

## CORIOLOPSIS GALLICA THERMOSTABLE LACCASE

### KEYWORDS

- Laccase
- Enzyme
- Fermentation
- White-rot fungi

### Collaboration type

License agreement  
R&D collaboration

### IP status

EP21199193 -  
27/09/2021  
PCT patent ongoing

### Inventors

FLAHAUT Sigrig  
SONGULASHVILI George

### THE TECHNOLOGY IN A NUTSHELL

The new method of thermoresistant laccases production using white-rot fungus *Coriolopsis gallica*.

### STATE OF THE ART

Laccases are a diverse group of multi-copper enzymes that oxidise a wide variety of organic and inorganic compounds. It is an economically important enzyme because of its ability to catalyze various oxidation reactions useful in industry.

Most laccases described in the literature were isolated from higher fungi, especially white-rot fungi belonging to the basidiomycetes. However, the extracellular level of the laccase enzyme produced by these fungi is low. Moreover, the high number of possible biotechnological applications of laccases, the thermostable and robust laccase of *C. gallica* in particular, and their potential uses in the environmental field necessitate industrial-scale production of active and stable laccase enzymes.

### THE INVENTION

The inventors have introduced a new, thermostable laccase using an optimized method. The process involves submerged fermentation of a fungal strain called *Coriolopsis gallica* in a liquid fermentation medium within an agitated tank bioreactor. This allows for the production of high yields of laccase within a short period of time. As a result, the laccase produced is both robust against downstream processing and thermostable, with potential application in: a) Agrofood; b) Pharma; c) Environment & Energy; d) Materials & Engineering.

### CONTACT



Lyophilized *C. gallica* laccase  
-  $2 \pm 0.5$  U/mg activity  
- Half-life: 20 min in 80°C

### KEY ADVANTAGES OF THE TECHNOLOGY

- Very high enzymatic resistance to heat
- Great stability over time during conservation, allowing to incorporate the technology into many industrial applications.

## POTENTIAL APPLICATIONS

- Bio-active molecule synthesis for pharma and agriculture
- Synthesis of bioactive natural products and their analogues
- Synthesis of antioxidant
- Water treatment
- Stabilization of food and beverage
- Lignocellulose pre-treatment
- Biosensors for detection of micropollutants

## THE TEAM

TEAM activity is focused on white biotechnology of laccases. The production of laccases, ligninolytic enzymes of fungal origin, is carried out in the different volume (10 - 200L) bioreactors. Thanks to the physicochemical and catalytic properties of laccases, various applications are envisaged in the food, health, environmental or industrial fields. Incorporated into materials, solubilized or immobilized, different laccase preparations are tested.

To modify some of these properties, genetic mutations are made after cloning of the laccase gene (s); the heterologous production of the protein makes it possible to study its modified function and / or structure.

The results of this research come from several disciplines: molecular biology, chemistry, computer science applied to microbiology (bacteria, yeast, fungi).

## THE INVENTORS

**Prof. Sigrid Flahaut** (Head of team, Applied Microbiology Laboratory at EBB) is Associated professor in microbiology at ULB. She has worked on several fundamental or applied research topics using lactic acid bacteria, microbial biofilms or fungal enzymatic production.



**Dr. George Songulashvili** (Senior researcher at EBB) has overseen various R&D programs, teams, and innovation portfolios, all centered around fungal protein and enzyme discovery. He has also experienced in developing new UPS and DSP bioprocesses and driving industrialization at larger scales.

## RELEVANT PUBLICATIONS

> [High yield production in seven days of Coriolopsis gallica 1184 laccase at 50 L scale; enzyme purification and molecular characterization](#), Songulashvili et. al. Fungal Biology, April 2016.

> [Production of a high level of laccase by submerged fermentation at 120-L scale of Cerrena unicolor C-139 grown on wheat bran](#), Songulashvili et. al. Comptes rendus Biologies, Feb 2015.