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OIL EXTRACTION FROM SPENT COFFEE GROUND (SCG) USING HYDROUS ETHANOL AT DIFFERENT EXTRACTION TIME

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ABSTRACT

Coffee is a well-known beverage all around the world. It was because coffee included caffeine, which can give you the energy you need to sleep. The coffee beans are being processed, and nearly half of them will end up as wasted coffee grounds (SCG). Every year, approximately 9 million tonnes of SCGs are created worldwide, and they are inappropriately disposed of. It has become one of the issues leading to global pollution. As a result, an experiment was carried out to extract oil from SCGs using hydrous ethanol as a solvent and hand extraction at varied extraction intervals of 10 minutes, 20 minutes, 30 minutes, 40 minutes, 50 minutes, 60 minutes, 70 minutes, and 80 minutes. Throughout the trial, the maximum percentage yield was recorded at 60 minutes with 5.34% of coffee oil.

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1.1 Introduction

Spent coffee grounds (SCG) are produced daily, and approximately 9 million tones of coffee are produced globally every year (Loyao et al., 2018). Spent ground coffee (SCG) is made from organic coffee leftovers. Coffee is one of the most popular beverages in the world, but it has a great financial and environmental cost due to SCG. SCG includes oil in the range of 10-15% by weight, depending on the variety of coffee. The spent coffee grounds contain a high concentration of cellulose, approximately 8-15 percent, lignin, approximately 20-30 percent, lipids, approximately 7-21 percent, protein, approximately 13-17 percent, hemicellulose, approximately 30-40 percent, and ash, approximately 2 percent (Karmee, 2018).

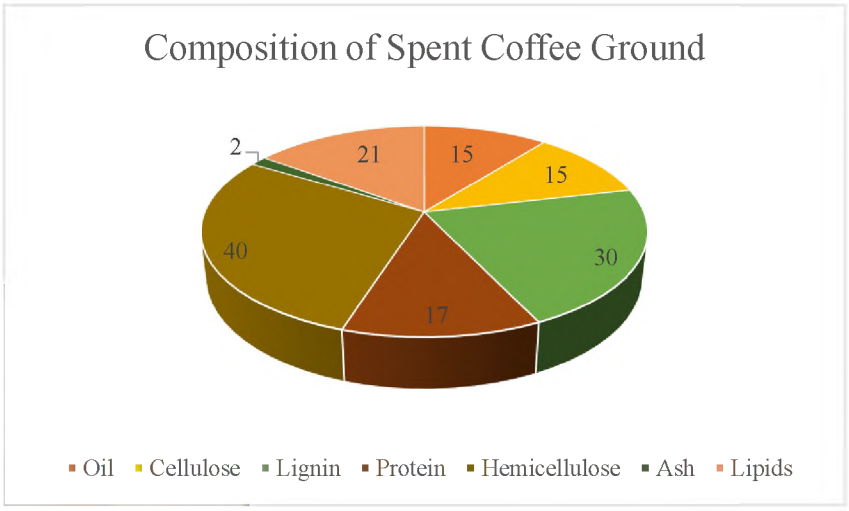

Figure 1: Compositions of Spent Coffee Ground

Globally, research has been performed to minimise SCG. One of them is extracting oil from used coffee grounds. Manual Extraction is one of the methods used to extract the oil, whereas it is the wet SCG that will go through various procedures, including a drying process for 24 hours, extraction using manual extraction, separation using a basic distillation process, and heating for 6 hours to eventually get the oil (Somnuk et al., 2017). The extracted oil from SCG will be considered a good vegetable oil production that can produce various novel multipurpose items, including cosmetics and

commercial medicinal purposes (Bijla et al., 2022).

Because wasted coffee grounds (SCG) are a solid waste by-product of coffee bean consumption, the amount of SCG produced each year will have an impact on our environment. Almost all SCGs will be disposed of in landfills, contributing to waste issues (Efthymiopoulos et al., 2019). We explored how to extract the oil from the SCG and transform it into something extremely beneficial in the future, such as skin care products, health supplements, biodiesel, and much more, in order to prevent pollution to the environment and save the earth. The goal of this research was to extract oil from spent coffee grounds (SCG) using hydrous ethanol at various extraction times and measure the percentage yield of coffee oil.