SYNLETT
Spotlight 410

This feature focuses on a reagent chosen by a postgraduate, highlighting the uses and preparation of the reagent in current research

Laccase

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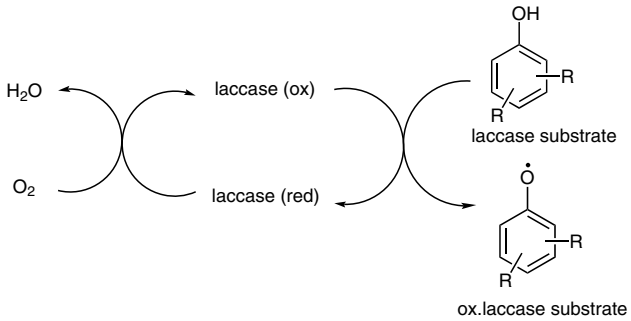
Introduction

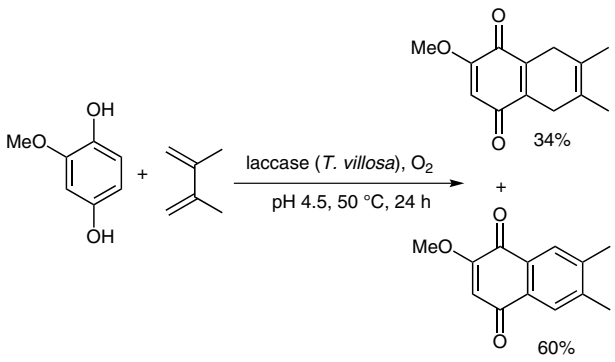
Laccases are blue multicopper oxidases (EC 1.10.3.2) and widely distributed in higher plants, bacteria, fungi, and insects.[1–3] Some of them have been used in the textile and paper industries as 'green' catalysts, because they just require oxygen to catalyze single-electron oxidation of the substrates, and generate only water as by-product.[4,5] Laccases perform transformations ranging from the oxidation of functional groups to heteromolecular couplings for productions (Scheme 1).[6]



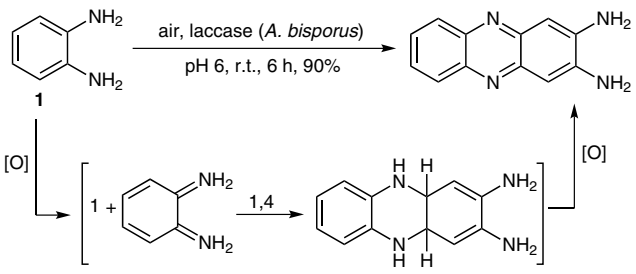
Scheme 1 Principal oxidation reactions by laccase

Abstracts

(A) Witayakran and Ragauskas reported a one-pot aqueous synthesis of 1,4-naphthoquinone in the presence of laccase.[7]



(B) Laccase from *Agaricus bisporus* and air can convert *o*-phenylenediamine into 2,3-diaminophenazine in 90% yield under mild conditions.[8]



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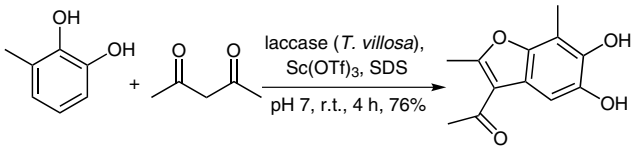
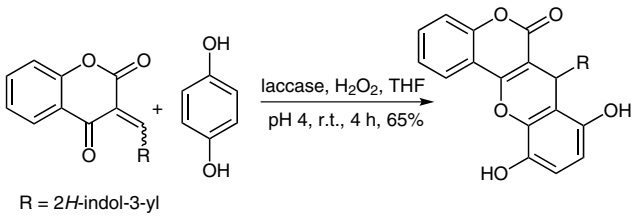
(C) $Sc(OTf)_3$/SDS and laccase were used as recyclable catalysts to efficiently and directly synthesize benzofuran derivatives from the reaction of catechols and acetylacetone.[9]

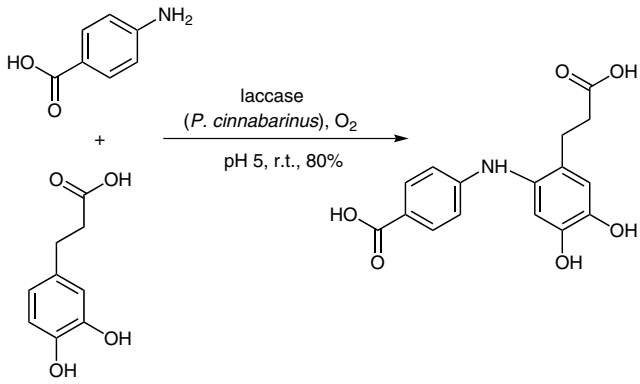


(D) Kidwai et al. have described the mild laccase-catalyzed synthesis of an HIV protease inhibitor, substituted benzopyranocoumarin, in 65% yield.[10]

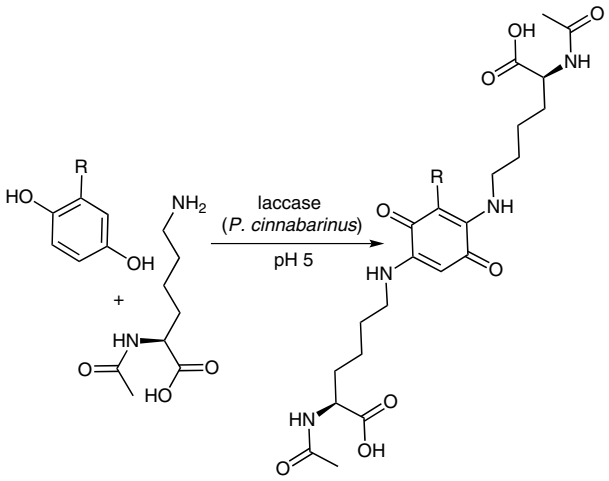


R = 2*H*-indol-3-yl

(E) Pilz et al. reported a convenient synthesis of a novel compound, 4-[2-(2-carboxyethyl)-4,5-dihydroxy-phenylamino]benzoic acid, by laccase-catalyzed cross-coupling in 80% yield.[11]



(F) Proteins containing large amounts of lysine residues can react with dihydroxylated aromatics to form a three-dimensional network through oxidative cross-links in the presence of laccase.[12]



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