J. Natn. Sci. Coun. Sri Lanka 1994 22(4): 305-312

2. /. /. 34

IN VITRO CALLUS AND CELL CULTURES OF *GOSSYPIUM HIRSUTUM* L. (COTTON)

K. HIRIMBUREGAMA and N. GAMAGE
Department of Botany, University of Colombo, P.O. Box 1490, Colombo.

(Received: 04 April 1994 ; accepted : 07 December 1994)

Abstract: The leaf, petiole, green stem, immature seed and anthers of *Gossypium hirsutum* L. (cotton) were cultured on the basic Murashige and Skoog (1962) medium (MS), supplemented with different types of growth regulators at varying concentrations. They were cultured in 24 h light and dark conditions separately. Callus formation was observed only on leaf and mature seed explants cultured in light. The morphological and histological characters of the two calluses varied. The calluses were transferred separately to basic MS liquid medium supplemented with 2,4-Dichlorophenoxy acetic acid (2,4-D) and/or Benzyl amino purine (BAP), to develop cell cultures. Cellular and quantitative studies on the cell cultures enabled selection of the most suitable culture for plant regeneration.

Key words: Callus, cell culture, *Gossypium hirsutum* L.

INTRODUCTION

Cotton (*Gossypium* spp, family Malvaceae)[1] is not only important as a fibre crop (seed hair; an elongated epidermal cell) but also as a valuable source of cattle feed after removal of fibre. Regeneration of plants from callus cultures of cotton was reported in 1977 for *Gossypium klotzchianum* L.[2] During the last decade, plant regeneration through somatic embryogenesis has been achieved in economically important cultivars of *Gossypium hirsutum* L. [3-7] that are commercially used in the USA and UK (e.g. Coker 201, 310, 315, 4360 & 78, GSC 25, C8160 & Acal. SJ-2).[8] In previous reports on *in vitro* cultures of *Gossypium hirsutum* L. embryogenic callus has been produced from the hypocotyl and cotyledon. Use o leaves and other parts of the plant have not been reported. The culture mediu in many instances, contained 6-(γ, γ-dimethylallyl-amino)-purine (2iP) a naphthalene acetic acid (NAA).

There are no reports on *in vitro* cultures of the cultivars of cotton used in S Lanka. Cotton can be grown in many parts of the country and can significantl contribute to the economy of the country. The importance of plant regeneratio through callus cultures is that it provides new ways of improving the cotton plan for disease resistance, salt tolerance and higher yields. The objectives of this study were to investigate the feasibility of *in vitro* callus and cell culture development in a local cotton cultivar for possible plant regeneration.

METHODS AND MATERIALS

Plant material: The cultivar selected for the experiment was *Gossypium hirsutum* L. cv. Coker 417. Seeds were germinated at room temperature on filter papers kept in plastic trays. For callus cultures, explants from 7-10d old seedlings and garden grown plants were used to obtain anthers, mature seeds,