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The Degradation Potential of Naphthalene by Postbiotic of *Lactobacillus casei* Strain Shirota

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Structured Abstract

Background: Polycyclic aromatic hydrocarbons (PAH) are ubiquitous in the environment. Its potential as highly toxigenic and carcinogenic has been reported in previous study and recent study has found out the potential of PAH to be degraded as a way in removing these compounds from environment, food and others. Probiotics has been investigated by many studies on its ability to degrade or/and detoxify PAHs and reported to have the potential as PAHs degrade. However, the use of postbiotic as PAHs degrade remains scarce.

Methods: Thus, in this study postbiotic from *Lactobacillus casei* strain Shirota. LcS was studied to degrade one of the simplest PAHs which is naphthalene as one of the most common types of PAHs that could be found in the environment and other resources. In this study, the LcS was cultivated until 10^8 CFU/mL before being introduced to the MRS medium that was being introduced with 25% naphthalene. The turbidity and GC-MS analysis has been conducted on the assigned samples.

Results: Based on the result obtained on the turbidity and pH analysis it has been identified that the decreasing trend in MRS medium turbidity at 600nm has shown that as incubation time increases, the OD value of the sample will also decrease. The hypothesis has been proven by the degradation% of naphthalene by postbiotic LcS at 31.0%.cThe foundation was being proven by obtained results from GC-MS analysis such as the presence of 2,4-Di-tert-butylphenol as intermediate in naphthalene degradation and reason for the increased trend in pH analysis.

Conclusion: In conclusion, the findings of this study indicated that the presence of 2,4-Di-tert-butylphenol also indicates that the degradation of naphthalene had occurred in the MRS medium. The study infers that postbiotic bacteria such as LcS could be helpful in biodegraded food products that are exposed to naphthalene and other PAH structures.

Keywords: Naphthalene degradation, Postbiotic, *Lactobacillus casei* strain shirota,

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