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## ENZYMOMOLOGY AND MOLECULAR BIOLOGY

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**The effect of natural deep eutectic solvent on laccase catalyzed polycatechin synthesis**Ayse Ezgi Unlu<sup>1,2</sup>, Brinda Prasad<sup>1</sup>, Kishan Anavekar<sup>1</sup>, Paul Bubenheim<sup>1</sup> and Andreas Liese<sup>1</sup><sup>1</sup>Hamburg University of Technology, Germany<sup>2</sup>Ankara University, Turkey

Catechin is a crucial member of flavonoids that show antioxidant properties both *in vivo* and *in vitro*. However, flavonoid monomers, like catechin, have some disadvantages such as low solubility and pro-oxidant activity. These drawbacks are reported to disappear in the polymerized form. The polymerization of catechin was reported using organic solvents to provide solubility in many studies. We present here the effect of natural deep eutectic solvent (NADES) as green solvents on laccase catalyzed polycatechin synthesis. The reaction media contained catechin (5 mg ml<sup>-1</sup>), acetate buffer (pH=5) and betaine (B)-mannose (M) (5:2, molar amount) at mentioned amounts. The effect of B-M amount (5, 50-90%), laccase concentration (15.6-125 U) and temperature (25-40°C) were investigated on polycatechin synthesis. The antioxidant activities of the polycatechins were tested in terms of superoxide radical scavenging activity and xanthine/xanthine oxidase activity. Size exclusion chromatography and HPLC analysis were used as analytical methods. According to the results, 5% B-M containing reaction media provided high molecular weight polycatechin that was comparable with acetone containing media. Therefore organic solvent content could be discarded from the reaction. However, handling of the reaction media and recovery of the product were challenging steps at increased NADES content. The conversion rate of catechin was found to increase with increasing laccase amount. Additionally, high laccase concentration (125 U) was found to provide high molecular weight and yield. On the other hand, temperature had no significant effect on polycatechin formation at tested range (25-40°C). All polycatechins obtained were found to have increased superoxide radical scavenging activity and xanthine/xanthine oxidase inhibitory activity when compared to monomer catechin. This study showed that polycatechin synthesis pathway could be shifted to a green route using NADES.

**Biography**

Ayşe Ezgi Unlu has expertise in enzymes, enzymatic reactions, fermentation, protein synthesis, proteomics, enzymatic biopolymers and green solvents. The synthesis of Naproxen, a member of NSAIDs, was the subject of her Master's thesis by using commercial lipase subjected to various pre-treatment strategies that enhanced the activity. Investigation of different parameters on the production of lipase by *Candida rugosa* and also proteomic analysis of the isoenzymes was another subject of her interest. She has done her Post-doctoral research on the synthesis of flavonoids using green solvents.

aeunlu@eng.ankara.edu.tr

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