ABSTRACT

The present thesis entitled "Application of Physical Methods to the study of Essential Oils" comprises of five chapters:

CHAPTER I : This chapter is an introductory one and traces the development of essential oil and the role of India in its past and present status. A brief resume of the work done has been given along with the methods available for the analysis of essential oils and the methods used in the present investigations.

CHAPTER II : It gives an account of the applications and importance of column, T.L.C. and Gas chromatography to the study of essential oils and enumerates the composition of the essential oils of Boswellia serrata, Achillea millefolium, Garuga pinnata and Careya arbora. The essential oils of Boswellia serrata has been found to contain: p-cymene 2.0%, d-limonene 3.88%, d-\(\alpha\)-thujene 31.8%, terpineol 13.4%, bornyl acetate 2.5%, \(\alpha\)-terpinolene 19.92%, methyl chavicol 4.46% and d-\(\alpha\)-phellandrene 5.2%. The essential oil of A. millefolium consists of:\(\alpha\)-pinene (7.85%), \(\beta\)-pinene (26.0%), \(\beta\) Caryophyllene (13.0%) d-\(\alpha\)-phellandrene (1.30%) d-\(\alpha\)-thujene (2.44%), d-limonene (1.98%), linalyl acetate (0.78%),
1,8- cineole (8.50%), azulene (25.90%) and borneol (2.10%).

The essential oil of *G. pinnata* has been found to have myrcene (2.45%), d-limonene (2.25%) α-pinene (10.78%) d-α-phellandrene (1.84%), cadine (3.7%), d-linalool (3.88%), methyl chavicol (5.48%) p-cymene (3.38%) methyl haptanone (18.63%) nerol (2.39%), terpineol (11.36%) eugenol (15.5%), and geraniol (5.17%). The essential oil of the flowers of *Careya arbora* has been studied and found to have the following constituents: caryophyllene (1.60%), p-cymene 1.50%, d-α-phellandrene 4.88%, d-limonene 0.50%, methyl chavicol 3.50%, citral 9.0%, 1,8-cineole 64.30%, terpineol 6.60% and citranellal 1.40%.

**CHAPTER III**: It consists of the quantitative estimation of (1) methyl chavicol (2) caryophyllene (3) d-limonene and (4) linalool by U.V. absorption spectroscopy in the essential oils by optical density measurement at the wavelength of maximum absorption. The I.R. spectroscopy has been applied for the identification and confirmation of the constituents of essential oils isolated by column chromatography.

**CHAPTER IV**: It describes the quantitative estimation of certain constituents of the essential oils by the application of various colour reactions. The colour reactions have been utilised for the estimation of the following terpenes (1) d-limonene (2) 1,8-cineole (3) eugenol (4) citral (5) α-terpineol and (6) linalool.
CHAPTER V: This chapter deals with Polarographic methods for the study of the following constituents: (1) 1,8-cineole (2) citral (3) α-pinene and (4) d-limonene