEVALONATE INTO RUBBER IN STEM SLICES OF *HEVEA*

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For developing a procedure for early selection of high yielding *Hevea* clones, experiments were carried out with stem pieces to measure the rate of incorporation of radioactive precursors ^{14}C -acetate and ^{14}C -mevalonate into rubber. Uptake of acetate was found to be twice as high as that of mevalonate. Large variation was observed between the percentage ^{14}C -acetate incorporated into rubber by stem sections from different individuals within the same clone, presumably due to stock-scion interaction. Mature stem pieces (resting stage of flush growth) were more efficient than young ones, the reason being attributable mainly to the differences in dry matter content. Ranking five clones by ^{14}C -acetate incorporation put them into more or less the same order as ranking based on field rubber yield, with exceptions.

Key words : *Hevea*, Rubber biosynthesis, Early selection, Precursors.

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INTRODUCTION

The biosynthesis of natural rubber in plants such as *Hevea brasiliensis* and *Parthenium argentatum* (guayule) has been well studied (Archer and Audley, 1967). Although most of these studies were carried out using guayule, there are evidences for a similar pathway of rubber biosynthesis in *Hevea* also (Kekwick, 1989).

Rubber biosynthesis can be divided into three main stages viz., the generation of acetyl cis-polyisoprene from acetate, conversion of acetyl-co-A to isopentenyl pyrophosphate (IPP) and the polymerization of IPP to cis-polyisoprene units (rubber). The role of acetate as the basic precursor in rubber biosynthesis has been well documented using ^{14}C -acetate (Arreguin *et al.*, 1951; Kuzicka, 1953; Bonner, 1960, 1967 and Lynen, 1967). The role of mevalonic acid as a precursor of rubber biosynthesis (Park

and Bonner, 1958) and its transformation to IPP have been reported (Archer *et al.*, 1963). The polymerization of IPP to cis-polyisoprene has also been demonstrated (Mc Mullen and Mc Sweeney, 1966).

Isotopic carbon introduced as precursors (^{14}C -acetate, ^{14}C -mevalonate and ^{14}C -IPP) has been useful in the study of rubber biosynthesis (Arreguin *et al.*, 1951; Park and Bonner, 1958; Kekwick *et al.*, 1959; Harris and Kekwick, 1961; Woo and Edwin, 1970). The technique of incubation of stem slices with the precursors followed by solvent extraction used for studies on guayule (Macrae *et al.*, 1986) has been followed in the present study with a view to correlate the rubber producing potential of the *Hevea* stem slices with yield and thereby predict the yield potential of *Hevea* plants at the juvenile stage itself.