Solid State Fermentation for α-Amylase and Probiotic Production by Bacillus using Cassava Chips as Raw Material

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Bacillus species being use as potential probiotics and α-amylase production were used in animal feed. Production of animal feed supplemented with α-amylase and bacillus probiotics was therefore investigated by solid state fermentation using cassava chip as raw material. A total of one hundred-six isolates of *Bacillus* spp., which isolated from soil and compost samples, 10 isolates of Bacillus exhibited the ability to inhibit *Staphylococcus aureus*, *Escherichia coli*, *Enterococcus aerogenes* and *Salmonella Typhimurium*. The strains KMS 2.1-1, KMS 2.2-1 and FB 11 showed high acid tolerant at pH 2 with 63.42, 62.71 and 58.42% survival respectively. These strains were also tolerant 0.3% of bile salt concentration at 6 hours with 52.36-85.43% survival rate and were able to form biofilms. The strain of KMS 2.2-1 showed the lowest weak β-hemolysis activity on sheep blood agar with no toxic tested to the rat, whereas KMS 2.1-1 and FB 11 had strong the activity. Therefore, KMS 2.2-1 which was identified by using 16S rRNA gene analysis as *Bacillus amyloliquefaciens* subsp. *plantarum* FZB42 with 99.6% identity, was selected as potential probiotic to culture by solid state fermentation using cassava chip as raw material. The results showed that fermented solid by *Bacillus amyloliquefaciens* KMS 2.2-1 gave the highest α-amylase activity, 49.2 unit/g dry substrate with 4×10^{10} cell/g dry substrate at 6^{th} day cultivation.

keywords : Probiotics, Bacillus, Antimicrobial activity, α-amylase, Solid state fermentation, cassava chip