ANALYSIS OF OCHRATOXIN A DEGRADATION BY PEDIOCOCCUS PENTOSACEUS AS A PROTIOCIA TREATMENT IN ANIMAL FEED

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I. INTRODUCTION

Ochratoxin A (OTA) is a mycotoxin produced by fungi that can contaminate various food products, posing a potential health risk to humans and animals. OTA has been linked to several health problems, including kidney damage, immune suppression, and cancer [1,2]. Probiotics, particularly lactic acid bacteria, have been suggested as a potential solution for reducing OTA levels in food products [3,4]. This study aimed to evaluate the safety and OTA degradation capacity of *Pediococcus pentosaceus*, a lactic acid bacterium commonly found in fermented foods, using a molecular docking approach and pharmacokinetic toxicity assessment.

II. MATERIALS AND METHODS

The study used in silico analysis to investigate the safety of *P. pentosaceus* and its potential to degrade OTA. The docking study was performed using the SwissDock tool to predict the binding energy between OTA and *P. pentosaceus*. Pharmacokinetic toxicity assessment was performed using the ADMET Predictor tool to evaluate the safety and toxicity of *P. pentosaceus*. In addition, several studies were reviewed to provide a comprehensive overview of the use of probiotics for reducing OTA levels in food products.

III. RESULTS AND DISCUSSION

The results of the docking study showed that *P. pentosaceus* has a high binding affinity towards OTA, indicating its potential to degrade OTA (Fig. 1d). Result of HPLC showed that after 24 h incubation, the group with 0.8 ppm of OTA plus candidate LAB culture exhibited no peak in reference to the OTA standards. Therefore, removal of OTA in the media was influenced by the *Pediococcus* strain (Fig. 1 a, b, c). The review of several studies suggested that probiotics, particularly lactic acid bacteria, have the potential to reduce OTA levels in food products. The mechanisms of OTA reduction by probiotics include adsorption, biotransformation, and enzymatic degradation. The study suggests that *P. pentosaceus* may be a promising dietary probiotic for reducing OTA levels in food products. However, further studies are needed to confirm these findings *in vivo*. The use of in silico methods is an efficient and cost-effective approach to investigate the safety and potential of probiotics for reducing mycotoxin contamination in food products. The review of several studies supports the potential use of probiotics, particularly lactic acid bacteria, for reducing OTA levels in food products. However, further research is needed to optimise the use of probiotics for reducing OTA levels in different food matrices.

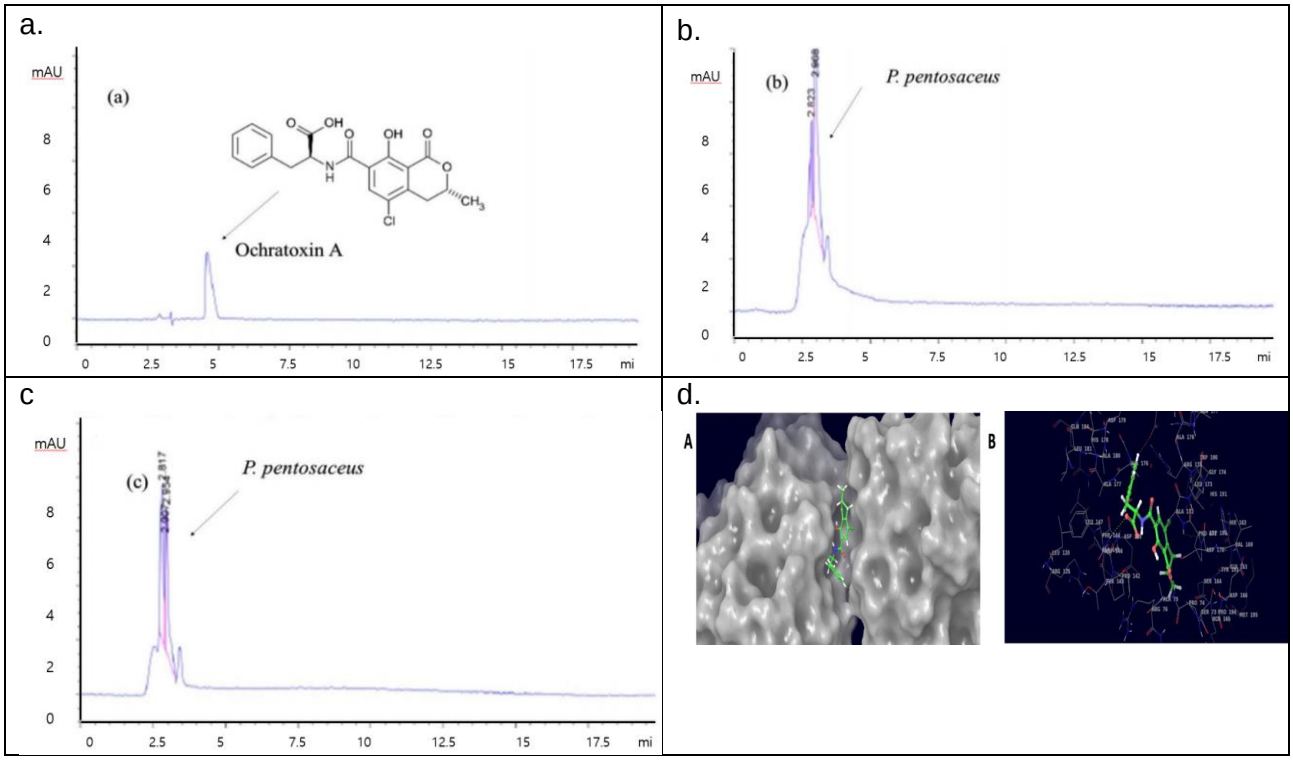

Figure 1. The OTA degradation (a) OTA degradation 0.8 ppm of OTA in MRS, (b) Control (*Pediococcus pentosaceus* in MRS without OTA) and (c) MRS after the incubation with *P. pentosaceus* and 0.8 ppm of OTA for 24 h, (d) representative image of docked complex of carboxylesterase.

IV. CONCLUSION

This study evaluated the safety and OTA degradation capacity of *P. pentosaceus* using in silico analysis and pharmacokinetic toxicity assessment. The results indicated that *P. pentosaceus* has a high binding affinity towards OTA, suggesting its potential for OTA degradation, and is safe for human consumption. The review of several studies supported the use of probiotics, particularly lactic acid bacteria, for reducing OTA levels in food products. However, further research is needed to optimize the use of probiotics for reducing OTA levels in different food matrices. Overall, the study highlights the potential of *P. pentosaceus* as a dietary probiotic for reducing OTA levels in food products and provides insights into the mechanisms of OTA reduction by probiotics.

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