Conference Abstract
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Inactivation of porcine epidemic diarrhea virus (PEDV) by heat-alkalinity-time (HAT) pasteurization

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Adequate processing of potentially contaminated raw material before use as feedstuff is a crucial aspect in the prevention of feed-borne transmission of porcine epidemic diarrhea virus (PEDV). Spray-drying of plasma and storage at dried conditions were demonstrated to inactivate 4.2 $\log_{10}$ PEDV/ml and up to 2.8 $\log_{10}$ PEDV/g, respectively[1,2]. We examined the extent of PEDV inactivation by heat-alkalinity-time (HAT) pasteurization, an additional safety step in the production of spray-dried porcine plasma (SDPP).

Neutral (pH 7.2) or alkalinized (pH 9.2 or 10.2) cell culture medium (MEM) and plasma samples were mixed with PEDV CV777 to a final titer of 5.5 $\log_{10}$ $TCID_{50}$/ml. Aliquots (n=3) were incubated for up to 120 min at 4, 40, 44 or 48°C, and the residual virus infectivity was determined via standard endpoint dilution assay on Vero-Ba cells. Decimal reduction time (D-value) of the respective treatments was calculated as the negative inverse of the slope of the semi-logarithmic survival curve. The upper 95% confidence level (UCL95) was calculated as: $\mu + t_{\alpha/2, n-1} \sigma/\sqrt{n}$, with n = 3 and $t_{\alpha/2, n-1} = 4.303$. Data are presented as mean [UCL95].

Irrespective of presence of plasma, PEDV was not sensitive to pH 7.2 to 10.2 at 4°C. At neutral pH and in absence of plasma, $D_{48°C,pH\ 7.2}$ was 24.9 [45.5] min. This confirms moderate susceptibility of PEDV to heat treatment at 48°C. At pH 10.2, however, $D_{48°C,pH\ 10.2}$ in MEM was reduced to 81 [114] s. Moreover, presence of at least 90% porcine plasma strongly increased sensitivity of PEDV to heat and pH treatment, resulting in $D_{48°C, pH7.2}$ = 2.8 [6.7] min and $D_{48°C, pH10.2}$ = 20 [35] sec. Calculated $H_{48°C}A_{pH10.2}T_{10min}$ inactivation of PEDV in plasma and MEM were 17.4 and 5.3 $\log_{10}$ $TCID_{50}$/ml, respectively. Depending on the HAT-conditions, peak loads of PEDV that could potentially be present in abattoir collected porcine blood can be completely inactivated by HAT-pasteurization.

[1]Gerber *et al*., 2014

[2]Pujols and Segalés, 2014