

ABSTRACT

In the first part of the thesis Pinus caribaea plantations at Erabadde (Gurotalawa), Kottawa (Galle) and the Pinus patula plantation at Nuwara Eliya were investigated. These studies were mainly directed towards investigating the possibility of commercially exploiting the plantations for oleoresin production. Here oleoresin output, turpentine content of oleoresin and chemical composition of oleoresin products were investigated.

Studies showed that the trees varied markedly from one another with respect to oleoresin output and the girth of the tree was not related to oleoresin yield. Based on these studies the trees may be divided into three categories. (1) good trees, those that produce good yields at all times (2) unsuitable trees, those which produce little or no oleoresin and (3) the majority (75%) of trees which produce average yields of oleoresin under favourable conditions. Although systematic tapping of the trees of the plantation may not be feasible, selected slaughter tapping could form the basis for an industry for producing resin and turpentine.

The average turpentine content at the Erabadde plantation was about 18 to 20%, while the plantation at Kottawa and Nuwara Eliya had a mean value of 12.6% and 15.2%. Gas liquid chromatography was used to study the turpentine composition. The major chemical component of turpentine was α -pinene (75 - 85%) and the second major component appeared to be β -challandrene. The major component of P. patula was β -challandrene (70%) the next highest being longifolene (12%). The turpentine composition of P. monotezumae (69% β -challandrene) and P. insularis (97% α -pinene) growing under Sri Lanka condition was also studied.

Studies on the constituents of resin indicated that the major constituent of P. caribaea oleoresin is not abietic acid but d and laevo pimaric acid.

The second part of the thesis deals with total alkaloid and quinine content of Cinchona trees which are the remnants of old plantations. The striking feature of this study was that samples collected from Sorlande, Dambatana and Nuwara-Eliya had over 10% of quinine as quinine sulphate. The extraction of alkaloids from the bark of Cinchona with chloroform, ethanol, methanol, petroleum ether, 5% sulphuric acid, ethanol-benzene, methanol-benzene and ethanol-petroleum ether is compared with that of benzene by estimating quinine contents. The results indicate that highest yields are obtained with a 1:1 mixture of ethanol-benzene.

Contained in the appendix of this thesis are details of spectroscopic data, on the constituents of the oil of Pinus species and the alkaloids of Cinchona species. These results confirm the identifications made in part I of the thesis by retention data techniques.