Elucidation of antibacterial compounds from inflorescences of banana (Musa balbisiana cv. saba) using liquid chromatography-tandem mass spectrometry

ABSTRACT

Background: Banana by-products are undervalued and their potential remains untapped. They are often composted after the fruits are harvested, reducing the cause of environmental pollutions due to open burning.

Objectives: The study aims to identify the bioactive compounds in banana [Musa acuminate x balbisiana Colla cv. Saba (Musaceae)] inflorescence buds that are responsible for the antibacterial activity on selected foodborne pathogens.

Methods: Dried inflorescence buds were extracted using methanol and subsequently partitioned into chloroform, ethyl acetate, butanol and deionized water. Further isolation of bioactive components was based on a bioassay-guided fractionation and the inhibitory activity at various concentrations against selected foodborne pathogens was determined. The compounds were identified using high-performance liquid chromatography coupled with electrospray ionization tandem mass spectrometry (LC-MS/MS).

Results: The SPE-fraction 3 (BWF-3) purified from the methanolic water partition of banana inflorescence showed the most prominent inhibition against Staphylococcus aureus with minimum inhibitory concentration at 12.0 μg/ml. The BWF-3 was later identified as proanthocyanidins with epigallocatechin as the main extension unit. Additionally, the survival of Listeria monocytogenes increased with the fortification of ferum (II) and (III) at a concentration as low as 1 mM but not for the calcium, magnesium, manganese and glucose.

Conclusion: The methanolic partition of banana inflorescence buds could be a potential source of natural antibacterial for food and pharmaceutical applications.