

TECHNOLOGY OFFER

Recombinant Production of Highly Stable Horseradish Peroxidase (HRP) Mutant from E. Coli

Recombinant production of horseradish peroxidase (HRP) guarantees a steady supply of high-quality single-isoform HRP preparations and represents an efficient alternative to traditional hairy root culture. Scalability, reproducibility and feasibility of QbD concepts open up a whole host of new application areas.

BACKGROUND

Horseradish peroxidase (HRP) is an industrially important enzyme with a broad field of applications in biotechnology, life sciences and medicine. Traditionally, commercial preparations of HRP are isolated from horseradish plant roots, which is time-consuming and inefficient. The respective isolates constitute a heterogeneous mixture of isoenzymes with plant-specific glycosylation patterns causing immunogenicity, thus limiting medical as well as industrial exploitation. Alternative strategies resulted in low yields and/or decreased enzyme activity and stability. Hence, fast, high-yield and high-quality production of recombinant HRP has high commercial value.

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A novel recombinant HRP mutant was engineered for effective expression in *Escherichia coli*, which enables the production of a highly pure, homogeneous single HRP isoenzyme at relatively low cost. In fact, the respective single isoform HRP preparation can compete with the plant derived wild-type protein for enzymatic activity and stability.

Besides, new process optimizations yield maximal enzyme refolding and recovery following typical expression in inclusion bodies.

Indeed, HRP from *E. coli* constitutes a viable alternative to the enzyme from plant-origin. It lacks surface glycans, which usually interfere with the human immune system. This is not only useful for many medically and commercially relevant applications, but also paves the way for therapeutic treatments based on HRP. Moreover, the novel recombinant expression system facilitates the individual production of pure isoenzymes for in-depth biochemical evaluation and subsequently rational design endeavors to generate tailor-made HRP mutants for any given application (increased substrate affinity, solvent stability, peroxide resistance, or en-antioselectivity).

ADVANTAGES

- Non-plant derived recombinant HRP variant
- Most efficient HRP production, non-dependent on hairy root cultures
- Homogeneous isoforms with stable biochemical properties
- Defined preparation concept
- Medical applicability
- Non-immunogenic (leaving out plant material-related glycosylation patterns)



REFERENCE:

M061/2019
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APPLICATIONS:

Molecular targeting
Detection and quantification
Biosensor systems
Biocatalysis
Organic synthesis
Bioremediation
Cancer therapy

KEYWORDS:

Recombinant HRP mutant,
increased thermostability,
comparable catalytic activity

IPR:

EP and PCT pending

OPTIONS:

R&D co-operation
License agreement
Sale

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