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Solubilization of Genistein in Poly(Ethylene Glycol) via Eutectic Crystal Melting[1] SASIWIMON BUDDHIRANON, THEIN KYU, The University of Akron — Genistein (5,7,4'-trihydroxyisoflavone) is a phytoestrogen found in soybean. It possesses various biological/pharmacological functions, e.g., tyrosine kinase inhibitory, anticarcinogenic, antioxidant, anti-inflammatory, and anti-microbial activities. However, genistein has poor water solubility and skin permeability, which have seemingly prohibited the progress to preclinical evaluation. Eutectic melting approach has been performed as a means of solubilizing genistein in poly(ethylene glycol) (PEG). Eutectic phase diagrams of blends containing genistein and PEG having three different molecular weights, i.e., 44k, 7k, and 500 g/mol, were established by means of DSC and compared with the theoretical liquidus and solidus lines, calculated self-consistently by taking into consideration all interactions including amorphous-amorphous, crystal-amorphous, amorphous-crystal, and crystal-crystal interactions. The eutectic temperatures were found to decrease with decreasing molecular weight of PEG. Guided by the phase diagram, it was found that genistein can be dissolved in PEG500 up to ∼7 wt% at room temperature. More importantly, the solubility of genistein in PEG can be improved to meet the end-use criteria of the PEG/genistein mixtures.

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