

# SUPPORTING INFORMATION

## Development of carbon-based support using biochar from guava seeds for lipase immobilization

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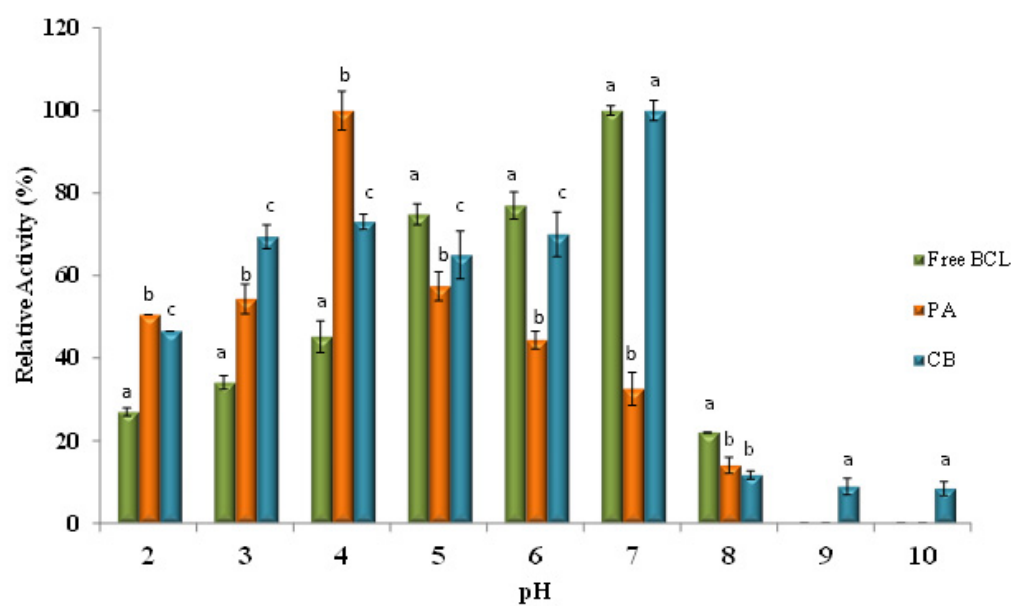
## Statistical analysis

To understand the pH effect, temperature effect and thermal stability on the activity of free BCL and immobilized by physical adsorption (PA), and covalent binding (CB), an analysis of variance (ANOVA) was performed at 95% confidence interval. The Tukey test at the same confidence interval was conducted to identify pair-wise differences. The experimental data were evaluated by ANOVA and the means were compared by the Tukey test at a 95% confidence interval, with the aid of Excel for Windows, version 2019. The minimum significant difference (DMS) of the Tukey test was determined according to Equation S1:

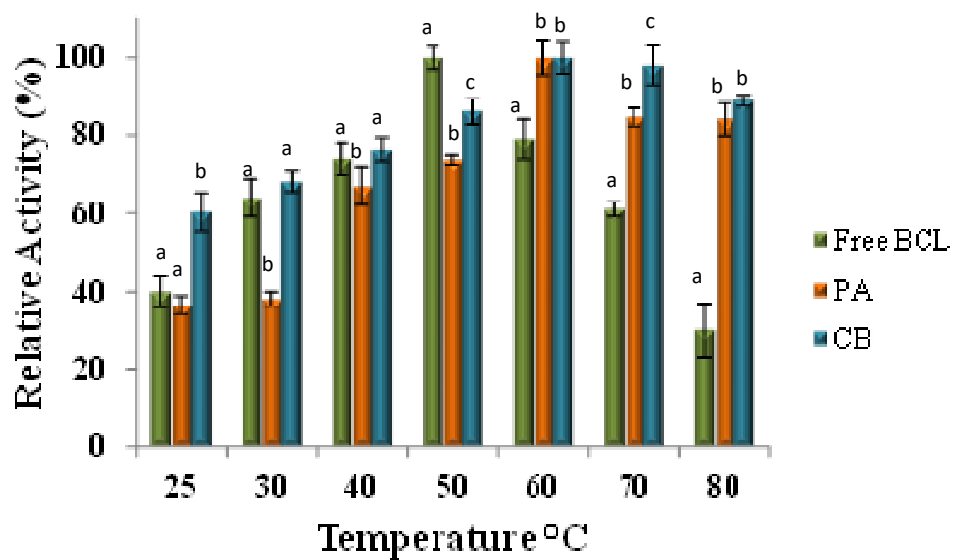
$$DMS = q \cdot \sqrt{\frac{MSR}{r}} \quad (S1)$$

where  $q$  is the student amplitude found in the student amplitude table  $q$  (Tukey test),

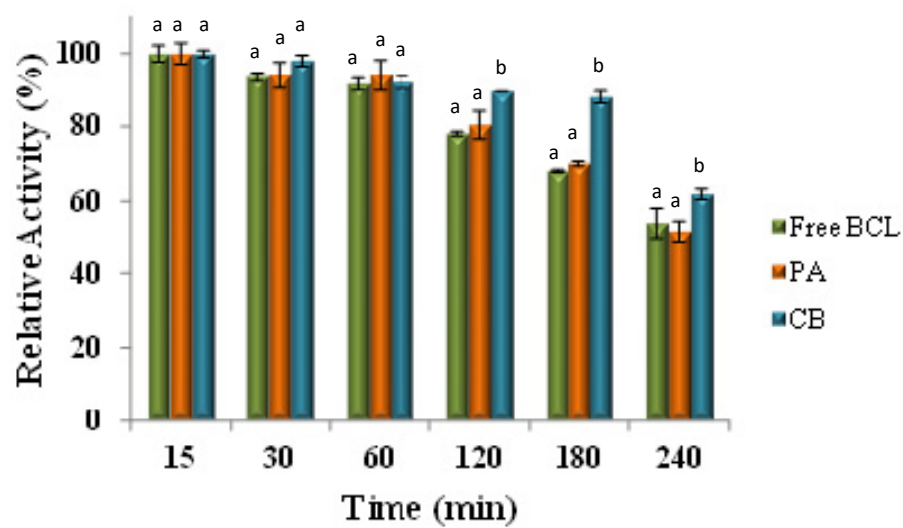
$MSR$  is the mean square of the residue,  $r$  is the number of repetitions for each group.



**Figure S1.** pH effect on the activity of free BCL and immobilized by physical adsorption (PA), and covalent binding (CB). Bars represent the standard errors. For each response, bars with different letters indicate differences based on Tukey test ( $p \leq 0.05$ ).



**Figure S2.** Temperature effect on the activity of the free and immobilized BCL, by physical adsorption (PA), and covalent binding (CB). Bars represent the standard errors. For each response, bars with different letters indicate differences based on Tukey test ( $p \leq 0.05$ ).



**Figure S3.** Thermal stability of the free and immobilized by PA and Covalent binding (CB) biocatalyst incubated at 60° C. Bars represent the standard errors. For each response, bars with different letters indicate differences based on Tukey test ( $p \leq 0.05$ ).