

Novel methods to extend shelf-life

“Key Customer Day” - 20 April 2018

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Novel methods to extend shelf-life

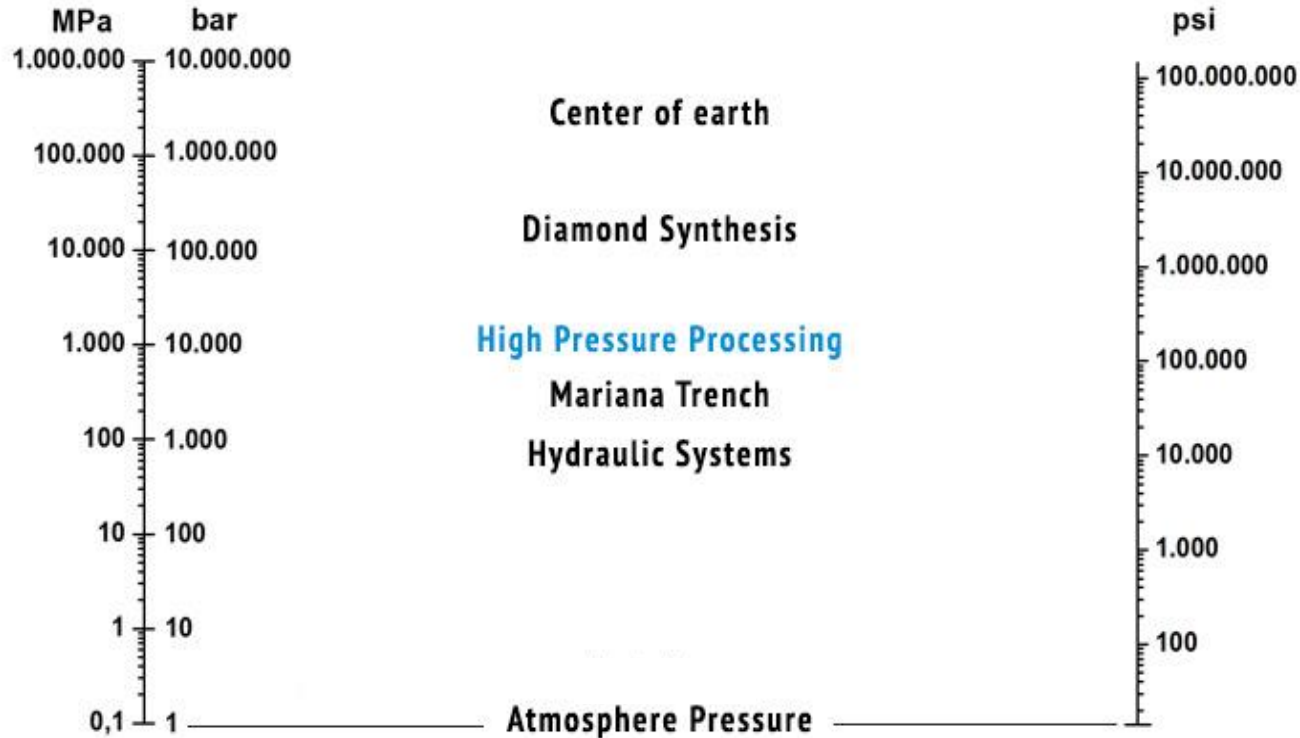
- Recent AFBI research - DAERA E&I project 15/1/21
- Effect of active packaging combined with HPP on shelf life
 - High Pressure Processing
 - Active Packaging
 - Experimental work
 - Results



What is HPP?

- Non thermal equivalent to pasteurisation
- Maintenance of natural attributes
- Extended shelf-life / Food safety

How high is high pressure?



Pressures above 400 MPa at cold (+ 4°C to 10°C) or ambient temperature can inactivate the vegetative flora (bacteria, virus, yeasts, moulds and parasites) present in food.

HPP equipment

AFBI facility :
research +
product
development



Commercial facility -
Up to 20+ million kg per year





What is active packaging?

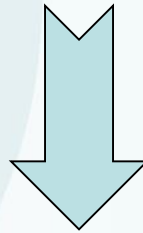
- Active functions beyond inert passive containment and protection.
- Engineered packaging films - anti-bacterial agents, etc. to control food degradation and extend shelf life.

Recent AFBI research

Effect of HPP in combination with active packaging on shelf life of raw minced beef

HPP
0, 400, 500 MPa

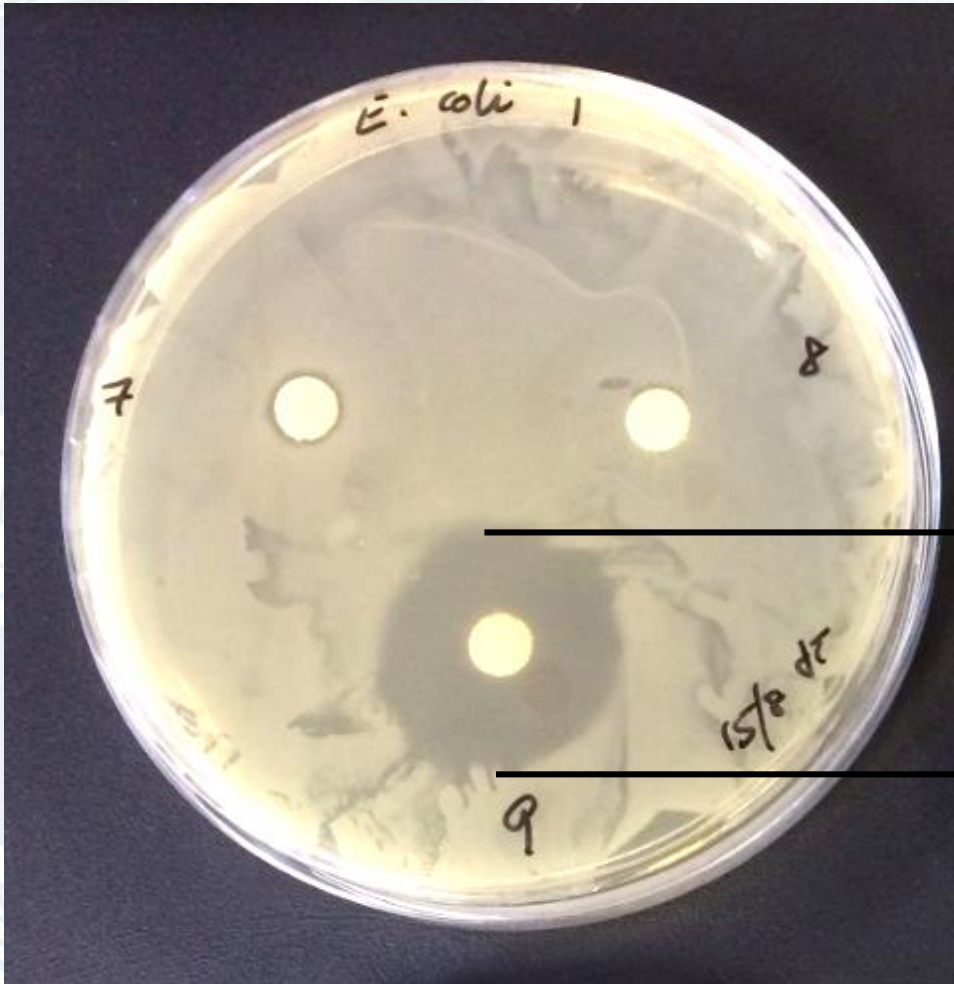
Active packaging
Essential oils



Shelf Life – measure spoilage organisms up to 70 days

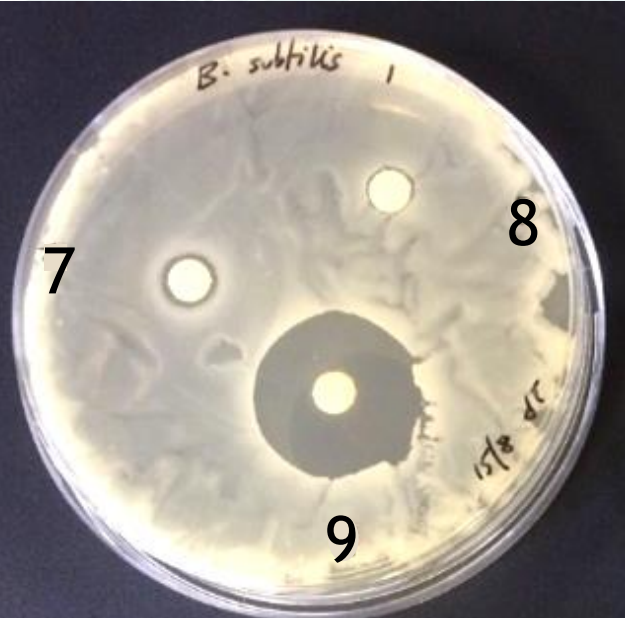
Selection of possible antimicrobials

Disk diffusion assay

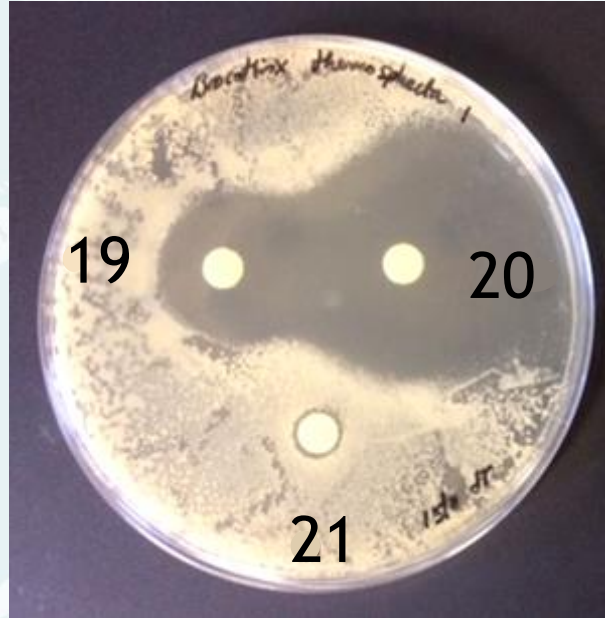


Zone of inhibition

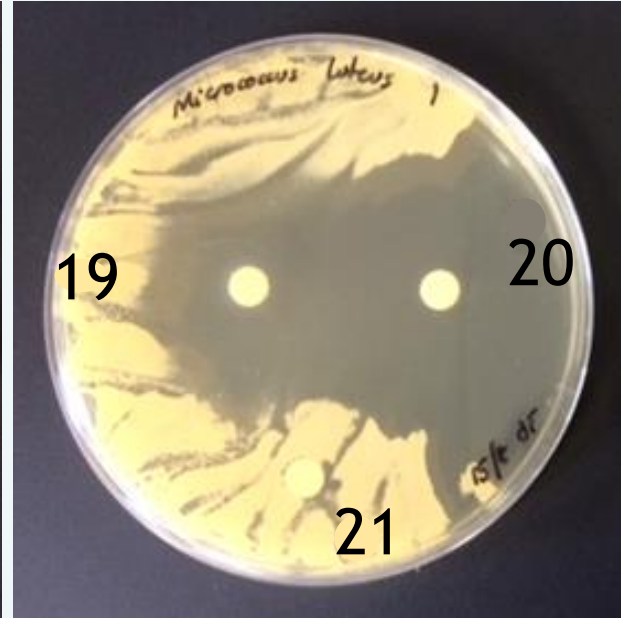
Effect of various antimicrobials on spoilage bacteria



Bacillus subtilis



Brochothrix thermosphacta



Micrococcus luteus



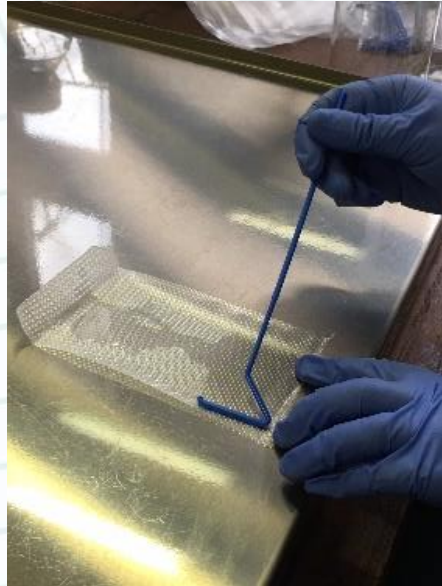
Selection of 3 oils which showed potential

- 9 Cinnamon bark oil**
- 19 Clove bud oil**
- 21 Lemongrass oil**

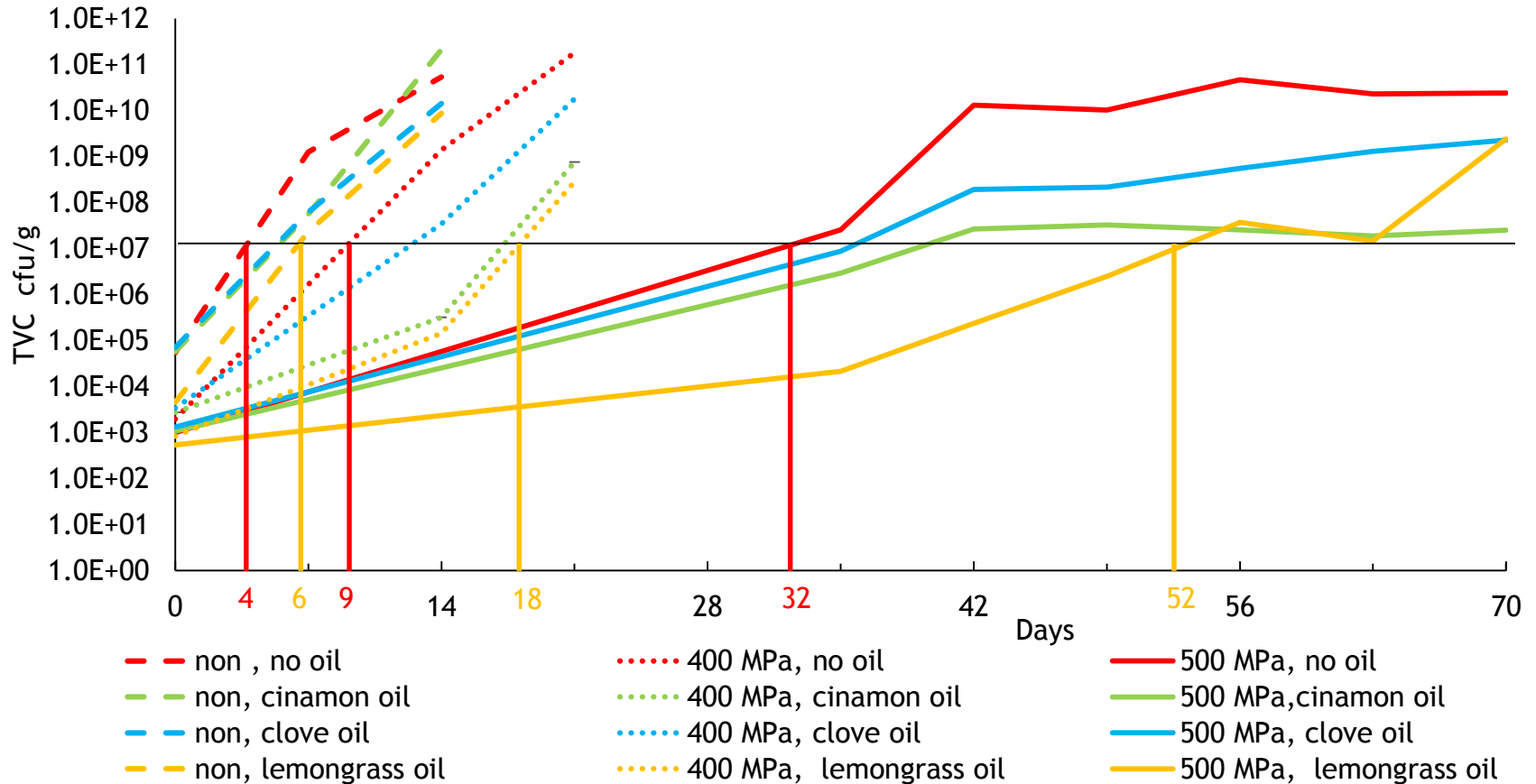
Sampling

- Several different supermarkets
- Same fat content of product
- 4 days from use-by date ∴ approx. 19 days post slaughter
- Some microbial load present
- Shorter sampling period
- Active packaging prepared on same day

Preparation of active packaging



Total Viable Count (TVC) as a measure of spoilage over time



Summary

- Potential for increasing the shelf life of raw minced beef.
- Application of 400MPa in combination with antimicrobial oil - increase of shelf life of up to 14 days beyond current use-by-date.
- 500MPa plus antimicrobial oil added a massive increase of shelf life by 48 days.
- Future work - commercial viability
 - » Consumer acceptability
 - » Food safety - pathogens