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Extraction of Antioxidant Compounds from Olive (*Olea europaea*) Leaf

A thesis present in partial fulfilment of the requirements for the degree of

Master of Technology in Food Technology

At

Massey University, Albany, New Zealand



MASSEY UNIVERSITY

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2011



Abstract

Olive leaves are by products of olive oil industry, which are also regarded as a rich source of antioxidants. The objective of the present work was to extract antioxidant compounds from olive leaves. The effects of extraction conditions on the total phenolic content were investigated. Three extraction methods were used in this research for recovery of phenolic compounds from olive leaves. A multilevel experimental design was implemented with the aim of optimising the recovery of phenolic compounds from olive leaves by using nontoxic water/ethanol-based solvent. The factors considered were (i) the extraction time, (ii) the extraction temperature, (iii) solvent: solid ratio and (iv) the ethanol concentration. The results suggest that a good recovery of phenolic compound from olive leaves may be achieved at 40°C with a solvent/ solid ratio of 30:1 and ethanol concentration of 80 % (v/v). Drying of fresh leaves before extraction is highly recommended to achieve better recovery of important phenolic compounds including oleuropein. Ultrasonic probe may be useful to improve extraction efficiency and also reduce extraction time. The quantitative and qualitative determinations of phenolic compounds were performed by high-performance liquid chromatography (HPLC), which revealed that oleuropein, luteolin-4-O-glucoside, luteolin-7-O-glucoside and apigenin 7-O-glucoside were the major phenolic compounds present. In this study phenolic compounds extracted from olive leaves of two cultivars (Frantoio & Barnea) were analysed. A comparison among two cultivars shows quantitative differences in some phenolic compounds. The antioxidant capacities of the extracts were evaluated by measuring the radical scavenging effect on 1, 1-diphenyl-2-picrylhydrazyl (DPPH) free radical and by using Oxygen Radical Absorbance Capacity (ORAC). Olive leaf extracts exhibited high antioxidant capacity which suggests olive leaf extract is effective in the function of scavenging free radical. The stability of olive leaf extract stored at four temperatures has also been investigated. The results show increasing temperatures caused greater extent of degradation of phenolic compounds. The best storage condition for olive leaf extracts was at -20 °C in absence of light and oxygen.



Acknowledgments

This thesis would not have been possible without the guidance and the help of several individuals who in one way or another contributed their valuable assistance in the completion of this study.

First and foremost, I would like to express my deep sense of respect, gratitude and appreciation to my supervisor A. Prof. Marie Wong for her invaluable guidance and constant support throughout my study. I really appreciated your patience and making yourself available at any time I needed. Thanks for your encouragement and helps with my English.

I would like to offer my special thanks to the director of “The Village Press”, Wayne Startup for providing funding, supplying olive leaf samples for this project. Thanks for offering me a chance to visit your factory, which was memorable experience I have ever had. Thanks for the valuable time you shared in this project.

I wish to express sincere gratitude to Helen Matthews, Rachel Liu, and Yan Wang for helping out in sorting chemicals and instruments. Many thanks for your kind assistance in laboratory works, and also for providing training on the use of instruments. I would also like take opportunity to thank Sue Pearce for her administrative support.

I am also grateful to Jenkins Ogwaro for not only being wonderful friend and classmate, but also for selfless helping me out with my experiments. Thanks to Jenkins for being such a good company in the laboratory and sharing his invaluable ideas and thoughts. I wish to thank Noriza for her generous and kindness to offer me priority to use HPLC.

In a special way, I wish to convey gratefulness to Yanlin Dong, Gracie Xiao, Rachel Liu, for their true friendship which has helped to bring out the best in me.

I would like to acknowledge my family, my parents and my sisters for being my source of inspiration. My special thanks to my beloved daughter, Nancy and my husband, Wenxing, for their love, support and understanding.



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