

Income generation of rural community by using solar distillation system and eliminating the role of middle man

Arslan Afzal^{1*}, Anjum Munir¹, Prof. Dr. Oliver Hense², Abdul Ghafoor¹, Asif Hanif³

¹Faculty of Agricultural Engineering & Technology, University of Agriculture, Faisalabad-Pakistan

²Department of Agricultural Engineering, University of Kassel, D-37213, Germany

³Department of Chemistry, University of Agriculture, Faisalabad-Pakistan

Corresponding Authors Email: arslan2175@hotmail.com

Abstract

Processing of different herbs by distillation technique was one of the agro-based industries which lies in medium temperature range (60-280 °C). This study has been carried out for essential oils extraction using solar distillation system as well as to perform the quality analysis of eucalyptus leaves (*comaldulensis*) essential oils using GC-MS analysis for income generation of rural community. The solar distillation system consists of a primary reflector (10 m² Scheffler concentrator), a secondary reflector, steam receiver, distillation still, condenser and Florentine flasks. Results have shown that the essential oils from 10 kg fresh eucalyptus leaves (*comaldulensis*) for different experiments were extracted to be 29.7, 30, 28.2, 29.9 and 30.2 ml. The heat energy consumed during distillation experiments was calculated to be 2.998, 2.745, 2.888, 2.816 and 2.418 kWh. GC-MS analysis shows that eucalyptol (C₁₀H₁₆ O) was identified as the most dominant compound of eucalyptus leaves (*comaldulensis*) essential oil (50.91%), which can effectively be used for making different medicines. This is the great opportunity of small scale farmer to on-farm solar industry for income generation of rural community. The promotion of on-farm processing and value addition of agriculture produces will enhance income of rural community thus reducing rural to urban migration and eliminating the role of middle man.

Keywords: Scheffler concentrator, Solar distillation system, essential oil, GC-MS analysis, income generation.