Biodegradable chitosan/bentonite composites with three different compositions were synthesized by the intercalation method using cetyltrimethylammonium bromide as the cationic surfactant. The composites were characterized using conductivity, density, particle size measurements, FTIR, TGA, XRD and SEM methods. Colloidal stabilities of the suspensions prepared in silicone oil (SO) were observed to increase with decreasing density. The effects of dispersed particle concentration, shear rate, electric field strength, electric field frequency and temperature on the electrorheological (ER) activities of the suspensions were investigated. The electric field viscosities of the suspensions showed typical shear thinning non-Newtonian viscoelastic behaviour. Yield stresses of the suspensions were observed to change in proportion to the square of applied electric field (E). Further, according to creep and creep-recovery analysis, reversible viscoelastic deformations were observed in the suspensions under $E \neq 0$ kV mm$^{-1}$. 