



EFFECT OF SPRAY-DRYING AND STORAGE TIME ON SALMONELLA INACTIVATION

A combination of spray-drying porcine plasma followed by post-drying storage for 14 days inactivated more than 9 logs of *Salmonella choleraesuis* and *Salmonella typhimurium* that had been added to the liquid plasma.

Pathogen contamination of animal-based ingredients is a major safety concern for both food and feed industries. During the last decade, a significant amount of data has been published about the safety of commercial spray-dried blood products relative to bacteria¹, and enveloped², and non-enveloped viruses³ affecting the swine industry. All of this research demonstrated the importance of several features during the manufacturing process of commercial blood products that contribute to the biosafety of these functional ingredients.

The objective of this study was to determine the effectiveness of the spray-drying process on the inactivation of *S. choleraesuis* and *S. typhimurium* spiked in liquid porcine plasma. In addition, a second objective was to test the additive effect of immediate post-drying storage of the dried samples at two different storage temperatures $4 \pm 2.96^\circ\text{C}$ or $23 \pm 0.3^\circ\text{C}$ (room temperature) for 14 days on the inactivation of both *Salmonella* strains.

SPRAY-DRYING AND STORAGE TIME FOR 14 DAYS INACTIVATE MORE THAN 9 LOGS OF BOTH SALMONELLA STRAINS



Effect of spray-drying porcine plasma at $200 \pm 5^\circ\text{C}$ Inlet temperature and two different outlet temperatures (80 ± 1 and $71 \pm 1^\circ\text{C}$) kept at normal residence time (RT) inside commercial driers and the effect of storage during 14 days at either 4°C or 20°C on the inactivation of *Salmonella choleraesuis* and *Salmonella typhimurium*.

SDPP: liquid porcine plasma spray-dried; RT: residence time of post-heating treatment after spray-dry of 60s (80.7°C) to simulate commercial conditions; RF: Log₁₀ Reduction Factor.

	<i>S. choleraesuis</i> CFU Log ₁₀ /g solids	RF	<i>S. typhimurium</i> CFU Log ₁₀ /g solids	RF
Inoculated Plasma	10.12 ± 0.17	691.9	9.56 ± 0.17	
71°C SDPP with 60 s RT	4.46 ± 0.14	-5.66	3.67 ± 0.13	-5.89
Storage 2 wk at 4°C	Absence	-10.12	Absence	-9.56
Storage 2 wk at 20°C	Absence	-10.12	Absence	-9.56
80°C SDPP with 60 s RT	4.82 ± 0.1	-5.30	4.21 ± 0.06	-5.35
Storage 2 wk at 4°C	Absence	-10.12	Absence	-9.56
Storage 2 wk at 20°C	Absence	-10.12	Absence	-9.56

References:

- ¹ Polo et al., 2002; Blázquez et al., 2018
² Polo et al., 2005; Gerber et al., 2014; Opriessnig et al., 2014; Pujols & Segalés, 2014
³ Pujols et al., 2008, 2011, 2014; Shen et al., 2011; Pérez-Bosque, Polo & Torrallardona, 2016
 Blázquez et al., 2018. Combined effects of spray-drying conditions and post drying storage time and temperature on *Salmonella choleraesuis* and *Salmonella typhimurium* survival when inoculated in liquid porcine plasma. Letters in Applied Microbiology 67(2):205-211. doi: 10.1111/lam.13017.