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TITLE:

**OIL EXTRACTION FROM SPENT
COFFEE GROUNDS (SCG) USING
ISOPROPANOL AT
DIFFERENT EXTRACTION TIME**

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2023

ABSTRACT

Coffee was one of the most well-known beverages in every region of the world. It was because coffee, which contains caffeine, might provide energy to keep one up at night. After that, the coffee beans went through processing, during which about half of them were turned into trash in the form of a spent coffee ground. Every year, around 9 million tonnes of SCGs are created worldwide, and the waste is disposed of improperly. It evolved into an issue among those leading to the world's contamination. As a result, an experiment was carried out to extract oil from the SCGs by utilising isopropanol as the solvent and applying manual extraction at several times of extraction, including 15 minutes, 30 minutes, 45 minutes, 60 minutes, 75 minutes, and 90 minutes respectively. The experiment lasted for a total of 120 minutes, during which time the highest percentage yield (11.83% of coffee oil) was produced at the 60-minute mark.

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CHAPTER ONE

BACKGROUND

1.1 Introduction

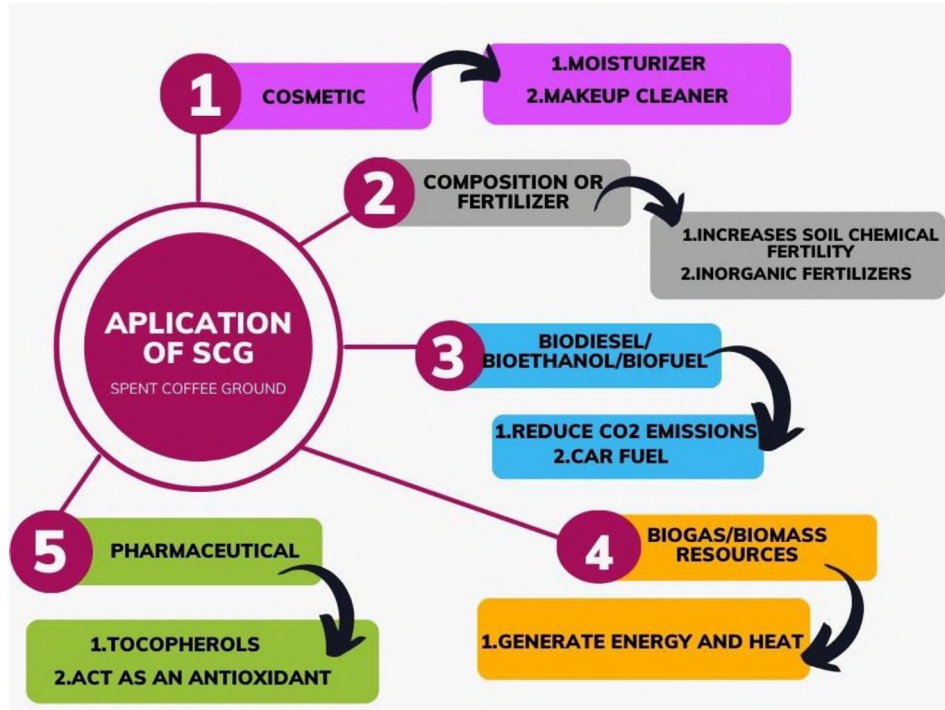
One of the world's most essential and usual beverages now is coffee (Birkenberg & Birner, 2018). This can be proved by new cafes are opening downtown or out of town. Coffee was also listed as the second-largest seller in the world_(Buratti et al., 2018)). There was an increasing interest in proposing sustainable and profitable applications for SCG. Studies point to several important components that can be extracted from SCG structure, such as bioactive compounds (López-Linares et al., 2021). SCG is the leftover brewing material that must be appropriately disposed of. A large-scale production line for coffee extraction and spray drying of coffee beans was established by Nestle, a Swiss business that produced the first instant coffee in the world under the brand name NESCAFE in 1938.

These substances exhibit strong antioxidant, anti-carcinogenic, anti-allergic, anti-inflammatory, anti-microbial, and anticancer effects in addition to advantageous neuroprotective properties (Ramón- Gonçalves et al., 2019). Bioactive compounds contained in SCG have commonly been extracted using traditional extraction methods, such as autohydrolysis, boiling extraction, extraction with polar or intermediate polar solvents (ethanol or methanol), or Soxhlet extraction with hexane. To conclude, we can use the spent coffee ground (SCG) for various purposes if we make the most of it. The primary goal of this study is to demonstrate the oil extraction from spent coffee grounds (SCGs) using 2-propanol as a solvent at various extraction times and characterize the oil by recognize functional group by using FTIR.

This review aims to use existing knowledge of SCG and its components in developing a biorefinery platform to add value to this inexpensive waste product. This

research is done to prove that there is oil in SCG. This little study has explicitly concentrated on using 2- propanol as a solvent to extract the oil.

1.2 Literature Review



1.2.1 Application of Spent Coffee Ground

The oil extracted from SCG has several advantages of which we are unaware. The oil has various possible uses, including producing various cosmetic items. Cosmetics utilizing wasted coffee oil were produced as an effective and risk-free makeup removal solution, and customers' preferences were also considered throughout this process (Xivivadh K et al., 2022). It has been shown that the waste product of discarded coffee grounds may be valorized into a more valuable commodity, such as safe and effective cosmetics (Lourith et al., 2022). Linoleic acid-rich spent coffee oil, as a specialty material for skin lightening and antiaging cosmetics, is objectively to be presented (Kanlayavattanakul et al., 2021). As reported in the previous research, it has been demonstrated that the oil extracted from used coffee grounds is suitable for producing makeup remover products due to its high nutritious content.

In addition to being used in the cosmetics industry, the oil obtained from the extraction of used coffee grounds has potential use to improve the mineral nutrition in food plant (Cervera-Mata et al., 2019). Moreover, phenolic compounds from coffee oil have been studied due to their beneficial effects on human health, as its protection against chronic degenerative diseases (cataracts, macular degeneration, neuro-degenerative diseases, and diabetes mellitus) (Ballesteros et al., 2017). The use of the oil can produce tocopherols that are rich in vitamin E and perform the function of an antioxidant by