NRCP Research Journal
Vol. 3, No. 2, July-September, 1993

# STUDIES ON THE UTILIZATION OF CITRUS WASTES

FELICIDAD E. ANZALDO and ANNABELLE V. BRIONES
*Perpetual Help College of Rizal, Las Piñas, Metro Manila, Philippines*
*Industrial Technology Development Institute*
*Department of Science & Technology, Bicutan, Tagig, Metro Manila, Philippines*

## ABSTRACT

***The volatile oil was removed from the wastes of calamansi (Citrus microcarpa Bunge), suha (Citrus grandis L.) and dalanghita (Citrus aurantium L.) by hydro-steam distillation and by expression. Hydro-steam distillation gave the highest yield. The physicochemical properties of the oils were also determined. Distilled oils have higher values of acid and ester numbers with lower values of specific gravity and refractive index than the expressed oils. Identification of the chemical constituents was done by thin-layer chromatography, gas-liquid chromatography and infra-red spectroscopy. The results showed the presence of limonene, citral, geraniol, $\alpha$- pinene, $\beta$ - pinene, terpineol and geraniol.***

***The residues after distillation of the volatile oil were utilized for the production of pectin. The results recorded a yield of 5.51% for dalanghita, 4.26% for calamansi and 1.34% for suha. The product obtained conforms with the specifications set by the United States Pharmacopeia XXII (1990) and are classified as rapid-set type.***

***Utilization of oil-free citrus wastes for carotenoid production was also done. The highest yield of carotenoid content was observed in calamansi as compared to suha and dalanghita.***

## INTRODUCTION

Citrus is one of the most popular fruits in the country. Likewise it is considered as an important crop and a top dollar-earner industry.

Citrus is chiefly utilized for its pulp and juice but the rind, pressed pulp, covering each individual segment of the edible portion, and seeds are considered as wastes. To a small extent, the rind has been made into confections. The average annual per capita consumption in the Philippines is approximately 7.0%. During peak season there is an abundant supply of these fruits. Thus, it is the aim of this project to find means of producing from these otherwise waste commodities into marketable goods such as volatile oils, pectin, and carotenoids. The commercial utilization of these wastes has aroused interest for the production of scents, flavors, jelling agents and colorants. Most of our