**Supplementary**

Table 1. Substrates used for the oxidation screening of selected mutants.

|  |  |  |
| --- | --- | --- |
| Phenol Compound | Structure | UV spectra (nm) |
| Ferulic acid |  | 430 |
| Vanillin |  | 410 |
| Gallic acid |  | 415 |
| Vanillic acid |  | 405 |
| Catechol |  | 400 |



Supplementary Figure S1. Comparison on PAGE SDS of the expression of laccase UNIK variants. Lane M: molecular weight standards; Lane 2-8 UNIK variants.



Supplementary Figure S2. The PDB model of LAC3 (GenBank AAR00925.1) was used to obtain a replacement model of LAC3-K0 to be analyzed with the protein-sol server to visualize hydrophobic patches (HP) on the surface of this protein. The ratio of non-polar to polar (NPP) residues is represented in the color scale below. A low NPP ratio is indicated in purple and in green for the converse. Surface patches are indicated by using the embedded NGL viewer on the protein-sol web application after calculation.



Supplementary Figure S3. Residues surrounding position 238 (N211; S236; F240, P300).