Changes were studied in the concentration of 38 volatile compounds during chilled storage at 5 degreesC of six lots of commercially produced vacuum-packed cold-smoked salmon and sterile cold-smoked salmon. The majority of volatile compounds produced during spoilage of cold-smoked salmon were alcohols, which were produced by microbial activity. Partial least-squares regression of volatile compounds and sensory results allowed for a multiple compound quality index to be developed. This index was based on volatile bacterial metabolites, 1-propanol and 2-butanol, and 2-furan-carboxaldehyde produced by autolytic activity. Only a few of the volatile compounds produced during spoilage of cold-smoked salmon had an aroma value high enough to indicate contribution to the spoilage off-flavor of cold-smoked salmon. These were trimethylamine, 3-methylbutanal, 2-methyl-1-butanol, 3-methyl-1-butanol, 1-penten-3-ol, and 1-propanol. The potency and importance of these compounds was confirmed by gas chromatography-olfactometry. The present study provides valuable information on the bacterial reactions responsible for spoilage off-flavors of cold-smoked salmon, which can be used to develop biosensors for on-pack shelf-life determinations.
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