

UTILIZATION OF CITRUS PEEL WASTE AS A SOURCE OF ESSENTIAL OILS AND CELLULOSE: A SUSTAINABLE PRODUCTION AND ENVIRONMENTAL SOLUTION

Sudarminto Setyo Yuwono¹, Imro'ah Ikarini^{1,2*}, Widya Dwi Rukmi Putri¹, Christina Winarti², Naila Syakira¹

¹Department of Food Science and Biotechnology, Faculty of Agricultural Technology, Brawijaya University, Malang, 65145, Indonesia

²Research Center for Agroindustry, National Research and Innovation Agency, (BRIN), Soekarno Integrated Science Center, Bogor, 16911, Indonesia

imro006@brin.go.id

Citrus peels are produced by the citrus drink industry and end up as industrial waste. The essential oil compounds contained in citrus peels have many benefits for various industries, such as pharmaceuticals, food, and cosmetics. The volatile compounds in citrus peels, including limonene, linalool, and β -pinene, have antimicrobial potential, so they can be used as food preservatives. The strong citrus aroma of citrus peels is very suitable for adding to food and cosmetic products. The citrus peel residue after essential oil extraction still contains cellulose, which holds significant potential for utilization in various food applications. This study aims to develop an effective and sustainable extraction technique to use citrus peel waste to produce valuable products, such as essential oils and cellulose. The essential oil extraction process was conducted by comparing ohmic heating and conventional distillation methods. The results showed that the ohmic heating method yielded 14.824% essential oil, whereas the conventional method yielded 6.953%. The remaining citrus peel waste after distillation, which still contains cellulose, was further extracted using the hydrolysis method, revealing a cellulose content of 4.32% and hemicellulose of 8.38%. The results of this study are expected to contribute to reducing organic waste through the utilization of orange peel as a source of raw materials for essential oils and cellulose. Produced essential oils and pectin through efficient and environmentally friendly methods, this study is expected to open up new opportunities for the industry to create innovative products with high value.

Keywords: citrus peel, cellulose, essential oil, ohmic distillation, waste