

THE INFORMATION OF NEW CONTRIBUTIONS OF THE THESIS

Title of thesis: “*Research of the technology to separate catechins from the green tea (Camellia Sinensis L.) transformation to creat the derivative O-Acetyl catechin and investigate their free radical scavenging activity*”

Speciality: **Organic Chemistry**;

Code: **62.44.01.14**

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Year:

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The dissertation has been carried out at Institute of Industrial Chemistry of Vietnam

Summary of new contributions of the thesis:

1. A technology process on the pilot level to extract catechins in the green tea by using a continuous liquid/solid back flow extraction technique has been set up. The process when compared with the ethanol extraction method by Soxhlet method gave the result: The concentration of EGCG in catechins was 50.62% when extracted with ethanol and was 53.67% when extracted by water; But the yield of total catechins extracted by water reached 12.5% higher than extracted by ethanol (9,4%). The continuous back flow extraction by water has the highly advantage in term of scale, time, solvent costs and biological safety. This is the first time in Vietnam a pilot-scale process using the continuous liquid/ solid back flow extraction has been carried out and set up in the aim to separate catechins from the green tea.

2. The separation efficiency of chromatographic methods for the separation of EGCG with various chromatographic phases such as the normal, the reverse phase, the adsorption/desorption have been investigated and compared. Based on the ratio of total catechins/column diameters multiplied the separation efficiency to select the specific column for EC, EGC, ECG, EGCG from the total catechin. A purification process of catechins from the total catechins of the green tea using HPLC high performance liquid chromatography was performed using Diaion HP20 SS and Sephadex LH 20 with a separation efficiency of more than 90%, catechins have a purity of $\geq 95\%$, quality suitable for the pharmaceutical uses. For the first time, the high pressure liquid chromatography using Diaion HP20 chromatography separator and chromatography column Sephadex LH20 was applied and tested in the semi-industrial production in

Vietnam.

3. The ability of the free radical scavenging activity EC_{50} of catechins in the green tea has been evaluated with EC, EGC, EGCG respectively 7,08; 4,60; 5,00 $\mu\text{g/ml}$. The result showed that hydrogen-aren groups in the catechin structure play an important role in the antioxidant activity of these substances.

4. The semi-synthesis of O-acetyl derivatives of EC, EGC and EGCG catechins has been investigated without the use of pyridine as solvent. The free radical scavenging of acetate derivatives has been evaluated and compared to the original catechins, resveratrol. The acetyl derivatives have a reduced the free radical scavenging activity against radical catechins but remain high: EC O-acetyl; ECG O-acetyl and EGCG O-acetyl have an EC_{50} value of 45.64 $\mu\text{g / ml}$ respectively; 52.99 $\mu\text{g / ml}$ and 34.58 $\mu\text{g/ml}$. The decrease of the free radical scavenging activity of the O-acetyl catechins increases the stability of these substances.

The research used a new technology mentioned above has a high scientific and practical significance. This is a new research direction in Vietnam, having a very promising application in the pharmaceutical industry. The research results have been published in the international and domestic journals.

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