Dual mode diffusion and sorption of sodium chloride in surimis under cooking conditions.

再録　報文

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Dual mode diffusion and sorption of sodium chloride in surimis under cooking conditions

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Highlights

·Summarizing reported Fick's diffusion coefficients in fish meats.

·Obtaining D_{NaCl} in surimis of Pacific cod, red sea bream and big-eye tuna at 98 °C.

·Explaining maximum having D_{NaCl} in surimis by dual mode diffusion theory.

·Finding Linear relations in the parameters vs. $C_{charged\ amino\ acids}$ in surimis plots.

Abstract

Diffusion and sorption behaviors of NaCl in surimis prepared from Pacific cod (Gadus morhua), red sea bream (Pagrus major) and big-eye tuna (Thunnus obesus) were studied. The variations of Fick's diffusion coefficients, D, of NaCl with respective maxima and of almost linear sorption isotherms were consistently interpreted with the dual mode diffusion and sorption theory. Good linear correlations were found between the concentrations of Langmuir mode sorption site, S_a, of NaCl ($R^2 = 0.993$) and also thermodynamic diffusion coefficient of the Langmuir species, $D_T(L)$, of NaCl ($R^2 = 0.950$), with charged amino acid contents in the surimis. The facts that S_a and $D_T(L)$ are related to the concentration of charged site suggest that the sites gather in a certain region, the water content of which becomes high with the site concentration.

要旨

タラ（Gadus morhua）・タイ（Pagrus major）・メバチマグロ（Thunnus obesus）から調製したすり身中のNaClの拡散および収着の挙動について研究した。NaClのフィックの拡散係数（D）は極大を持ち、収着等温線はほとんど直線を示し、他の食材と同様、二元収着拡散理論で解釈することができた。荷電アミノ酸含量は、ラングミュアー型収着座席濃度（S_a）とのあいだに良い直線関係が得られた（$R^2 = 0.993$）。また、ラングミュアー型種の拡散係数（$D_T(L)$）とのあいだにも良い直線関係が得られた（$R^2 = 0.950$）。S_a および $D_T(L)$ が荷電座席濃度と関連があるということから、吸着座席はある特定の領域に集まり、吸着座席濃度とともにその含水量が高くなることが示唆された。