

# The Effect of Probiotic Bacteria in Reducing Acrylamide Content in Coffee

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## Background

Acrylamide (AA) is an industrial chemical widely applied in paper, pulp, textiles and construction. In 2002, acrylamide was detected in food which raised public health concerns as acrylamide was classified as a Group 2A (probably carcinogenic to human) chemical by the International Agency for Research on Cancer (IARC) in 1994. It is naturally formed in starchy food products processed in a temperature of 120°C or higher. Thus, acrylamide is normally found in potato chips, biscuits and roasted coffee beans. According to the research from the Centre for Food Safety in Hong Kong, over 99% of biscuits or snacks contained acrylamide. To reduce the amount of AA in food, probiotic bacteria were selected to evaluate the ability to reduce acrylamide in food.

## Research Objectives

The project aims to evaluate the efficacy of three different probiotic strains: *Bifidobacterium longum* (BL), *Lactobacillus acidophilus* (LA) and *Lactobacillus casei Shirota* (Yakult bacteria) (LC) in reducing the acrylamide content of acrylamide standard solution.

- To review the possible factors affecting the level of acrylamide in coffee.
- To study the capacity of probiotic bacteria in the reduction of acrylamide.

## Literature Review

### Mitigation strategies for acrylamide :

- Pre-processing stage
- Processing stage
- Post-processing stage
  - Probiotic bacteria had the ability to reduce acrylamide levels by an average of 30%-60%

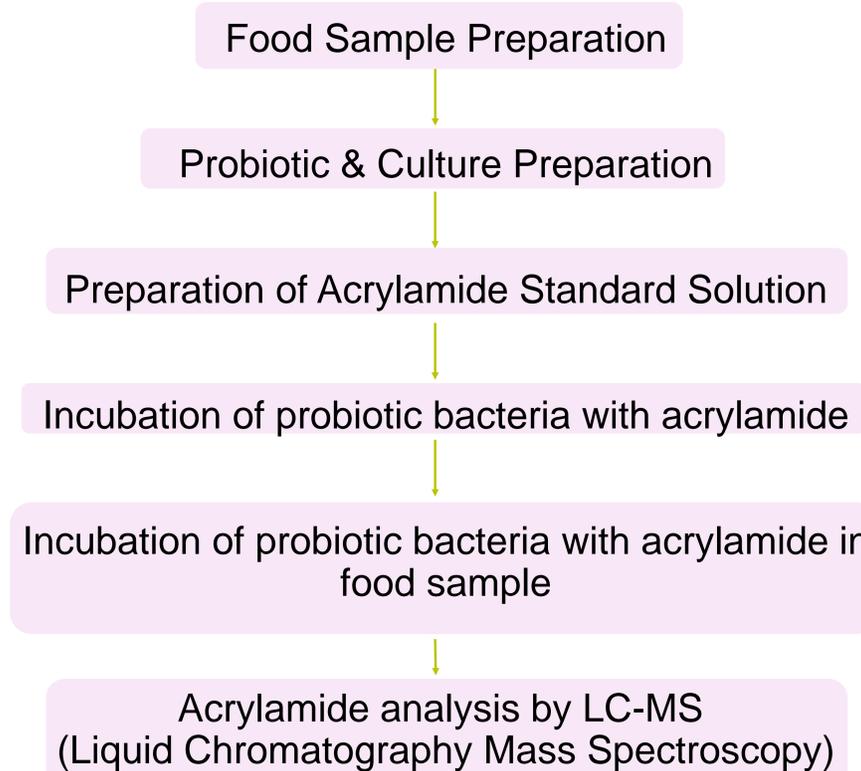
## Factors affecting the acrylamide content in coffee:

- Coffee species and quality of raw materials
- Roasting condition of coffee beans
- Post harvest processing method and storage
- Coffee beverage preparation

Coffee beverage	Acrylamide Levels (µg/l)
Turkish coffee	29.0-75.0
Espresso	11.0-36.0
Moka coffee	16.6
Filter coffee	6.0-16.0
French press <i>cafetiere</i>	9.0

Figure 1: Acrylamide level in coffee beverages

## Methodology



## Findings

In general, three probiotic strains showed a reduction ability on acrylamide with a reduction percentage ranged from 20% to 40%

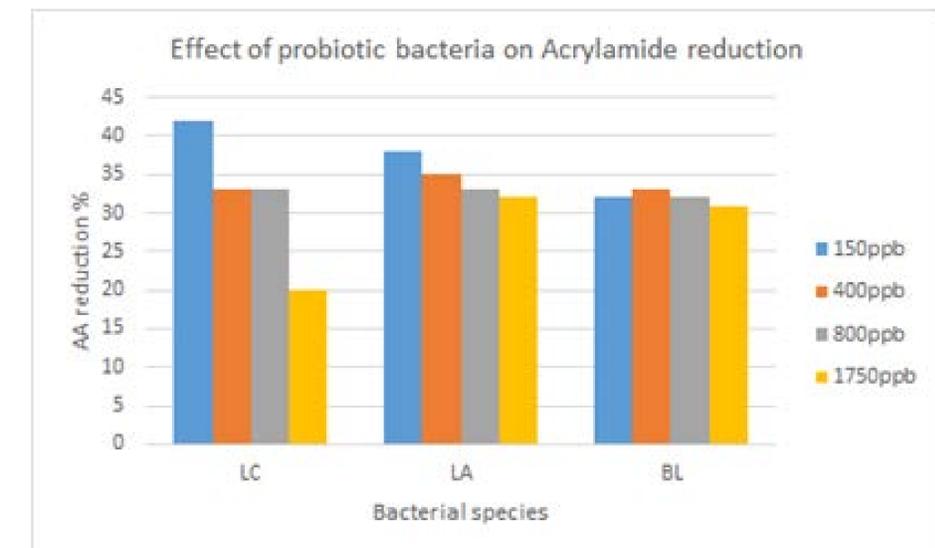


Figure 2: Effect of probiotic bacteria on acrylamide reduction

Overall, *L. acidophilus* showed an average of AA reduction percentage of 34.5 % at all concentration while both *L. casei Shirota* and *B.longum* showed an average of reduction percentage of 32% at all concentration.

## Conclusion

In conclusion, *L. acidophilus* had the highest reduction capacity of AA and had been the most effective on AA reduction. It also showed that the reduction percentage of AA decreased with increasing concentrations of acrylamide. In further studies, the ability of probiotic bacteria in reducing the absorption of acrylamide from the body should be evaluated with an *in vitro* digestion model.