Polymerization of cardanol using peroxidase and its potential application as new coating material

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Cardanol is obtained by thermal distillation of cashew nut shell liquid. It is a phenol derivative having a C 15 unsaturated alkyl chain with 1 to 3 double bonds at its meta position. Although it has been used as a raw material for resins and friction lining materials, new applications may be found if it could be polymerized using enzyme technology. The major advantages of enzymatic polymerization are : no need for formaldehyde, which has to be used in chemical polymerization and chemoselective conversion. Peroxidase induces oxidative polymerization of phenol derivatives under mild conditions to yield a new class of polyphenols. Unlike soybean peroxidase, it has been shown that horseradish peroxidase is not able to perform oxidative polymerization of phenol derivatives having a bulky meta substituent such as cardanol. A redox mediator has been applied to enable horseradish peroxidase to polymerize cardanol.