

## HARNESSING A VERSATILE ROBUST LACTONASE FOR BIOTECHNOLOGICAL APPLICATIONS

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Extremozymes have gained considerable interest as they could meet industrial requirements. Among these, SsoPox is a hyperthermostable enzyme isolated from the archaeon *Sulfolobus solfataricus*<sup>1</sup>. This enzyme is a lactonase catalyzing the hydrolysis of acyl-homoserine lactones; these molecules are involved in Gram-negative bacterial communication referred to as quorum sensing<sup>2</sup>. SsoPox exhibits promiscuous phosphotriesterase activity for the degradation of organophosphorous chemicals including insecticides and chemical warfare agents<sup>3</sup>. Owing to its bi-functional catalytic abilities as well as its intrinsic stability, SsoPox is appealing for many applications, having potential uses in the agriculture, defense, food and health industries. This enzyme have been rationally engineered and highly improved lactonase and phosphotriesterase variants were isolated<sup>4</sup>. Their biotechnological properties were investigated and their resistance against diverse process-like and operating conditions such as heat resistance, contact with organic solvents, sterilization, storage and immobilization were underlined<sup>5</sup>.

Lactonase improved variants were shown to drastically reduce virulence and biofilm formation in clinical isolates of *Pseudomonas aeruginosa* and to decrease mortality in rat pneumonia model<sup>6,7</sup>. The antibiofilm capacity of the enzyme was also proved to be of outmost interest for antifouling applications.

Enhanced phosphotriesterase variants were shown to efficiently decontaminate a broad panel of organophosphorus insecticides and were successfully incorporated into filtration devices for bioremediation purposes<sup>8</sup>. The degradation products generated through enzyme hydrolysis drastically reduced toxicity and increased regeneration capacity in planarian, an original Plathelminthes model.

Regarding their tremendous stability these variants are currently used to develop antibacterial medical devices, antifouling paintings and insecticide bioremediation tools.

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