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Novel oil produced by *Aureobasidium pullulans* has antibacterial activity with specificity for species of *Streptococcus*

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Liamocins are a heterogeneous mixture of polyol-lipids produced by the fungus *Aureobasidium pullulans*. When grown on sucrose, *A. pullulans* strain NRRL 50380 produces four types of liamocins with chemical structures consisting of a single mannitol head group partially O-acylated with polyester tails containing three or four 3,5-dihydroxydecanoic ester groups, some of which are acetylated. Liamocins possessed antibacterial activity with specificity against Streptococcus species with MICs ranging from ≤10 μg/ml to 78 μg/ml for the following: *S. agalactiae, S. infantarius, S. mitis, S. mutans, S. pneumonia, S. salivarius, S. suis* and *S. uberis*. *Enterococcus faecalis* and *Bacillus subtilis* were less susceptible, while the following bacteria were not susceptible: *Staphylococcus aureus, Lactobacillus fermentum, Escherichia coli* and *Pseudomonas aeruginosa*. In an effort to improve yields (typically 0.5-6.0 g liamocin/L), different growth media and strains of *A. pullulans* were tested. Selective growth on different polyols resulted in considerable structural variation of liamocins including some with galactitol, sorbitol, D-arabitol, D-xylitol and D- or L-threitol head groups. Liamocins with D-arabitol or D/L-threitol head groups were active but to a lesser extent than the mannitol liamocins. The components of mannitol liamocins were separated by HPLC and assayed by MALDI-TOF/MS, and a fraction that was enriched for liamocin B1 (the non-acetylated type with four 3, 5-dihydroxydecanoic acid groups) had the highest antibacterial activity against *S. agalactiae* (MIC = 16 μg/ml). Liamocins have potential application as a narrow spectrum antimicrobial agent that targets streptococcal pathogens, but avoids disruption of normal flora and reduces selection for antibiotic resistance in commensal bacteria.

Biography

Kenneth M Bischoff received his PhD in Biochemistry from Purdue University in 1995. He joined the USDA Agricultural Research Service in 1998 as a Microbiologist investigating antimicrobial resistance in food-borne pathogens. In 2004, he relocated to the USDA National Center for Agricultural Utilization Research (NCAUR), Peoria, IL and redirected his research towards improving the biochemical processes for the bio-refining industry. He is currently a lead scientist for bio-based products research in the Renewable Product Technology Research Unit at NCAUR.

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