

## NATURAL DEEP EUTECTIC SOLVENTS FOR ENHANCED PIPERINE BIOAVAILABILITY

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### Abstract

Piperine, bioactive alkaloid from black pepper (*Piper nigrum* L.) and long pepper (*Piper longum* L.) exerts numerous biological activities. The main limitation of its biological potential comes from hydrophobic nature and poor bioavailability. Natural deep eutectic solvents (NADES) are developed as a green alternative to organic solvents due to their physico-chemical properties and biocompatibility. NADESs are formed by at least one hydrogen bond donor (HBD) and one hydrogen bond acceptor (HBA), that when combined at a certain molar ratio present a significant decrease in the melting point becoming liquid at, or near, room temperature. These components are mainly primary metabolites or can be any components that can be found in nature. These systems have shown the greatest potential in the field of green chemistry, since they are abundant, inexpensive, recyclable and attractive for food, cosmetic and pharmaceutical applications.

In our study, five hydrophobic menthol based NADES systems were evaluated for the solubility of piperine, by 2 hours stirring at room temperature. Piperine concentration was measured by HPLC-PDA method on Luna C-18 column, after elution with 70% methanol-water mobile phase. In all tested systems menthol served as HBA and HBDs were limonene, lauric acid, lactic acid, 1,2-propandiol and ibuprofen. Determined piperine solubility values were  $23.53 \pm 2.31$ ,  $45.62 \pm 1.99$ ,  $129.93 \pm 13.39$ ,  $44.20 \pm 3.87$ , and  $72.05 \pm 11.13$  mg/ml for these five systems, respectively.

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