212/B

Investigation of oil content and chemical composition in effluents of cinnamon (*Cinnamomum verum* Prsl.Syn. *C. zeylanicum*) leaf oil industry

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Distillation of Cinnamon *(Cinnamomum verum Prsl.Syn. C. zeylanicum)* leaf oil, carried out widely in the southern part of Sri Lanka, is the largest essential oil industry in the island. Export value and volume of Cinnamon leaf oil was 131.3 million rupees and 187.7 metric ton in 2005 in Sri Lanka. It is extracted by steam distillation and in this process, some oil is found in the aqueous effluent of the distillation unit. These are collected in large vessels and fed into the boiler in a subsequent distillation process to increase oil yield. In addition, oil deposited at the bottom of vessels with effluent is collected after 100 – 150 runs and is also marketed. Therefore, this study was carried out to determine the oil content and chemical composition of oil extracted from effluent and heavy oil at the bottom of effluent tanks. Three effluent water samples and heavy oil samples of 8 liters and 10 mL respectively, were collected randomly from cinnamon leaf oil distillation units in the Galle district. Effluent water samples were distilled in the laboratory and percentage of average oil content in effluent water was determined. The oil samples were analyzed using Gas Liquid Chromatograph (SHIMADZU GC-8A) equipped with Flame Ionization (FI) detector and 10% carbowax 20 M WAW column. The average concentrations of different chemical constituents identified were taken and the colour of both samples was determined visually. The oil extracted was golden yellow; whereas heavy oil was dark brown in colour due to oxidation of some constituents. Average concentrations of cinnamicaldyhyde and eugenol of the extracted oil from effluent water was 49.69% and 48.37% respectively. Major chemical constituent of heavy oil collected from tanks was eugenol with an average concentration of 89.29%. Average oil content in the effluent water of cinnamon leaf oil industry is 1.41 g/L and approximately 1.06 – 1.20 kg of oil is lost per batch in existing cinnamon distillation units. The introduction of improved and efficient oil distillation units is suggested as a necessity in place of current systems in the country.

Keywords: cinnamon leaf oil, effluent water, cinnamicaldyhyde, eugenol