

Parameter Screening in Ethanolic Extraction of Total Phenolics Extracts from *Sesamum Indicum L.* Using Single Factor and Two-Level Factorial Design

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EXTENDED ABSTRACT

Sesamum indicum L. is an herbaceous plant from the family of *Padaliacea* grown in tropical and subtropical part of the world. There are up to 20 species from this genus, usually grown due to the high protein from their seeds and the edibility of their leaves. It is a self-pollinated plants usually grown on annual basis with multi-branching stem network with an average height of about 1.25m [1]. This plant has shown a remarkable use as food and in disease prevention and this is due to the presence of a significant amount of gamma-tocopherol and vitamin-E.. Nahar and Rokonzaman, [2] tested the ethanolic extracts of *Sesamum indicum* on an acid-induced writhing modeled mice. Their study confirmed the ability of the extracts to inhibit writhing as comparable with the standard drug called ibuprofen. The aforementioned medicinal properties of the extracts against oxidative diseases are dependent on the total phenolic content present in different extraction conditions. The needs then arise to extract and investigate the effect of extraction parameters on the total phenolic content. This study therefore investigated the effects of five microwave extraction parameters on the total phenolic content using the single factor experiment and two-level factorial design. The investigated parameters include irradiation time (1-5 min), microwave power (400-800 W), temperature (60-90°C), solvent-feed ratio (8-12 mL/g) and ethanol concentration (%). The result obtained indicated that irradiation time (7.12 %), microwave power (13.63 %), ethanol concentration (37.03 %) and the overall model have a significant contribution to the microwave refluxation of total phenolic content in *Sesamum indicum L.* leaf. Pareto chart (Fig.1) is a simple vertical bars used in the ranking of each extraction factors in the order of significant contribution. It revealed ethanol concentration as the most significant extraction factors above the bonferroni limit of 8.37517 and t-value limit of 3.18245. However, temperature was found to be far below the t-value limit and it's therefore an insignificant factor in the extraction of total phenols from *Sesamum indicum L.* The higher contribution of ethanol concentration to the total phenol yield could be attributed to the interaction between the extracting solvent and pepper matrix. The use of a binary mixture of water and ethanol therefore posses dielectric constants (63.18) which makes them absorb sufficient energy for an increased total phenols and hence increased extraction efficiency.

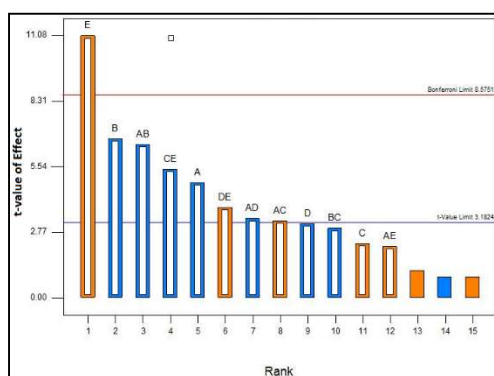


Fig.1. Pareto chart showing the significance of each factor

Acknowledgment:

This study was supported by Research and Innovation Department through the grant PGRS-160320.

References

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