

## Abstract

**Purpose:** To determine the influence of hydrogen bonding and solubility parameter on the glass transition temperature ( $T_g$ ) of various drug–poly(vinylpyrrolidone) blends. **Methods:** The  $T_g$  of PVP films containing either acetaminophen, naproxen, salicylamide, carbamazepine, griseofulvin or propranolol hydrochloride were measured using differential scanning calorimetry. Fourier transform infrared (FTIR) spectroscopy and X-ray diffraction was used to characterize the specific interactions between the drug–PVP blends and the physical state of the films, respectively. The total solubility parameter and its individual components were calculated using the method of Van Krevelen. **Results:** Salicylamide displayed the greatest plasticizing effect, depressing the  $T_g$  to the minimum. This was consistent with the FTIR data, which indicated the presence of hydrogen bonding with PVP. Griseofulvin showed the least plasticizing effect due to lack of interaction with PVP. All the drugs except griseofulvin were amorphous within the film up to 30% (w/w) drug composition. The correlation between the various components of the solubility parameters and the plasticizing effect of drugs was very poor. **Conclusions:** Spectroscopic investigation for the presence of interaction between the drugs and PVP proved to be extremely predictive of the plasticizing effect of various drugs. In contrast, solubility parameters appeared to be far less sensitive indicators of drug–PVP miscibility.