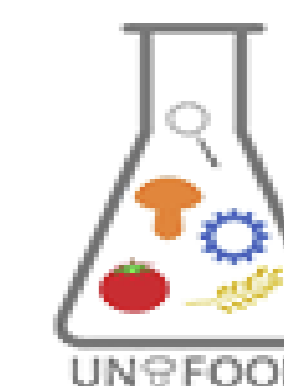


COMPARISON OF MICROWAVE-ASSISTED, SUBCRITICAL WATER, AND HIGH VOLTAGE ELECTRIC DISCHARGE EXTRACTION EFFICIENCY IN PRODUCTION OF DILL SEED EXTRACTS



UNIFood Conference

September 24th-25th 2021 University of Belgrade

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Anethum graveolens L. commonly known as dill is a plant native to the Mediterranean and West Asia. Dill is one of the most popular aromatic spices, but it is also cultivated throughout the world as a medicinal plant. Although the majority of the research is focused on essential oils, it has been proven that ethanolic and aqueous extracts of dill also possess significant pharmacological activity. It has been reported that the extracts of dill seeds exhibit diuretic, spasmolytic, antifungal, anti-inflammatory, antidiabetic, antioxidant, and anticancer activity. Considering the highly significant biological potential of dill seed, there is a constant need for the improvement of extraction methods for obtaining dill extracts. Three green, innovative extraction methods were applied, and the efficiency of the methods was measured by the yield of the extraction, content of total phenols, total flavonoids and the antioxidant activity of the extracts.

Microwave assisted extraction (MAE) was conducted on five different temperatures (40, 60, 80, 100 and 120°C) and two different times of extraction (5 and 10 min). Subcritical water extraction (SWE) was conducted also on five different temperatures (100, 125, 150, 175 and 200°C). Lastly, high voltage electric discharge (HVED) extraction was conducted on three frequencies (40, 70 and 100 Hz) and three extraction times (1, 5 and 15 min). The content of total phenols was in the range from 66.98 to 145.66 mg GAE/g DE (dry extract). The lowest yield was achieved by using HVED 66.98 mg GAE/g DE, whereas higher recovery was achieved with subcritical water (126.24 mg GAE/g DE). However, the most efficient extraction was MAE using temperature of 40°C for 10 min (145.66 mg GAE/g DE). It was established that using environmentally friendly solvents and relatively simple and inexpensive equipment can provide dill extracts rich in hydrophilic bioactive compounds in a short extraction time.

