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A review on Salmonella control in fattening pigs through the use of potassium diformate (KDF) - European case studiesChristian Lückstädt; Peter Theobald; Horst Auerbach

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Salmonella control has a high priority in European pork production. It is a significant cause of human Salmonellosis and causes major economic losses in the pork production chain, through reduced productivity, increased veterinary and hygiene control costs. Preventing the spread of salmonella to the consumer requires special control measures during slaughter and processing. The extra cost of these controls is increasingly being transferred back to the producer in the form of financial penalties or the loss of the market for contaminated pigs.

Gut health is increasingly being shown to be effective against intestinal pathogens, a strategy that has only really been made possible through the removal of antibiotic growth promoters in feed. Creating and maintaining a healthy intestinal environment has become essential to productivity and food safety programmes alike.

S. enteritica typhimurium is the predominant serotype found in pig carcasses in Europe, accounting for around 71% of cases. Several serotypes are resistant to antibiotics, putting increasing pressure on producers to prevent contamination. While salmonella cannot be eradicated in pig units, it can be controlled to minimise the risk to consumers. Biosecurity plays a significant role in salmonella control. In feed compounding, although heat treatment is effective in reducing contamination of feed leaving the feed mill, this effect does not persist during transport, storage and subsequent outfeeding. When conditions within the feed are less conducive to bacterial infection, salmonella contamination can be reduced. The next critical control point is within the pig's gut itself, where conditions for bacterial growth may once again be optimal. Salmonella growth requires warmth (35-37°C is optimal), a moisture content greater than 12% and a pH between 4.5 - 9.0. It is no coincidence that the pig gut can provide salmonella everything it needs to thrive.

While biosecurity and hygiene in the feed mill and on farm are essential, the acidification of feed ingredients or finished feeds with organic acids also offers considerable benefits to salmonella control. Feed acidification is not only effective within the feed; possibly its biggest benefit occurs within the pig itself. Research trials in the UK, France and Ireland with 0.6% potassium diformate (KDF) feed additive, showed significantly reduced salmonella count in the feed as well as in the gut of pigs. This effect

is particularly well illustrated by data collected on 12 farms in Ireland (Lynch et al., 2007). The main objective of this investigation was to evaluate the efficacy of salmonella control measures on highly infected farms. Salmonella control has been compulsory under Irish law since 2002 and farm status is categorised by the percentage of positive pigs in a herd according to the Danish mix-ELISA test. Category 3 (>50% positive) farrow-to-finish farms and their associated fattening units were selected for the study. All the farms that were treated with KDF alone; or a combination of KDF with improved hygiene and biosecurity measures had notable improvements in both bacteriological and serological prevalence of *Salmonella* spp. All but one farm in which KDF was used ended the trial with a much improved salmonella status, with bacteriological prevalence also low on most farms. Using improved hygiene and biosecurity measures alone also improved salmonella status, but to a much lesser extent. The reduction in prevalence obtained by KDF alone, compared to the two farms which also implemented additional hygiene and biosecurity, demonstrates the additive's efficacy.

These findings are not unique, however. Studies by Dennis and Blanchard (2004) in the UK as well as most recently in France (Correge et al. 2010) concluded potassium diformate, to be an effective tool in a salmonella control strategy in commercial farms, reducing the percentage of salmonella positive pigs by 50% and in pork meat juice ELISA scores by 46%, respectively in grower finisher pigs. The UK trial also showed an improvement in daily gain of 7.7%, reduced mortality and a reduction in medicinal intervention compared to the rolling average for that unit. The economic benefit of implementing salmonella control was also evaluated.

Correge et al. (2010). Effect of acidifying fattening feed to reduce carriage of *Salmonella* in high prevalence pig herds. *Journees Recherche Porcine*, 217-218.

Dennis and Blanchard (2004). Effect of feeding potassium diformate on incidence of salmonella infection on a commercial unit. *The Pig Journal* 54, 157-160.

Lynch et al. (2007). Development of on-farm control measures for the reduction of Salmonellosis in slaughter pigs. *Teagasc*. 54 pp.