

# The synergistic effect of probiotics bacteria to reduce acrylamide in food

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## Background

- Acrylamide (AA) is a chemical substance that may lead to cancer. 
- Cooking methods such as baking, roasting and frying may form acrylamide unintentionally.



- Probiotics can remove acrylamide by physically binding with it through the cell walls of bacteria and produce enzymes to break it down.

## Objectives

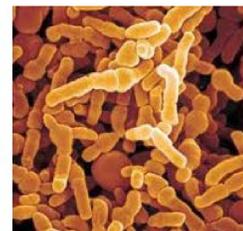
- To investigate the efficacy of 3 probiotic strains in reducing different concentrations of acrylamide standard solutions alone and in combination.
- Probiotics
  - Lactobacillus acidophilus*
  - Lactobacillus casei Shirota*
  - Bifidobacterium longum*



*Lactobacillus acidophilus*

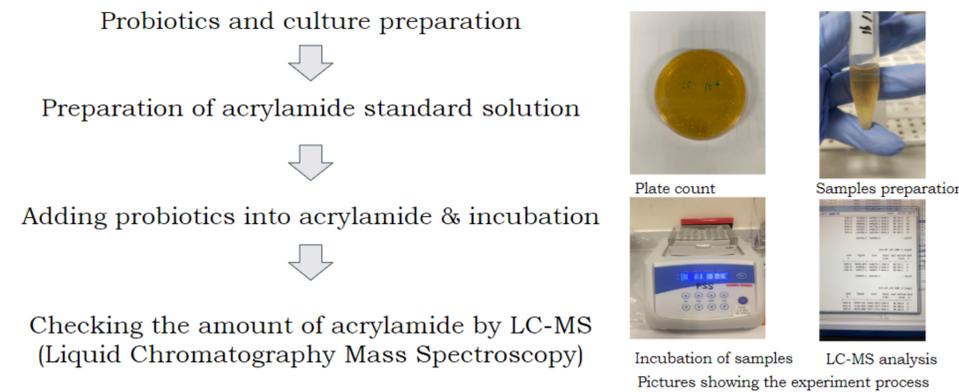


*Lactobacillus casei Shirota*



*Bifidobacterium longum*

## Methodology



## Findings

- Fig 1. shows that *Lactobacillus acidophilus* has the highest AA reduction ability, which can reduce around 32-35% of acrylamide content at these 3 concentrations among the selected probiotics.
- Fig 2. shows that the combination of *Lactobacillus casei Shirota* and *Bifidobacterium longum* had the highest synergistic effect in acrylamide reduction, which can reduce around 42% to 57% of acrylamide content at 3 concentrations among the selected probiotics.

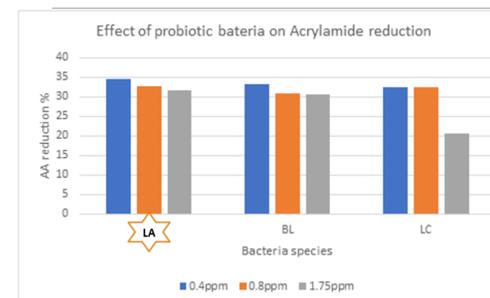


Fig 1. LA: *Lactobacillus acidophilus* BL: *Bifidobacterium longum* LC: *Lactobacillus casei Shirota*

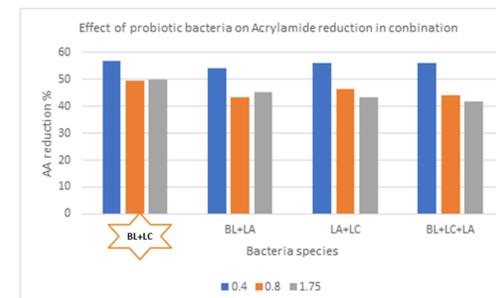


Fig 2. LA: *Lactobacillus acidophilus* BL: *Bifidobacterium longum* LC: *Lactobacillus casei Shirota*

## Conclusion

- Lactobacillus acidophilus* was the best probiotic in reducing AA among the three.
- The combination between *Bifidobacterium longum* and *Lactobacillus casei Shirota* had the highest synergistic effect in AA reduction.
- At low AA concentration, the AA reduction ability is higher than that at a high AA concentration.

## Future studies

- The bio-accessibility of acrylamide with and without the addition of the selected probiotic or probiotic combination using an in vitro digestion model under simulated gastrointestinal digestion conditions can be investigated.

## Consideration for future implementation

- Reduce acrylamide content in snacks, such as biscuit and chips, by adding probiotics during pre-processing and pro-processing steps.



## Reference

- Stadler, R., Blank, I., Varga, N., Studer, A. & Stadler, R. (2002). Acrylamide from Maillard reaction products. *Nature*, 419, 449-50.