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Investigating the Potential of Autofermentation Cyanobacteria Crude Extract as Antimicrobial Animal Feed Additives.

Microbial infections significantly harm animal health, welfare, and productivity. The researchers have extensively explored the potential of natural antimicrobial feed additives as sustainable alternatives to conventional antibiotics to address this challenge and concerns regarding antimicrobial resistance(AMR) and its implications for human health, animal welfare, and the environment. As a source of natural antimicrobials, cyanobacteria have been proposed as a promising source due to their sustainable growth and abundance of antimicrobial compounds. Additionally, cyanobacteria have the remarkable ability to produce organic acids, which have the potential to act as antimicrobial agents. The synthesis of organic acids is facilitated by autofermentation, a metabolic process that occurs under dark anoxic conditions. For survival, cyanobacteria use cellular carbon compounds to generate adenosine triphosphate (ATP) through fermentation pathways. Building on this knowledge, we propose the hypothesis that cyanobacterial autofermentation may result in a significant increase in the antimicrobial activity of aqueous crude extracts by producing organic acids, in conjunction with secondary metabolites (including peptides produced during autofermentation). To investigate this hypothesis, we conducted experiments aimed at evaluating the effects of both fresh and autoformatted *Fischerella ambigua,* and *Nostoc* aqueous crude extracts, as well as a simulated organic acid mix, on the inhibition of *Salmonella* and *Campylobacter* poultry strains. Our findings clearly indicate that autofermented crude extracts exhibit significantly greater antibacterial activity when compared to the organic acid mix and fresh crude extracts. Future research endeavors will prioritize a thorough examination of secondary metabolites, encompassing both peptides and non-peptides, to achieve a comprehensive understanding of the mechanisms underlying the augmented antibacterial activity observed.