Carnobacterium: positive and negative effects in the environment and in foods

Abstract The genus Carnobacterium contains nine species, but only C. divergens and C. maltaromaticum are frequently isolated from natural environments and foods. They are tolerant to freezing/thawing and high pressure and able to grow at low temperatures, anaerobically and with increased CO2 concentrations. They metabolize arginine and various carbohydrates, including chitin, and this may improve their survival in the environment. Carnobacterium divergens and C. maltaromaticum have been extensively studied as protective cultures in order to inhibit growth of Listeria monocytogenes in fish and meat products. Several carnobacterial bacteriocins are known, and parameters that affect their production have been described. Currently, however, no isolates are commercially applied as protective cultures. Carnobacteria can spoil chilled foods, but spoilage activity shows intraspecies and interspecies variation. The responsible spoilage metabolites are not well characterized, but branched alcohols and aldehydes play a partial role. Their production of tyramine in foods is critical for susceptible individuals, but carnobacteria are not otherwise human pathogens. Carnobacterium maltaromaticum can be a fish pathogen, although carnobacteria are also suggested as probiotic cultures for use in aquaculture. Representative genome sequences are not yet available, but would be valuable to answer questions associated with fundamental and applied aspects of this important genus.

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