

Investigating the Presence of Pathogenic Bacteria in Conventional & Hydroponic Iceberg Lettuce in Singapore

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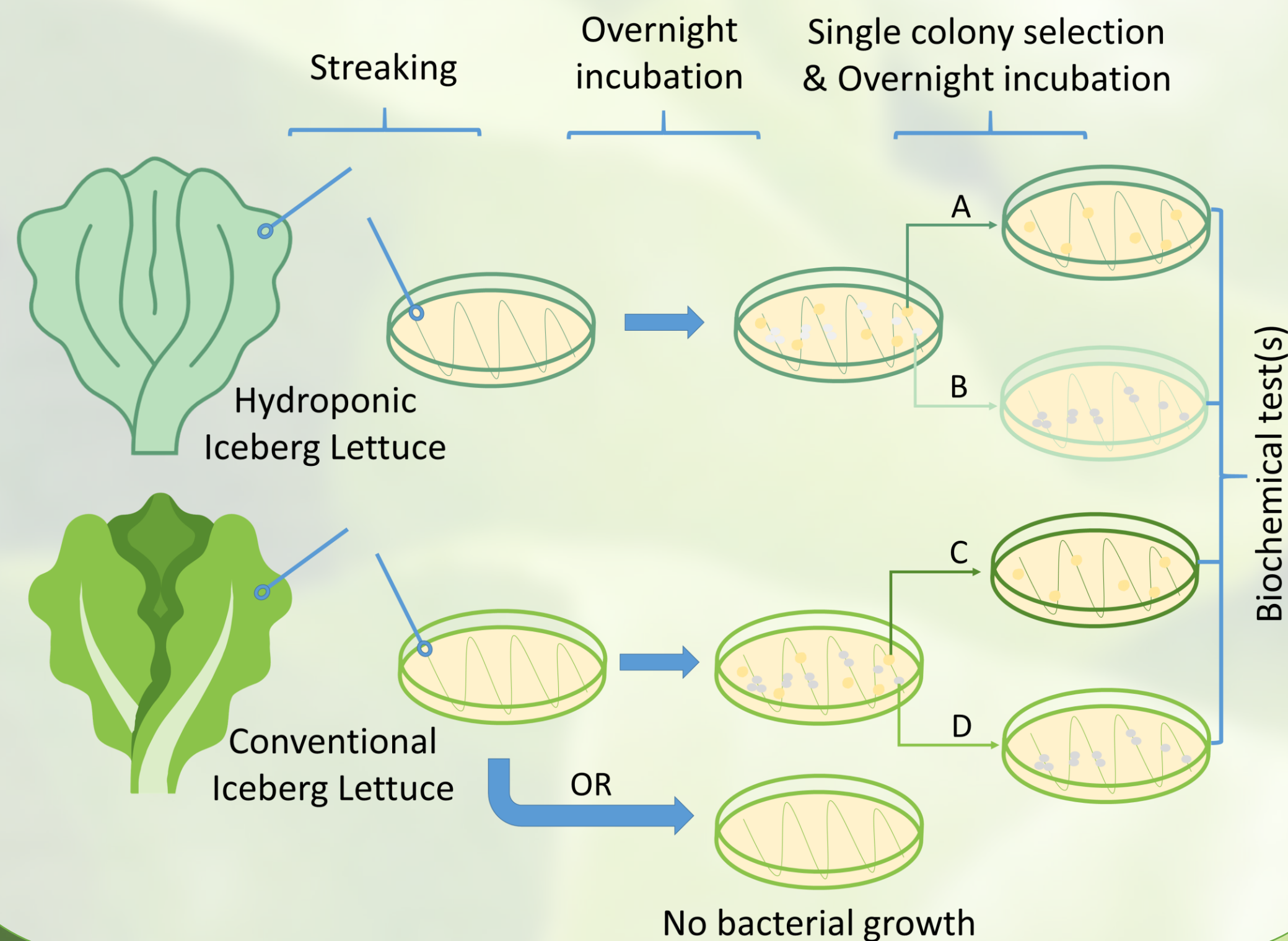
Introduction

- ❖ Commercially-sold green leafy vegetables in Singapore are grown conventionally, hydroponically & organically
- ❖ Less bacteria is found on conventionally-grown vegetables due to the routine use of chemical pesticides to prevent bacterial decay & increase shelf-life
- ❖ Some bacteria are pathogenic and can cause foodborne illnesses when consumed
- ❖ Foodborne illness outbreaks commonly involve fresh produce such as lettuce^[1]
- ❖ It is important to investigate the microbial risk in lettuce to ensure food safety especially when healthy eating habits have increased vegetable consumption^[2]

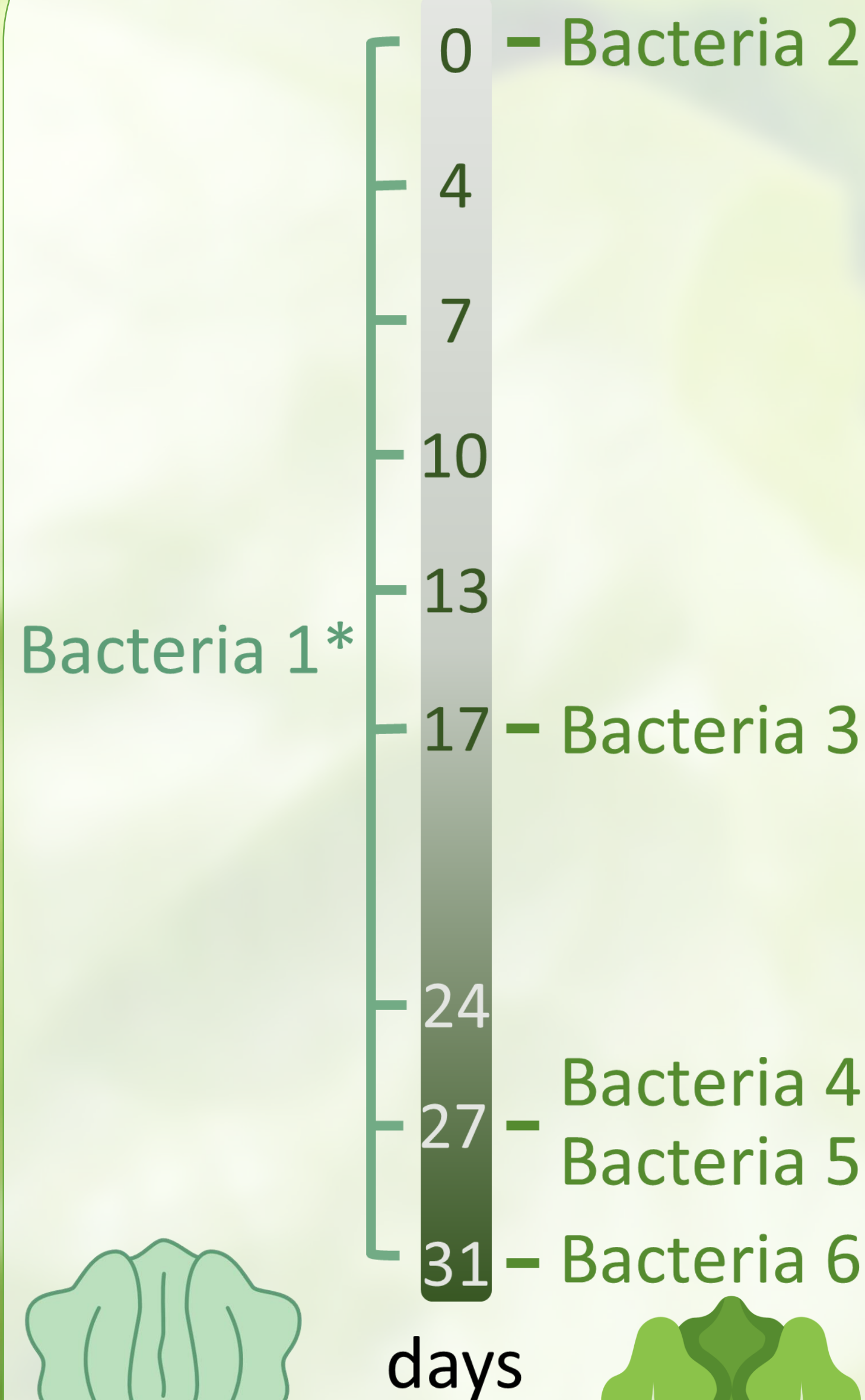
Aim

To investigate the bacterial profile in conventional & hydroponic Iceberg lettuce samples over 30 days

Methods



Results



❖ Continuous growth of 1 bacteria throughout observation period

❖ Significant bacterial growth only after 3 weeks of purchase

Discussion

- ❖ *Bacteria 1 found in the hydroponic lettuce is probably *Pseudomonas spp.* as
 - ❖ observed characteristics were verified from literature
 - ❖ it is commonly found in water & plant seeds such as dicots, a class consisting of lettuce
- ❖ Chemical-intensive growth conditions may have hindered bacterial growth in the conventional lettuce during the initial 3 weeks
- ❖ Although susceptible to *Escherichia coli* O157:H7 & *Salmonella*, both lettuces were not found to have the pathogens over the 30 days
- ❖ Possibility of slow decay due to storage of lettuce samples under refrigerated conditions



Future Work

- ❖ Further biochemical analysis is needed to confirm the identities of the 6 bacteria to determine whether they are spoilage and/ or pathogenic bacteria
- ❖ Investigate microflora within leaves in addition to surface as pathogenic bacteria can survive surface-produce washing when internalized through wounds or via stomata & roots^[1]

Acknowledgements

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References

- [1] Hou, Z., Fink, R., Radtke, C., Sadowsky, M. and Diez-Gonzalez, F. (2013). Incidence of naturally internalized bacteria in lettuce leaves. *International Journal of Food Microbiology*, 162(3), pp.260-265.
- [2] Kuan, C., Rukayadi, Y., Ahmad, S., Wan Mohamed Radzi, C., Thung, T., Premarathne, J., Chang, W., Loo, Y., Tan, C., Ramzi, O., Mohd Fadzil, S., Kuan, C., Yeo, S., Nishibuchi, M. and Radu, S. (2017). Comparison of the Microbiological Quality and Safety between Conventional and Organic Vegetables Sold in Malaysia. *Frontiers in Microbiology*, 8.