

Identification and development of biological control agents against bacterial pathogens on vegetables

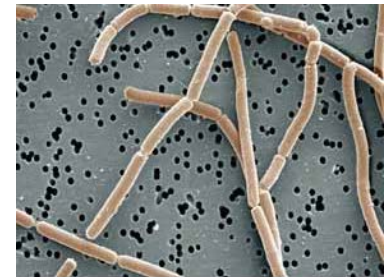
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Increasing demand of fresh fruits and vegetables:

Healthy foods: fresh, various vitamins, bioactive compounds

Easy and less preparation

Outbreaks of foodborne diseases:

Risks of contamination and only minimal processing

Human pathogens: *Escherichia coli* O157:H7, *E. coli* O101:H4, *Listeria monocytogenes*, *Salmonella*

Chlorine washing & other treatments:

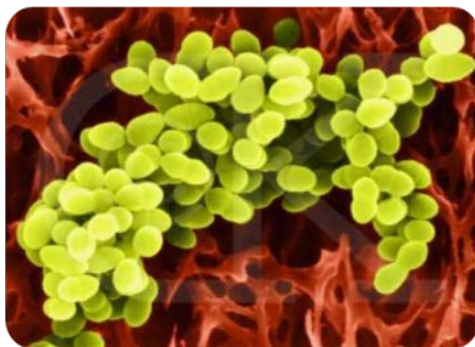
Incomplete effectiveness (reduces microbial load)

Chlorine residues are undesirable

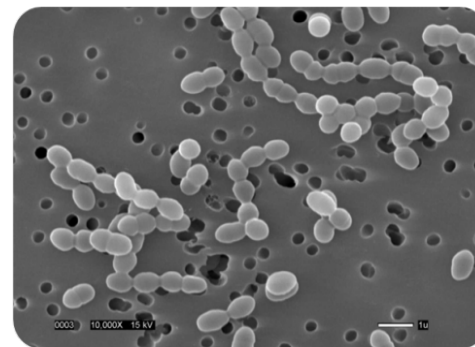


Lactic acid bacteria (LAB) as biocontrol agents:

- Non- pathogenic (GRAS-generally regarded as safe)
 - Used in a variety of food fermentations and as probiotics
 - Naturally present on foods (fruits, veges, meat) – 1000's per serving
- Produce antimicrobial compounds (bacteriocins, organic acids [lactic acid], hydrogen peroxide, other small molecular weight compounds)
- Absence of adverse effects: browning, off odors, harmful residues



Lactococcus



Leuconostoc

OBJECTIVES

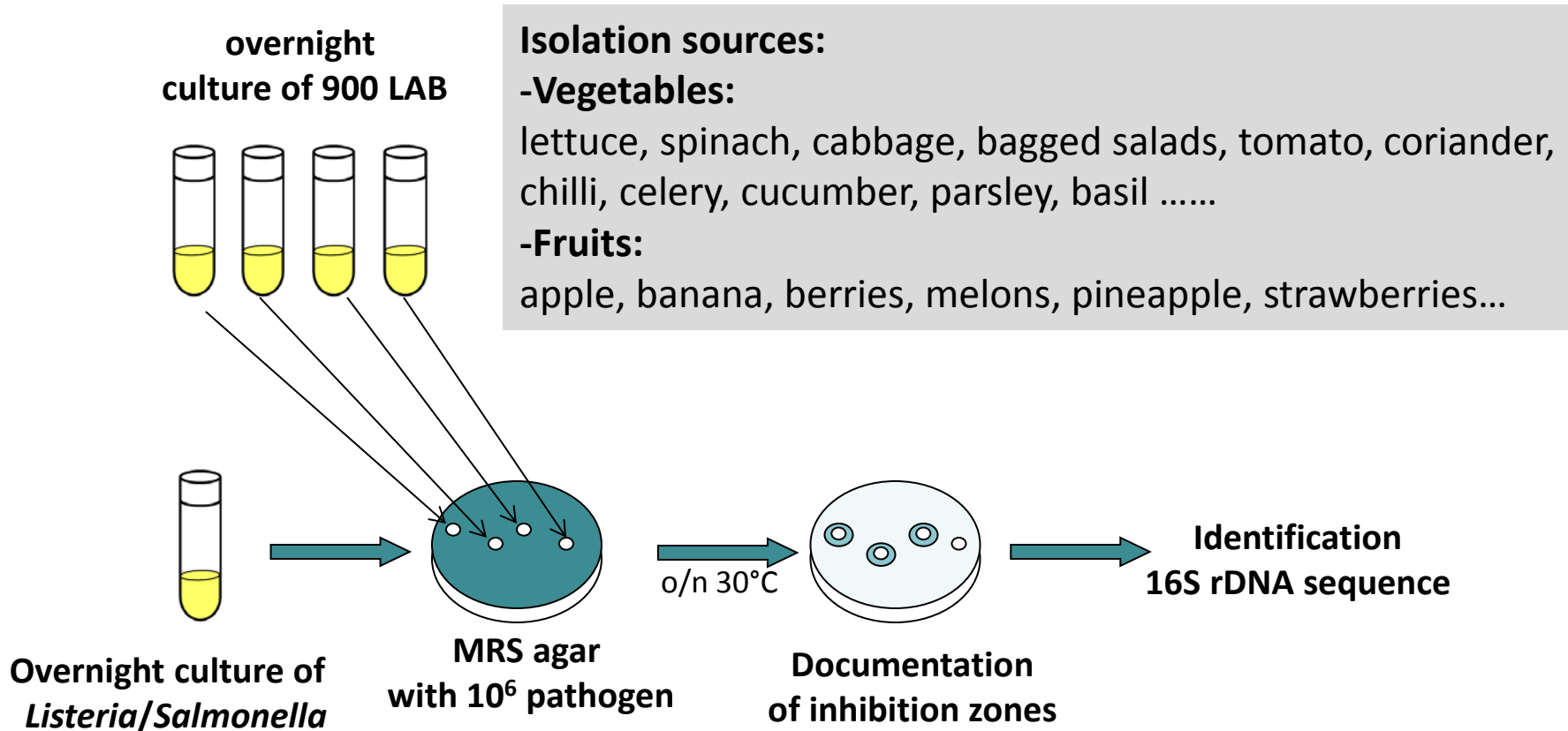
Research hypothesis

- LAB isolated from fruits and vegetables show antimicrobial activity against pathogens

Objective

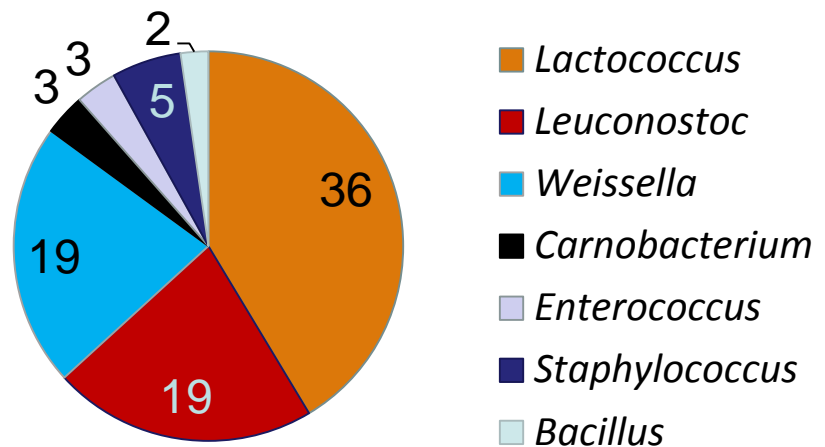
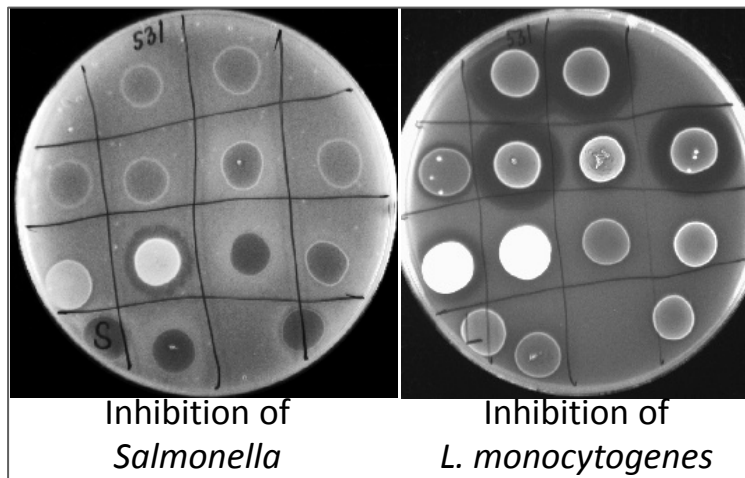
- To identify and investigate the biocontrol potential of LAB isolated from fruits and vegetables against pathogens on vegetables

Inhibitory potential of LAB from fruits and vegetables



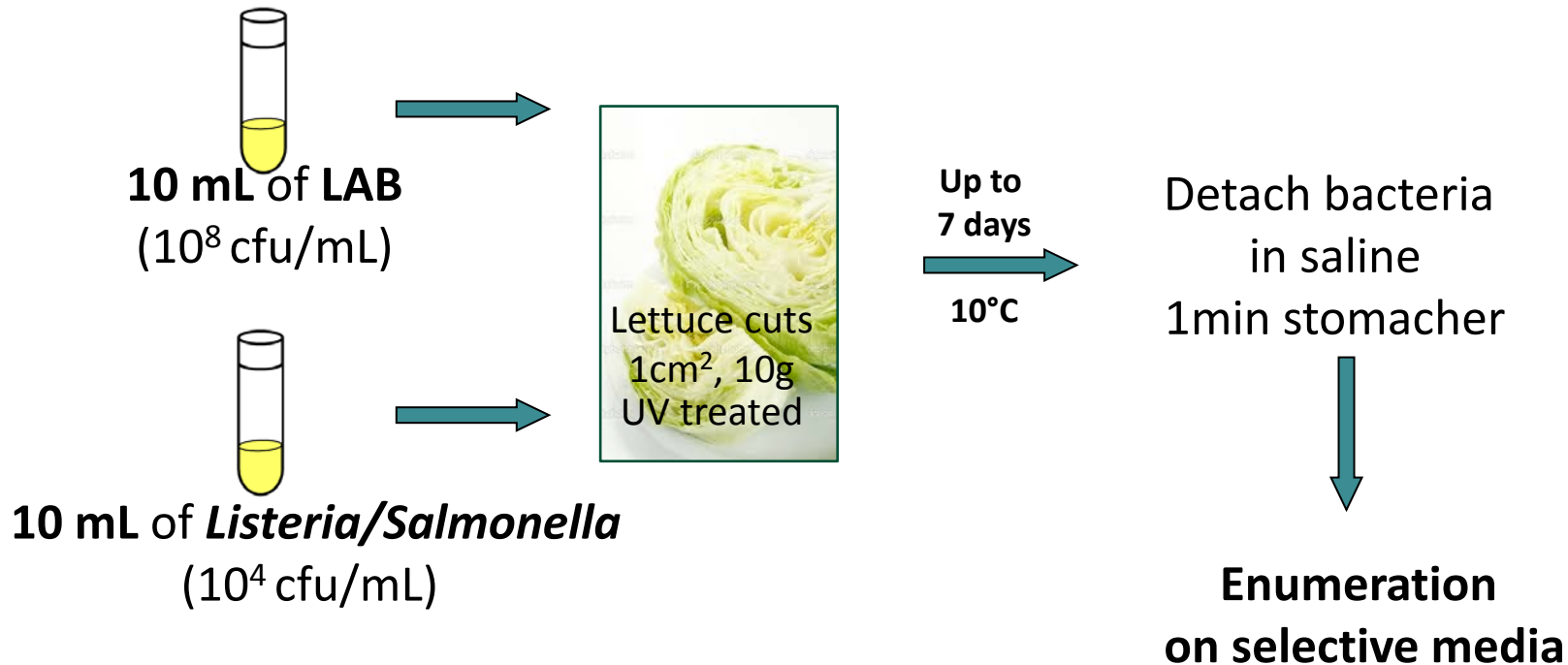
Biocontrol in foods

- Biomining antimicrobial LAB
 - Can re-apply to food as biocontrol agents
- Isolate ~ 900 LAB isolates from vegetables and fruits
- Screen for antimicrobial activity using agar spot assay



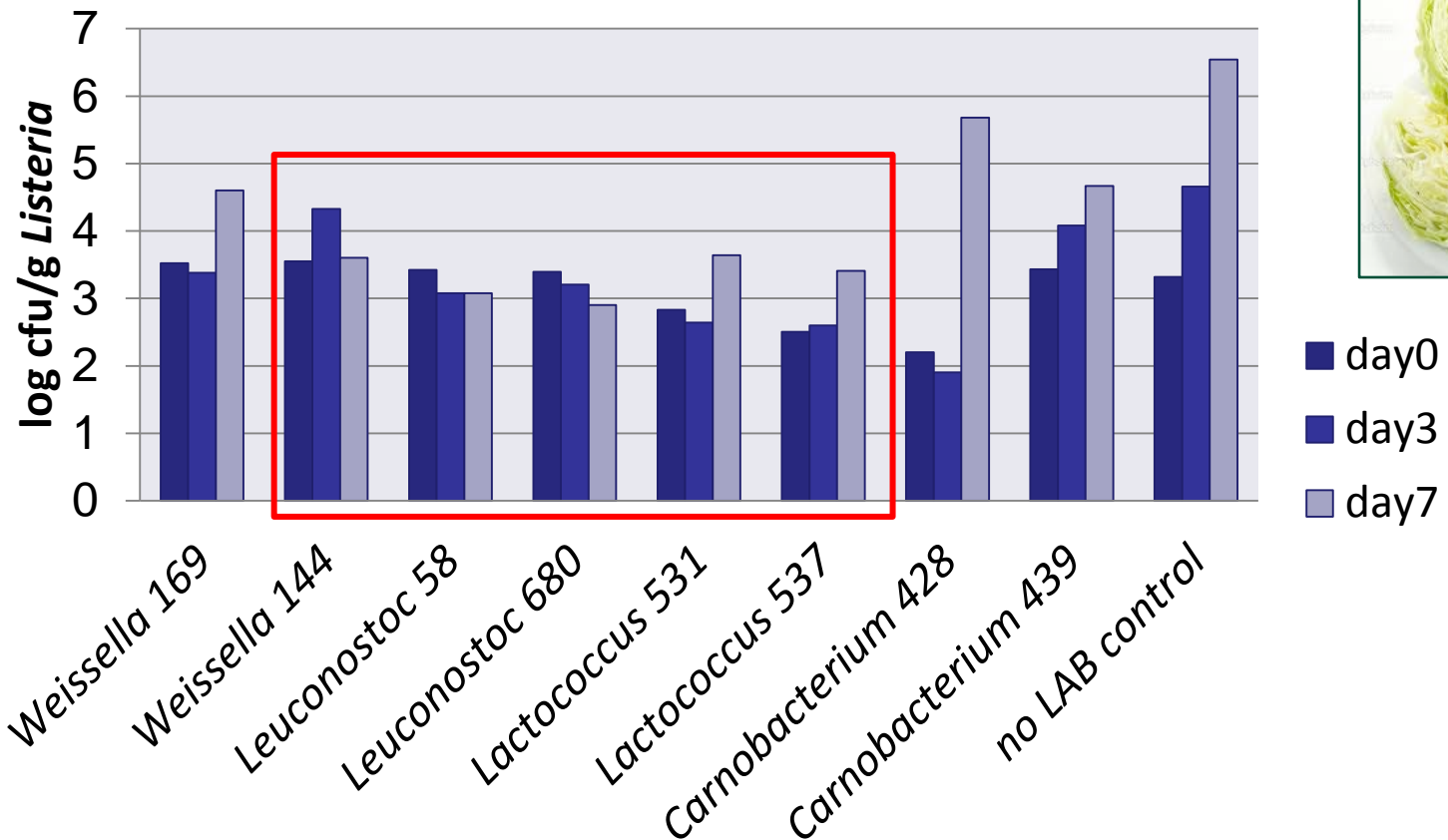
MATERIALS AND METHODS

Ability to inhibit pathogen growth on lettuce cuts



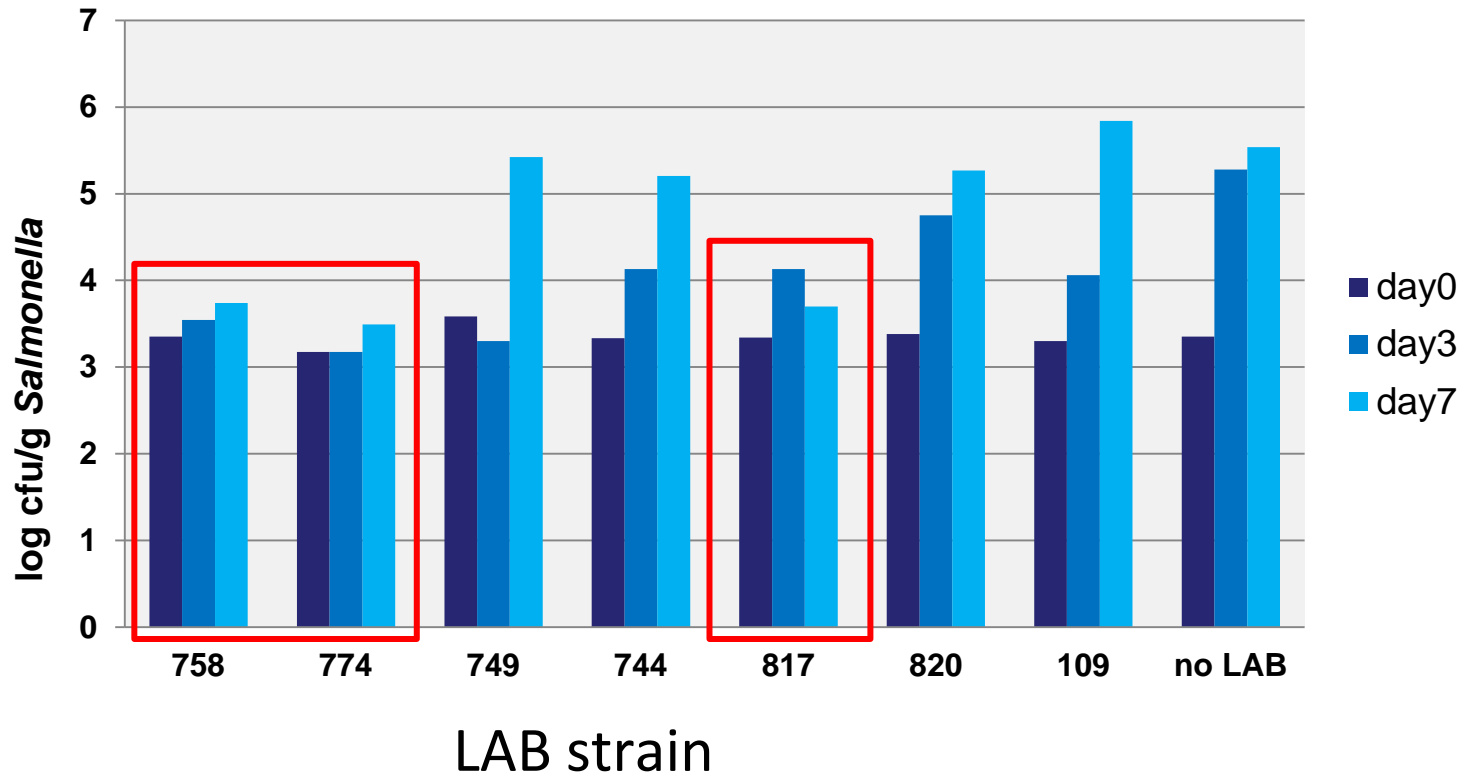
Inhibition of *Listeria* growth on lettuce

- L. monocytogenes* growth inhibition on lettuce cuts by LAB



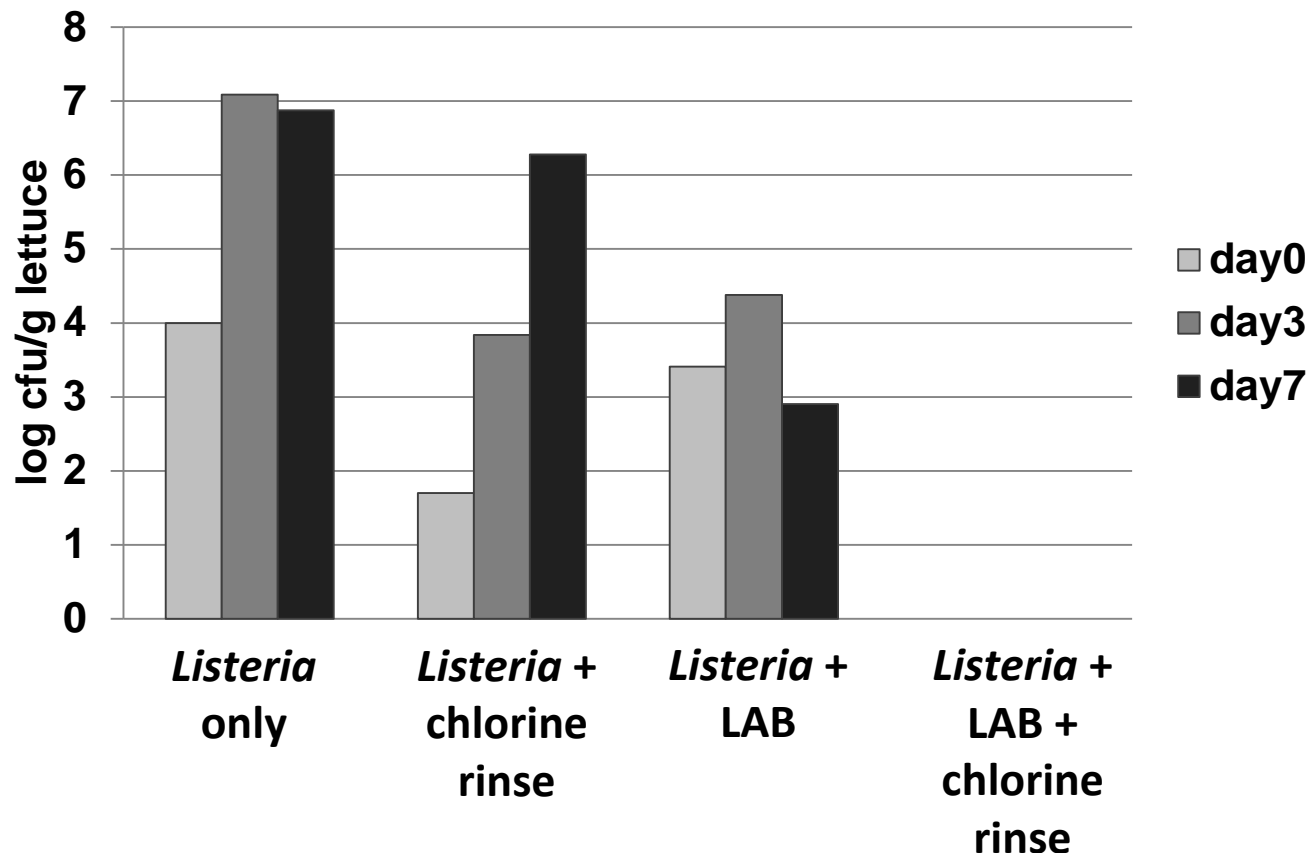
Inhibition of *Salmonella* growth on lettuce

- *Salmonella* growth inhibition on lettuce cuts by LAB

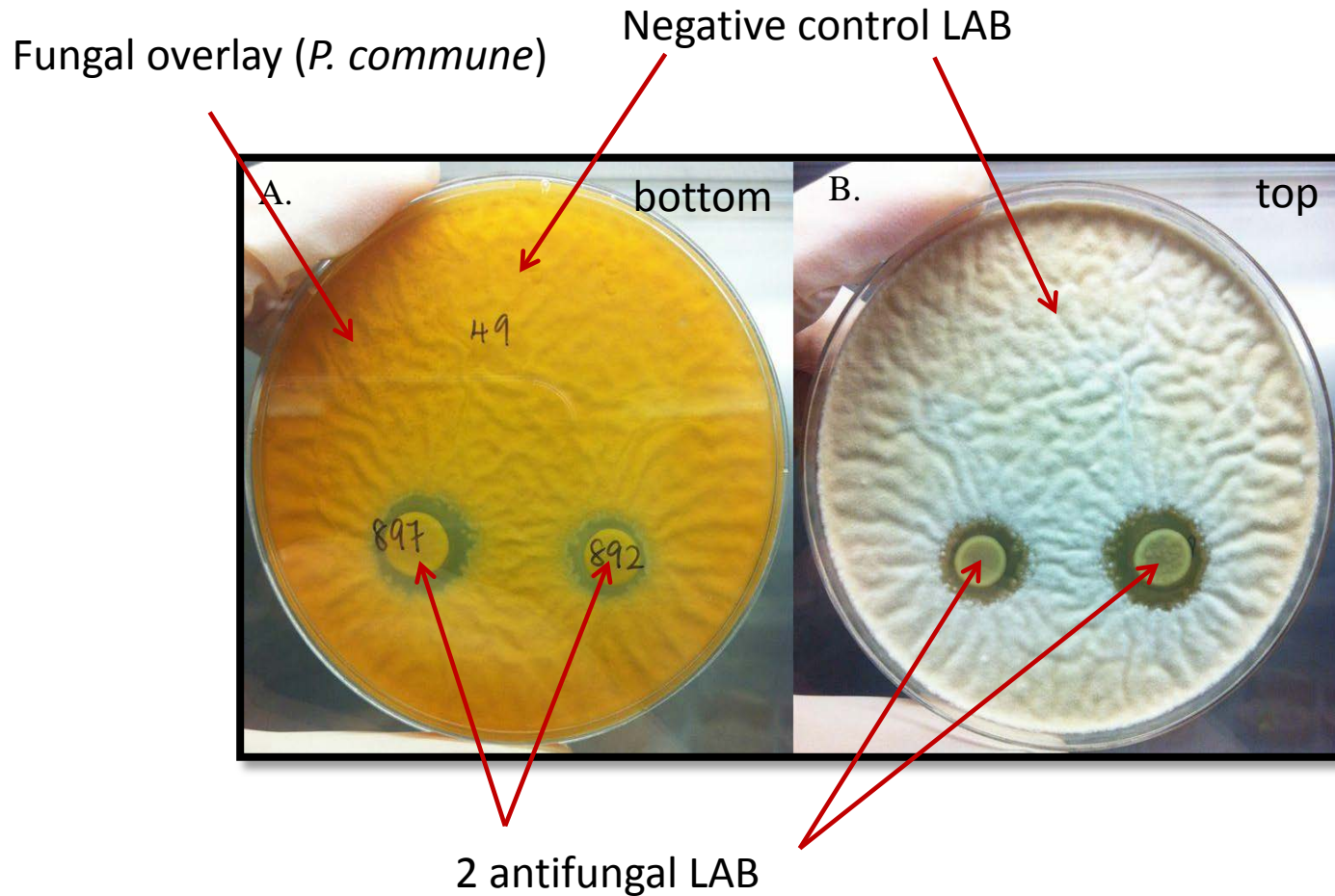


Combination of LAB + chlorine

- *L. monocytogenes* growth inhibition on lettuce cuts by LAB and or chlorine



Other applications of fruit and vege LAB



- 12 LAB from 900 tested had antifungal activity (all *Lactobacillus plantarum*)

CONCLUSIONS

- LAB have potential as antimicrobial agents for use as biocontrol agents on RTE vegetables
- Safety assessment of them is needed
- Understand mechanism of action
 - *Anti-Listeria Lactococcus* all have the nisin gene
- Effects on foods or gut microflora

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