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# Purification and Structural Elucidation of Salty-Taste-Modifying Substances in Food

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Summary

Salty taste is promoted or inhibited by food constituents. One possible mechanism is that some food constituents interact with $Na^+$ and reduce the activity of ion. In this study, we tried to analyze the salty-taste-controlling food constituents using $^{23}$Na-NMR. The $Na^+$ activity was evaluated by half width of the signal. An organoleptic examination revealed that the salty taste of soy sauce was weakened compared to its NaCl concentration. This result suggests that there should be salty-taste-inhibiting food constituents in soy sauce. The $^{23}$Na-NMR signal of soy sauce was 3 times as wide as that of NaCl solution. This result suggests that there should be some substances interacting with $Na^+$ in soy sauce. The substances were searched for through solvent fractionation. However, no candidate was detected. Therefore, we considered the signal broadening in $^{23}$Na-NMR was brought by viscosity of the solution, not by food constituents. Glycerol was added to NaCl solution to modify the viscosity. The $^{23}$Na-NMR signal of NaCl solution with 30% glycerol had almost same half width as that of soy sauce. $^{17}$O-NMR was measured to evaluate the viscosity of the solution. The signal of soy sauce was more than twice as wide as that of NaCl solution. These results suggest that the $^{23}$Na-NMR signal broadening of soy sauce should be because of the viscosity of the solution. On the other hand, $^{35}$Cl-NMR signal of soy sauce was 17 times as wide as that of NaCl solution. This broadening was significant because it was larger than that brought by viscosity. This result indicates that there should be some substances interacting with $Cl^-$ in soy sauce. Such substance might decrease the activity of $Cl^-$. $Cl^-$ is also important to perceive salty taste, because sodium acetate has no salty taste. From this research, it is suggested that there should be no sodium-binding substances but chloride-binding substances in soy sauce, which inhibit the salty taste.