

Barrio, M. et al. (2017). "Pressure-temperature phase diagram of the dimorphism of the anti-inflammatory drug nimesulide." *Int J Pharm* 525(1):54–59.

Understanding the phase behavior of active pharmaceutical ingredients is important for formulations of dosage forms and regulatory reasons. Nimesulide is an anti-inflammatory drug that is known to exhibit dimorphism; however up to now its stability behavior was not clear, as few thermodynamic data were available. Therefore, calorimetric melting data have been obtained, which were found to be $T_{I-L} = 422.4 \pm 1.0$ K, $\Delta H_{I \rightarrow LH} = 117.5 \pm 5.2$ Jg(-1), $T_{II-L} = 419.8 \pm 1.0$ K and $\Delta H_{II \rightarrow LH} = 108.6 \pm 3.3$ Jg(-1). In addition, vapor-pressure data, high-pressure melting data, and specific volumes have been obtained. It is demonstrated that form II is intrinsically monotropic in relation to form I and the latter would thus be the best polymorph to use for drug formulations. This result has been obtained by experimental means, involving high-pressure measurements. Furthermore, it has been shown that with very limited experimental and statistical data, the same conclusion can be obtained, demonstrating that in first instance topological pressure-temperature phase diagrams can be obtained without necessarily measuring any high-pressure data. It provides a quick method to verify the phase behavior of the known phases of an active pharmaceutical ingredient under different pressure and temperature conditions.

Beg, S. et al. (2013). "Development of solid self-nanoemulsifying granules (SSNEGs) of ondansetron hydrochloride with enhanced bioavailability potential." *Colloids Surf B Biointerfaces* 101:414–423.

The current work aims to prepare the solid self-nanoemulsifying granules (SSNEGs) of ondansetron hydrochloride (ONH) to enhance its oral bioavailability by improving its aqueous solubility and facilitating its absorption through lymphatic pathways. Preformulation studies including screening of excipients for solubility and pseudoternary phase diagrams suggested the suitability of Capmul MCM as lipid, Labrasol as surfactant, and Tween 20 as cosurfactant for preparation of self-emulsifying formulations. Preliminary composition of the SNEDDS formulations were selected from the phase diagrams and subjected to thermodynamic stability studies and dispersibility tests. The prepared liquid SNEDDS formulations were characterized for viscosity, refractive index, droplet size and zeta potential. The TEM study confirmed the formation of nanoemulsion following dilution of liquid SNEDDS. The optimized liquid SNEDDS were transformed into free-flowing granules by adsorption on the porous carriers like Sylysia (350, 550, and 730) and Neusilin US2. Solid state characterization employing the FTIR, DSC and powder XRD studies indicated lack of any significant interaction of drug with the lipidic and emulsifying excipients, and porous carriers. In vitro drug release studies indicated faster solubilization of the drug by optimized SSNEGs (over 80% within 30 minutes) vis-a-vis the pure drug (only 35% within 30 minutes). In vivo pharmacokinetic studies in Wistar rats observed significant increase in C(max) (3.01-fold) and AUC (5.34-fold) using SSNEGs compared to pure drug, whereas no significant difference ($p > 0.1$) was observed with the liquid SNEDDS. Thus, the present studies ratify the bioavailability enhancement potential of SSNEGs of ONH prepared using porous carriers.