DOES *SALMONELLA* SP SURVIVE IN COW SLURRY DURING STORAGE?

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Introduction

Salmonella

Pathogenic microorganism

Enterobateriaceae family

Gastrointestinal tract of man and animals as its main reservoir

Release by the faeces of the infected animals

Cattle are considered one of the main disseminators

Introduction

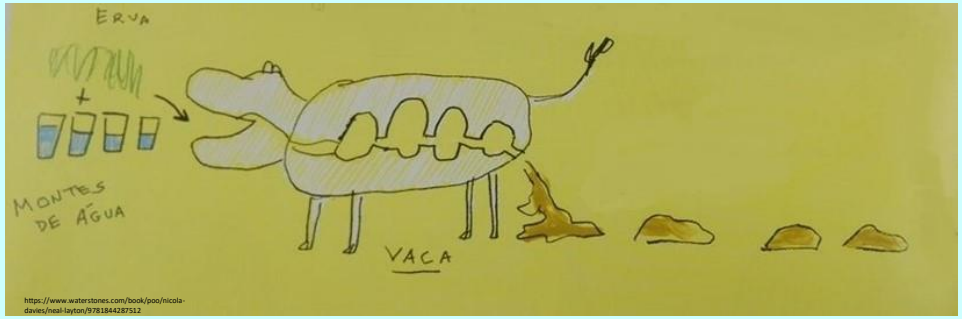
Can be isolated from animal effluents

One of the main forms of infection associated with production animals

Significant economic impacts

Objective

- The aim of the study was to evaluate the survival capacity of *Salmonella* sp. in the liquid fraction of dairy cow slurry stored at 20°C and 4°C during 90 days



Material and methods

- Mechanical separation of the slurry ⟹ Liquid fraction
- Screening for the presence of *Salmonella* sp.
- 1 liter of liquid fraction was dispensed in Kilner jars with 2L volume

Material and methods

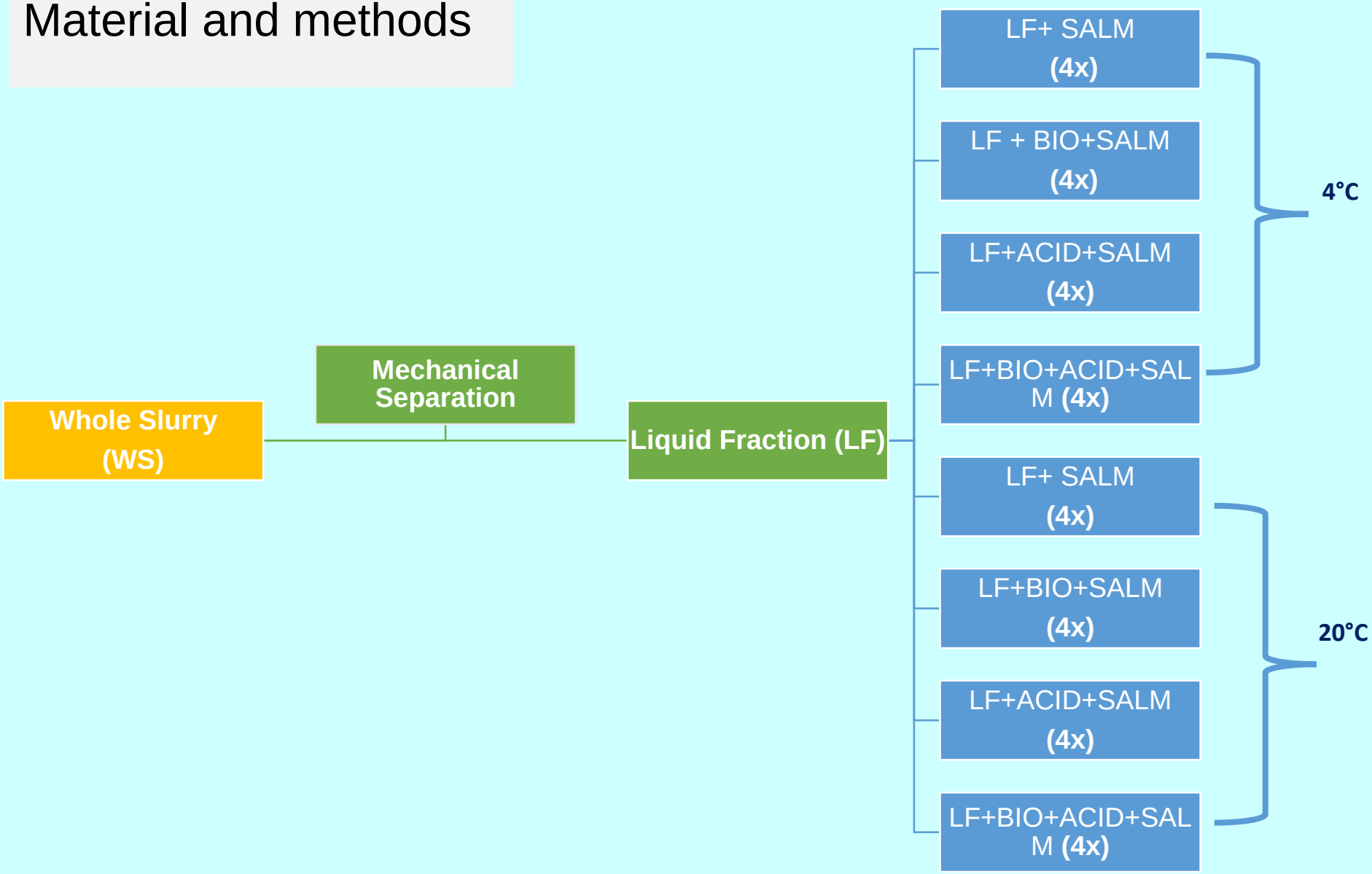
Three treatments were applied:
- ✓ Biochar
- ✓ Sulfuric acid
- ✓ Biochar + Sulfuric acid

4 replicas for each temperature

One control was maintained

1 mL of a solution of *Salmonella* sp. (0.5 Macfarland scale) was added

Material and methods



Material and methods

Sampling dates

0 3 8 15 30 60 80 90 days

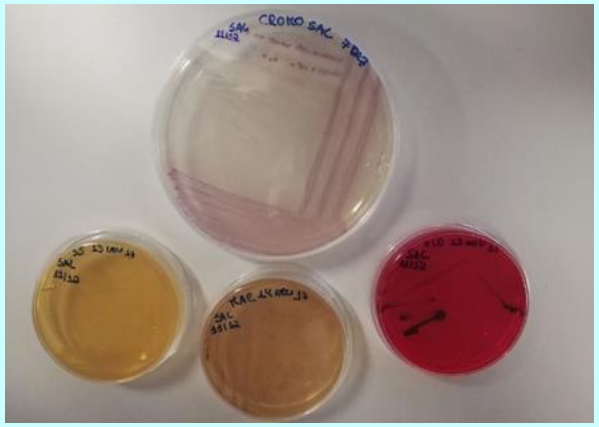
pH and weight measurements every fortnight

Microbiological determination of the presence of *Salmonell*a sp.:

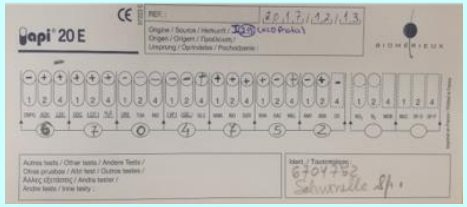
1. Non-selective pre-enrichment: 2 mL of sample in 100 mL Tryptone water ®
2. Selective Pre-enrichment: 1mL of the above solution to liquid medium of Rappaport ®

42.5 ºC

Material and methods



- MacConkey agar®
- Chromagar *Salmonella* agar ®
- Xylose lysine deoxycholate agar (XLD agar) ®
- *Salmonella-Sighella* agar, (SS agar) ®



- Gram staining; oxidase proof; Api 20E ®

Results

	LF + SALM		LF+BIO+SALM		LF+ACID+SALM		LF+BIO+ACID+ SALM	
Sampling dates	**4ºC**	**20ºC**	**4ºC**	**20ºC**	**4ºC**	**20ºC**	**4ºC**	**20ºC**
0	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
8	4/4	4/4	4/4	4/4	4/4	4/4	4/4	3/4
15	4/4	1/4	4/4	1/4	4/4	4/4	4/4	0/4
30	4/4	0/4	4/4	0/4	4/4	2/4	4/4	0/4
60	4/4	0/4	4/4	0/4	4/4	2/4	4/4	0/4
80	4/4	0/4	4/4	0/4	4/4	2/4	4/4	0/4
90	4/4	0/4	4/4	0/4	4/4	2/4	4/4	0/4

LF- liquid fraction of slurry; Salm- *Salmonella* sp.; Bio- Biochar; Acid- Sulphuric acid

Results

- In the microbiological analyses made before the storage → no *Salmonella*
- In the screening made 3 days after storage → all the samples give positive results;
- At day 15 → there were already differences between the two temperatures;
- All Samples stored at 4°C → give positive results until day 90;
- At day 30, the presence of *Salmonella* was only observed for two samples stored at 20°C;

→ situation that was maintained until day 90 after storage

Discussion

- ✓ *Salmonella* survival is influenced by storage temperature, suspended solids content and by pH value of the slurry (Guan and Holley, 2003; Arrus et al., 2006; Côté et al., 2006; Olszewska and Skowron, 2013; Biswas et al., 2016)
- ✓ High temperatures presents better results in the elimination of the pathogen (Plachá et al., 2001; Côté et al., 2006; Olszewska and Skowron, 2013)
- ✓ A study in pig slurry suggests that the storage of slurry in adequate conditions, separated, aerated and stored during 2 months becomes microbiologically safe to be applied to soil (Mannion et al., 2007)
- ✓ The treatment of slurry with sulphuric acid has the propose of maintain low the GHG emissions, and improve the nutrient value of the slurry (Fangueiro et al., 2015; Owusu-Twum et al., 2017)

Conclusion/future perspectives

- Slurry can represent a source of transmission of *Salmonella* sp.

farm environment

- manipulation and storage must be done with carefully and attention

- Difficulties correlating laboratory studies with on-farm conditions

- Additional studies

- the evaluation of bacteria survival correlated with different slurry treatments are needed
- studies that evaluate the survival of bacteria's on slurry applied to soil

Thank you!
Hvala!
Obrigado!

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