

OXIDOREDUCTASE REACTIONS FOR COSMECEUTICAL PRODUCTION FROM SOY BEAN PRODUCTS

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One of the recent trends in cosmetics industry is using natural and organic ingredients in the manufacturing of cosmetics. Although various plant extracts are major sources of these ingredients, they usually contain complex mixtures with few functionally bioactive ingredients, so that clear scientific proof and supporting data on their effects and efficacy of the ingredients on our body and skin are lacking. Whereas specific biotransformation reactions of single compound can provide various biologically active compounds for their functional studies. Among such biotransformations, we have special interests in producing bioactive natural products(isoflavonoids) derived from soybean such as daidzein and genistein using various oxidoreductases such as P450, tyrosinase, isoflavone reductase and glycoside oxidase, which can control hydroxylation, oxidation/reduction and deglycosylation.

In this talk I will present several examples of producing modified isoflavonoids using such enzymes or enzyme systems, which can be used as cosmeceuticals.

Since most of such oxidoreductase systems require electron transfer system, using recombinant E.coli system, construction of an efficient enzyme systems and protein engineering for their specific activity improvement, cofactor NAD(P)H optimization and related metabolic engineering, enhancing transport of substrate and product, etc. will be applied and discussed using isoflavonoids as model systems. In addition, we would like to explain how "systems and synthetic biological approaches" work for these enzyme reactions, and what kinds of strategies are desirable to develop their industrial scale biotransformations.