Enzymes from fungi simplify chemical synthesis

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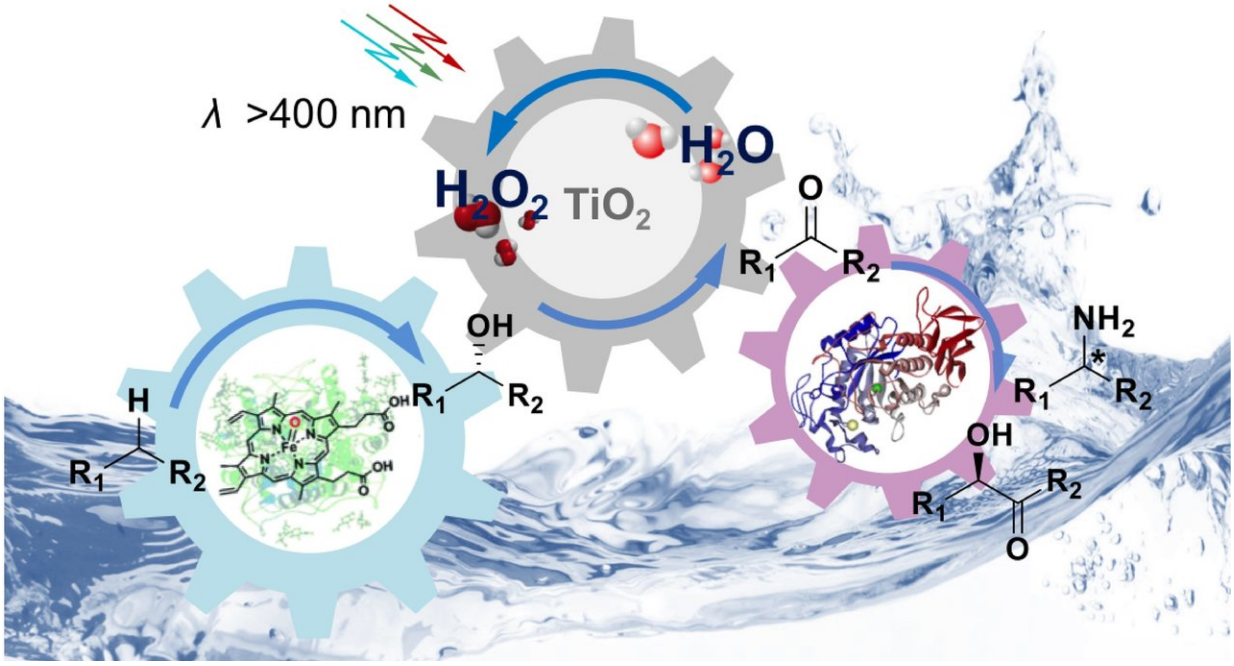

Credit: Delft University of Technology

Using natural enzymes obtained from fungi, scientists from TU Delft have potentially made the synthesis of certain pharmaceuticals, cosmetics and agrochemicals much simpler, cheaper and environmentally more benign. They have recently reported their findings

in *Nature Catalysis.*.

The team, led by Dr. Frank Hollmann of the Biocatalysis Group at the Department of Biotechnology, performed selective hydroxylation reactions with this new approach. Using traditional chemical technology, this sort of reaction is fairly difficult, if not impossible. The catalysts enabling them to perform these reactions are the so-called peroxygenases.

"These catalysts offer attractive means for chemistry. They are simple to use because they only need hydrogen peroxide (H_2O_2) to function. But this causes a major challenge as too much H_2O_2 can also kill the enzymes. This can be overcome by the controlled reduction of oxygen from air. So far, this required other valuable cosubstrates such as glucose, which is questionable from an environmental, economic and ethical point-of-view. Using visible light, we can now substitute these cosubstrates by simple water," says Hollmann.

"We have shown that visible light-driven, catalytic water oxidation can be used for the generation of H_2O_2 from water, which makes peroxygenase catalytically active. We believe that this concept bears an enormous potential for large scale implementation."

More information: Wuyuan Zhang et al. Selective aerobic oxidation reactions using a combination of photocatalytic water oxidation and enzymatic oxyfunctionalizations, *Nature Catalysis* (2017). DOI: 10.1038/s41929-017-0001-5

Provided by Delft University of Technology