the efficiency of insect tracheal system in supply of G_2 during these stressed situations like continuous biting without elevation of anaerobic glycolysis. A sharp increase in the content of acetylcholine (Ach) in head and thorax may be the reason for observed immobility or lack of coordination in movements of ants after biting. Observed hyper proteinemia in ants within a short period of 30 minutes was evidenced by additional bands in electrophorogram.

L 8

Comparative study of three different methods of coconut plumule extraction for embryogenic callus induction

U. Bhavyashree, K. Lakshmi Jayaraj, T.P. Fayas, K.K. Sajini, M.K. Rajesh and Anitha Karun

Central Plantation Crop Research Institute, Kasaragod 671124

A protocol was standardized to obtain maximum embryogenic calli from plumule culture. In the present study three different plumule extraction methods were carried out, *viz*., i) Plumule extracted aseptically from *in vitro* germinated embryo after 10-12 days (T_1). ii) Plumule extracted from germinated embryo subjected to GA_3 treatment after 5 days (T_2). iii) Plumule extracted from fresh embryo (T_3). The primary calli induction from the T_1 was 21%, T_2 27% and T_3 79% respectively. However the calli formed from T_3 had 56% of embryogenic calli. The calli obtained from sliced embryos formed less percentage of embryogenic calli because of the presence of cotyledonary tissues which inhibits multiplication of meristematic tissues. In the case of plumule extracted from GA_3 treated embryos, non embryogenic calli was more compared to fresh plumule. It was found that the addition of GA_3 in the initial stages inhibits the formation of embryogenic calli and favors direct shooting. Currently this protocol is employed for scaling up the planting material production from released varieties of coconut.

L 9

Histological studies of somatic embryogenesis of coconut plumule derived callus

K. Lakshmi Jayaraj, U. Bhavyashree, T.P. Fayas, K.K. Sajini, M.K. Rajesh and Anitha Karun

Central Plantation Crop Research Institute, Kasaragod 671124

Somatic embryogenesis is a regeneration system that leads to the formation of bipolar structures resembling zygotic embryos from somatic cells. It is a useful approach for thelarge-scale micro propagation of plant species, such as coconut,that have no natural vegetative propagation system. During somatic embryogenesis, several cellular changes occur inside the tissues. Since coconut is one of the most recalcitrant species to generate *invitro*, it is necessary to study in detail about the cellular changes that occur during the somatic embryogenesis to improve the culture strategies for better response. In the present study, coconut plumules were used as an explant for

in vitro regeneration studies, which consisted of the shoot meristem including leaf primordia. Histological studies were carried out in different stages of plumule culture.No apparent growth was observed in 15 days old cultures. After 30 days, morphological bulging and histological initiation of cell division from actively dividing meristematic cells were observed. Proliferation of meristematic cells leading to the development of callus structures was observed after 45 days. After 75 days globular friable callus were observed and histological studies revealed the presence of meristematic centers which eventually formed somatic embryos. Histological studies were also carried out for certain abnormalities like compact calli, abnormal somatic embryoids and rudimentary shoots with multiplied roots. Itrevealed the presence of intact cotyledonary leaves which seemed to inhibit the apical meristem development of somatic embryoids. It was also observed that the presence of vascular bundles in the early stages of callus formation may lead to the direct formation of meristemoids. These results could aid future studies leading to enhanced control of the somatic embryogenic process and greater efficiency of somatic embryo and plantlet formation in coconut.

L 10

Antioxidant and cytotoxic potential of urushiol

Ayana Ravi and Oommen P. Saj
Dept. of Botany, University College, Thiruvananthapuram

Holigarna arnottiana belongs to the family Anacardiacea is allergic to human. The urushiol is a polyphenolic compound isolated from the plant is the allergenic principle. The biological activity of Urushiol was tested by MTT assay, cytotoxic activity in breast cancer cells like MCF-7. The result showed positive result with a concentration based effect.

L 11

Antibacterial properties of epidermal mucus extract of fresh water eel, *Anguilla bicolor bicolor* (McClelland, 1844)

K.P. Prajeena, J.R. Jithine and G. Prasad
Department of Zoology, University of Kerala, Kariavattom Campus, Thiruvananthapuram-695581

The epidermal mucus secretions in fish provide first line of defense against bacteria, virus, fungi and parasites. Antimicrobial agents in the mucus bind to microbes and destroy it. There are reports of antimicrobial activity of mucus against a wide range of microorganisms from different fish species. It varies from species to species and can be specific towards certain bacteria. The present work aims to screen the antimicrobial activity of the mucus extracts of fresh water eel, *Anguilla bicolor bicolor* against selected human pathogenic bacteria.

The mucus samples were mixed with known volumes of distilled water and acetone for separating the compounds. Antimicrobial activity was screened against five human pathogenic bacteria following the standard disc diffusion method on agar plates. The antimicrobial activities of both