

A rapid colorimetric screening method for vanillic acid and vanillin-producing bacterial strains

ABSTRACT

Aim: To isolate a bacterial strain capable of biotransforming ferulic acid, a major component of lignin, into vanillin and vanillic acid by a rapid colorimetric screening method.

Methods and Results: For the production of vanillin, a natural aroma compound, we attempted to isolate a potential strain using a simple screening method based on pH change resulting from the degradation of ferulic acid. The strain *Pseudomonas* sp. AZ10 UPM exhibited a significant result because of colour changes observed on the assay plate on day 1 with a high intensity of yellow colour. The biotransformation of ferulic acid into vanillic acid by the AZ10 strain provided the yield (Y_p/s) and productivity (Pr) of 1.08 mg mg⁻¹ and 53.1 mg L⁻¹ h⁻¹, respectively. In fact, new investigations regarding lignin degradation revealed that the strain was not able to produce vanillin and vanillic acid directly from lignin; however, partially digested lignin by mixed enzymatic treatment allowed the strain to produce 30.7 mg l⁻¹ and 1.94 mg l⁻¹ of vanillic acid and biovanillin, respectively.

Conclusions: (i) The rapid colorimetric screening method allowed the isolation of a biovanillin producer using ferulic acid as the sole carbon source. (ii) Enzymatic treatment partially digested lignin, which could then be utilized by the strain to produce biovanillin and vanillic acid.

Significance and Impact of the Study: To the best of our knowledge, this is the first study reporting the use of a rapid colorimetric screening method for bacterial strains producing vanillin and vanillic acid from ferulic acid.

Keyword: Biotransformation; Biovanillin; Ferulic acid; *Pseudomonas* sp.; Rapid screening; Vanillic acid