

DATE: 4 May 2023

**SUMMARY of**  
**2022 RESEARCH RESULTS REPORT**  
**For International Collaborative Research with IPR, Osaka University**

<b>Research Title</b>		Crystallization and X-ray analysis of lignocellulose-degrading enzyme from Indonesia local isolate
<b>Applicant</b>	<b>Name</b>	Prof. Dr. Ni Nyoman Tri Puspaningsih, M.Si.
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	<b>Present Title</b>	Professor
<b>Research Collaborator (Host PI)</b>		<b>Prof. Genji KURISU</b>
<p><b>Summary</b></p> <p>GbtXyl43B and CelGH5 are lignocellulose-degrading enzyme group that has a high novelty in enzyme structure. Understanding the structural interactions between enzyme and its substrate can be used as a basis for engineering the properties of enzymes to improve the ability and capability of enzymes catalytic processes. Three-dimensional structure of enzyme can explain the catalytic mechanism of enzyme against substrate, so that it can be explained how the enzyme interacts with the substrate and the residues involved. Therefore, this study was conducted to determine the three-dimensional structure of GbtXyl43B and CelGH5, and also its interaction with the substrate/ligand by using an X-ray crystallographic approach. The specific aims of this research are; (1) optimization of enzyme crystal formation and (2) exploring x-ray crystallographic data. The method used in this study includes the stages of enzyme production, enzyme purification, and crystallization screening &amp; x-ray diffraction. Based on screening result using crystal screen kit, GbtXyl43B protein produces significant aggregation, so that it does not produce a crystal profile like the screening result of CelGH5. The results of CelGH5 screening provide information that it has the potential result for further processed to obtain crystal diffraction data. While GbtXyl43B must be re-optimized for getting the best conditions to produce crystals formed. The positive conditions of the formation of CelGH5 crystals were optimized to obtain a large crystal size and feasible for analysis using X-ray diffraction. The results of X-ray diffraction at Spring 8 on the optimized CelGH5 crystals formed, indicated that the CelGH5 crystals obtained were in a polycrystal state, so it is necessary for further optimization. The CelGH5 protein derived by the metagenome approach from compost soil of palm oil waste has enormous potential to be crystallized and to determine its three-dimensional protein structure. So, research related to determining the structure of CelGH5 needs to be continued in order to obtain optimal results in this collaboration. This research is still ongoing in order to obtain proper results and can be published scientifically, so that the achievement of this research in the form of research papers/articles cannot be achieved. The next researcher who continues this research activity and is still a research team, is expected to be able to achieve the desired results so that the expected joint scientific publications can be achieved.</p>		

**\*Deadline: May 12, 2023**

**\*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.**

**\*This summary will be published on the web.**