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Co-production of live yeast cells and gallic acid by tannase-producing yeast, *Sporidiobolus ruineniae* (isolated from a traditional fermented tea leaf) for application as an alternative feed additive

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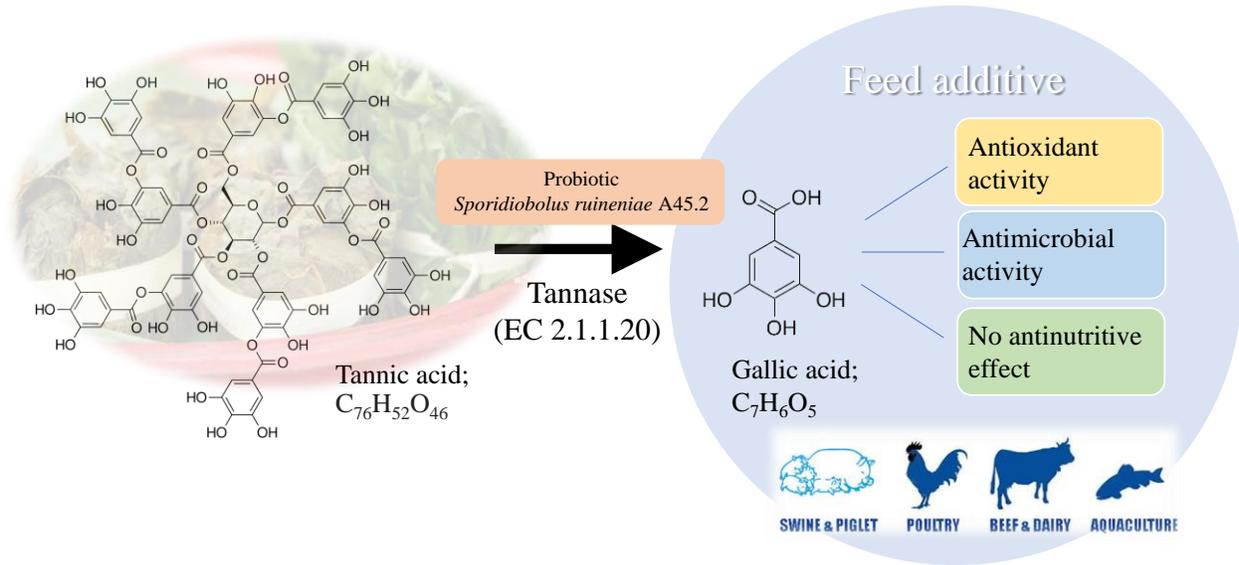
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Abstract:

Sporidiobolus ruineniae A45.2 isolated from Miang, a traditional fermented tea-leaf of northern Thailand, is not a common yeast as it has shown to possess a great deal of merit over other yeasts in terms of the tannin tolerance and the production of tannase and gallic acid from tannic acid, and may show a greater potential when it acts as a probiotic yeast. The aims of this research study are to evaluate *S. ruineniae* as a probiotic yeast and to optimize a medium composition and condition for biotransformation of tannic acid to gallic acid. Under simulated gastric and intestinal conditions, *S. ruineniae* showed ability to tolerate acid, bile salts, gastric and intestinal juices. Although no antimicrobial activity detected from yeast malt broth, *S. ruineniae* exhibited 58.4±2.7% cell surface hydrophobicity and 63.0±4.3% auto-aggregation and thus, it is considered a probiotic yeast. Tannase produced by this yeast was an inducible enzyme and was designated as a cell-associated tannase (CAT). To establish the highest level of bioconversion of tannic acid to gallic acid, CAT and viable cells, co-production system was conducted and optimized using response surface methodology (RSM) and then successfully validated with the synthesis of 11.2 g/L gallic acid with antimicrobial activity from 12.3 g/L tannic acid, the production of 31.1 mU/mL CAT with viable cells of 7.99 logCFU/mL after 48 h of cultivation in a 1-L stirred tank fermenter. Therefore, the biomass, in combination with gallic acid that was formed in the fermentation medium, could be directly used as a feed additive.

Graphical abstract



The research scope of the MRG 6280057 project