Obstruction of storage hardening in NR by using polar chemicals

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The effect of the polar chemicals phenol, diethylene glycol, and hydroxylamine hydrochloride on obstruction of storage hardening in NR was examined. A decrease in gel content and molecular weight of NR was observed after addition of diethylene glycol and hydroxylamine hydrochloride, whereas no significant change was observed after addition of phenol. The storage hardening behavior of NR containing these polar chemicals was investigated by accelerated storage with phosphorus pentoxide. The gel content, Mooney viscosity, and Wallace plasticity values of NR containing phenol increased obviously during accelerated storage hardening, whereas these values increased gradually in the presence of diethylene glycol and were constant in the presence of hydroxylamine hydrochloride. The efficiency of these polar chemicals for inhibiting storage hardening in NR follow the order hydroxylamine hydrochloride, diethylene glycol, and phenol, respectively. The mechanism of network formation during accelerated storage hardening was proposed to involve phospholipids at the chain ends of the NR molecule. Molecular structure analysis by Fourier transform infrared spectroscopy suggested that hydroxylamine inhibits storage hardening in NR by chemical interaction with phospholipid, apart from its polarity.