

# Short-term intake of *Lactiplantibacillus plantarum* ZDY2013 fermented milk promotes homoeostasis of gut microbiota under enterotoxigenic *Bacillus cereus* challenge

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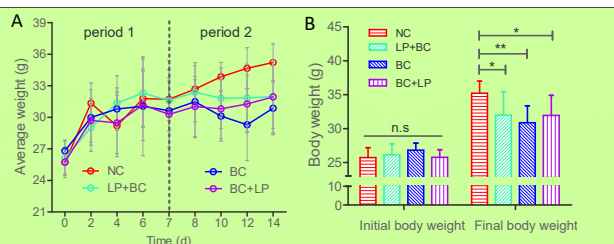
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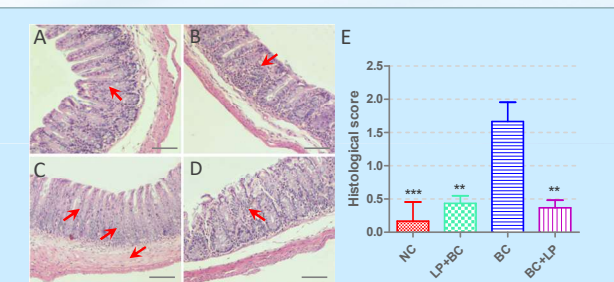
## Introduction

Probiotics have long been used as functional starter cultures for fermented foods and are associated with numerous health benefits. We investigated the ameliorating effects of *Lactiplantibacillus plantarum* ZDY2013 fermented milk on disease phenotypes triggered by enterotoxigenic *B. cereus* in mice. Results revealed that administration of pathogenic *B. cereus* for one week induced damages to intestinal structures and bowel function, accompanied by an imbalance of gut microbiota, which were rescued by supplementation of *L. plantarum* fermented milk. Our findings revealed that *L. plantarum* ZDY2013 has the potential to be a fermented starter in functional foods and retains its antagonism against *B. cereus* pathogenesis.

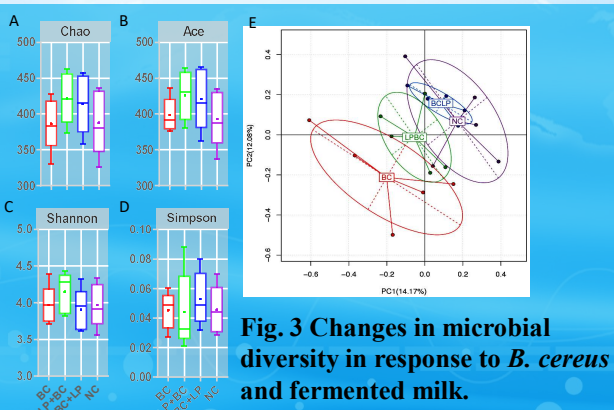
*Lactiplantibacillus plantarum* is an excellent starter used in functional foods with an apparent benefit to consumers. *L. plantarum* ZDY2013 can dynamically reduce polluted *B. cereus* during milk fermentation. Thus, we aim to further evaluate whether its fermented milk exerts similar properties in inhibiting the pathogenetic effects triggered by enterotoxigenic *B. cereus* in mice.



**Fig. 1** Amelioration of *L. plantarum* fermented milk on *B. cereus* induced body weight loss.

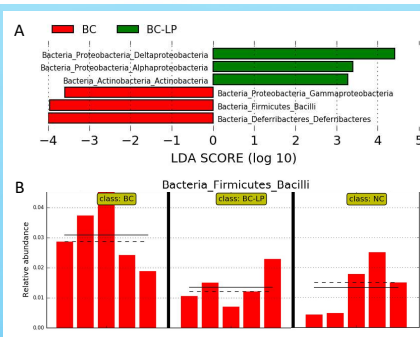
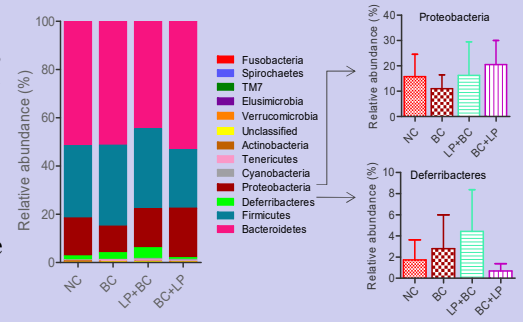


**Fig. 2** *L. plantarum* fermented milk alleviated the tissue damage elicited by enterotoxigenic *B. cereus*.

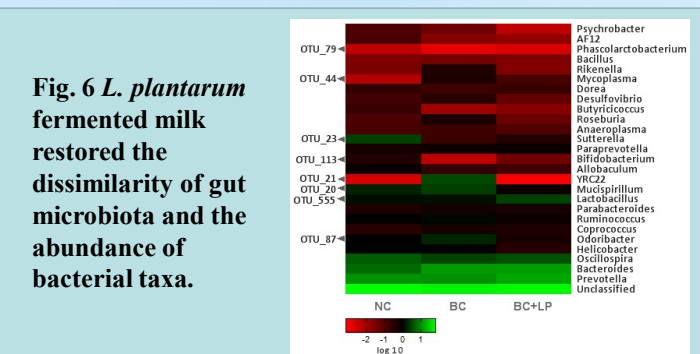


**Fig. 3** Changes in microbial diversity in response to *B. cereus* and fermented milk.

**Fig. 4** Allochthonous strains did not significantly change the taxonomic composition but altered the abundance of some species.



**Fig. 5** *L. plantarum* fermented milk restored the abundance of specific bacterium.



**Fig. 6** *L. plantarum* fermented milk restored the dissimilarity of gut microbiota and the abundance of bacterial taxa.

## Conclusion

*L. plantarum* ZDY2013 fermented milk exerts a crucial protective role in supporting gut health, possibly owing to its regulation of the gut microbiota and enhancement of probiotics. Our study contributes an understanding of the association between functional food intake and food-borne disease prevention, indicating that the intake of probiotics fermented milk following pathogen invasion may have greater efficacy in exerting their protective properties.