DATE: Day____Month____Year 2025

SUMMARY of
FY2024 RESEARCH RESULTS REPORT
For International Collaborative Research with IPR, Osaka University

Research Title		Three-dimensional structure determination of industrially important enzymes isolated from extremophiles
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	Affiliation	Universiti Putra Malaysia
	Present Title	Head of Research Centre
Research Collaborator (Host PI)		Prof Dr Atsushi Nakagawa

Summary

Enzyme usage for industrial applications and commercialization purposes is broadly recognized. Over the decades, many efforts have been devoted to researching these potentially robust biocatalysts. They are distributed in all environments, ranging from moderate to extreme temperature habitats, with an intrinsic capacity to function under extreme conditions. Apart from being industrially important, enzymes also play a role in environmental management. Treatment of environment using chemical and physical methods are high-cost, environmentally persistent and may contribute to toxicity. The usage of enzymes has been proven to be eco-friendly, quick, and effective to clean up in situ pollutants and toxics from the environment. The biotechnological applications of some enzymes in bioremediation processes have been proven in previous studies, such as in pesticide biodegradation, biosensor development, plastic depolymerization, and wastewater treatment. To study the metabolic functions of an enzyme, more critical evaluation of protein structure is acquired, however, the gap between the known sequences and solved crystal structures is still huge. The gatherings of structural information via crystallization technique will help to have a better understanding on the structure-function relationship of enzymes. The employment of this approach will not only help bacterial enzymes to become the leading biocatalysts in an extensive array of industrial purposes, but as well be useful in environmental management. A number of high-resolution structures were solved based on the high quality datasets. The structures were deposited to PDBj and are scheduled to be released by earliest by June 2025. Structures obtained allows for the understanding of the functional and mechanistic aspect of multisubstrate enzymes. In addition thermal adaptation strategies were also identified which enables future improvement of the enzymes for academic and industrial purposes.

***Deadline: May 9, 2025**
***Please submit it to E-mail: tanpakuken-kyoten@office.osaka-u.ac.jp.**
***Please describe this summary within 1 sheet. Please DON'T add some sheets.**
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