Formation of histamine and biogenic amines in cold-smoked tuna: An investigation of psychrotolerant bacteria from samples implicated in cases of histamine fish poisoning

Two outbreaks and a single case of histamine fish poisoning associated with cold-smoked tuna (CST) were reported in Denmark during 2004. The bacteria most likely responsible for histamine formation in CST implicated in histamine fish poisoning was identified for the first time in this study. Product characteristics and profiles of biogenic amines in the implicated products were also recorded. In the single poisoning case, psychrotolerant Morganella morganii -like bacteria most likely was responsible for the histamine production in CST with 2.2% ñ 0.6% NaCl in the water phase (WPS). In outbreak 1, Photobacterium phosphoreum most likely formed the histamine in CST with 1.3% ñ 0.1% WPS. In outbreak 2, which involved 10 persons, the bacteria responsible for histamine formation could not be determined. The measured concentrations of WPS were very low compared with those of randomly collected commercial samples of CST and cold-smoked blue marlin (4.1 to 12.7% WPS). Challenge tests at 5øC with psychrotolerant M. morganii and P. phosphoreum in CST with 4.4% WPS revealed growth and toxic histamine formation by the psychrotolerant M. morganii -like bacteria but not by P. phosphoreum. In a storage trial with naturally contaminated CST containing 6.9% WPS, lactic acid bacteria dominated the microbiota, and no significant histamine formation was observed during the shelf life of about 40 days at 5øC and of about 16 days at 10øC. To prevent toxic histamine formation, CST should be produced with >5% WPS and distributed with a declared 5øC shelf life of 3 to 4 weeks or less.

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