Abstract

The physical states of water and its freezing behaviour in shelled corn during subzero drying were determined by using ^{2}H NMR and ^{1}H MRI techniques. In this context, the 2H NMR spin–lattice relaxation times (T_1) and spin–spin relaxation times (T_2) of water in corn were measured. The relaxation times were found to decrease with decreasing temperature. The results revealed that there were two main water components in corn of >30% wb (wet basis) with long and short T_1. Both components exhibited minima around -20 °C. In more dehydrated corn (18.6% wb) only a single water component, with short T_1 and T_2 was observed. ^{1}H MRI images revealed the location of water and its freezing behaviour in different areas.