

Colloidal stability and rheology of jatropha oil-based waterborne polyurethane (JPU) dispersion

ABSTRACT

Jatropha oil-based waterborne polyurethane (JPU) dispersions were produced by polymerising the jatropha oil-based polyols (JOLs) with isophrene diisocyanate (IPDI) and dimethylol propionic acid (DMPA). The colloidal stability of the resulting JPU dispersions were studied by particle size analysis and rheology measurements. Inclusion of up to 5.4 wt.% of DMPA as an internal emulsifier produced a wide range of particle sizes from 84 nm to 825 nm. The dispersions have a solid content of 24.2–26.9 wt.% with a relatively low viscosity in the range 6.2–60.2 mPa s. The JPU dispersions exhibited the typical flow behaviour of the commercial polyurethane dispersions, ranging from almost Newtonian to a shear thinning fluid, and the experimental data correlated well with the Cross model. The samples were stable after 18 months of storage under room conditions.