Effect of sodium bicarbonate and varying concentrations of sodium chloride in brine on the liquid retention of fish (Pollachius virens) muscle: High quality low salt saithe muscle

BACKGROUND Negative health effects associated with excessive sodium (Na) intake have increased the demand for tasty low-Na products (<2% NaCl) rather than traditional heavily salted fish products (~20% NaCl). This study investigates the causes of improved yield and liquid retention of fish muscle brined with a combination of salt (NaCl) and sodium bicarbonate (NaHCO3).

RESULTS Water characteristics and microstructure of saithe (Pollachius virens L.) muscle brined in solutions of NaCl and NaHCO3 or NaCl alone were compared using low-field nuclear magnetic resonance (LF-NMR) T2 relaxometry, microscopy, salt content, liquid retention and colorimetric measurements. Saithe muscle was brined for 92 h in 0, 30, 60, 120 or 240 g kg⁻¹ NaCl or the respective solutions with added 7.5 g kg⁻¹ NaHCO3. NaHCO3 inclusion improved the yield in solutions ranging from 0 to 120 g kg⁻¹ NaCl, with the most pronounced effect being observed at 30 g kg⁻¹ NaCl. The changes in yield were reflected in water mobility, with significantly shorter T2 relaxation times in all corresponding brine concentrations. Salt-dependent microstructural changes were revealed by light microscopy, where NaHCO3 supplementation resulted in greater intracellular space at 30 and 60 g kg⁻¹ NaCl.

CONCLUSION Sodium bicarbonate addition to low-salt solutions can improve yield and flesh quality of fish muscle owing to altered water mobility and wider space between the muscle cells.