

Abstract

The gut microbiota represents a vast reservoir of bioactive substances with potential implications for human health and disease. This study focused on the identification of a novel metabolite originating from the gut microbiota strain *Aneurinibacillus aneurinilyticus* and evaluated its antibacterial properties. Advanced analytical techniques such as high-performance liquid chromatography, high-resolution mass spectrometry, liquid chromatography-mass spectrometry, and nuclear magnetic resonance were employed with optimization to isolate and identify the metabolites. Following the successful isolation of the target metabolite, subsequent structural elucidation revealed the structure of 4-Hydroxysattabacin. Disk-diffusion antibacterial assays were conducted against the *Bacillus subtilis* strain as a representative of Gram-positive bacteria to assess 4-Hydroxysattabacin functional significance. The findings demonstrated a substantial inhibitory effect, suggesting 4-Hydroxysattabacin as a potential novel antibacterial agent. Nevertheless, this research has presented a valuable contribution to the realms of natural product discovery and antibacterial drug development.

Keywords: *Aneurinibacillus aneurinilyticus*, 4-Hydroxysattabacin, gut microbiota, structural elucidation, antibacterial agent