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Investigation of Optimal Thermal Parameters During Distillation of Essential Oils from Herbs

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Abstract

Essential oils and aromatic plants have long been used throughout the world in foods, fragrances, perfumery, cosmetics and medicines. In the last decade, these potent natural remedies have gained enormous popularity in industrialised countries particularly in the multi-million-dollar aromatherapy business. Different methods like distillation, cold expression and solvent extraction etc are used for essential oils extraction. Out of all these methods, distillation methods have advantage of extracting more refine essence of the plant materials and herbs by evaporating volatile material. Due to complicated and sensitive thermal processes, distillation techniques are only limited at commercial scale. The main object of the paper is to develop simple and best methodologies for easy adaptation of these techniques. The trials are involved in the "LILAC" project investigations and possibilities to promote small scale agro-industrial processing. The laboratory apparatus comprised of electric heater of 250 watts, round glass boiler having 2 liters capacity, glass still tube, condenser and Florentine flask. The laboratory experiments were carried out with the help of insulated glass distillation unit. In each experiment, 100 gram of the herb material was used. The energy consumptions of different herbs for water and steam distillation were determined with the help of energy meter. The optimal thermal and physical parameters were recorded for different herbs. The process curves for different medicinal, culinary herbs were also drawn against different energy levels and compared. The heat energies required to extract one ml of essential oil of cloves buds, fennel, cumin, melissa, patchouli, cassia, orange peels, lavender, peppermint were found to be 0.19, 0.75, 050, 4.44, 4.01, 2.22, 4.15, 2.95, 3.33 kWh respectively. It was also concluded that fresh herbs gave better extraction results with comparatively low process heat requirement. Consequently, these results are helpful in adaptation of distillation technology at commercial scale.

Keywords: Aromatic plants, cold expression, essential oils, solvent extraction

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