

INTERNATIONAL TRADE

Title: Survey of Microbiological Status of Offal Products from Pork Processing Facilities in the United States – NPB #16-162

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Scientific Abstract: In the United States, five million metric tons of pork variety meats and other byproducts are generated each year with a large amount of this material being rendered to generate low value products like pet food, meat/bone meal, fat, and grease. An alternative use of the US variety meats would be to market and sell them to consumers in countries like China that prefer strong tasting pork products like the variety meats. The desirability of these products in foreign markets makes them higher value products, which could help increase the value of live hogs for US producers. To be able to market and sell these variety meats in global markets, it is important to understand the microbiological status of these products. Therefore, the objective of the current study was to: **Determine the microbiological profile of commonly consumed offal products (liver, heart, kidney, brain and intestine) as currently handled in pork production facilities in the United States. This microbiological profile will include tests for: mesophilic aerobic plate counts (APC), *Salmonella*, *Yersinia enterocolitica*, and *Toxoplasma gondii*.** To address this objective, samples of heart, kidney, liver, brain and intestine were obtained from 15 pork processing plants in 10 states found across the Midwestern and Southeastern pork-producing region of the US. Of the 370 offal samples tested in this study, 9 (2.4%) tested positive for *Yersinia enterocolitica*, 81 (21.8%) tested positive for *Salmonella*, 11 (3.2%) had APC >10⁷ CFU/g, and 0 (0%) tested positive for *Toxoplasma gondii*. Eight of the nine *Yersinia*-positive samples came from one processing plant indicating that *Yersinia* is not a common contaminant of US offal products. The 81 *Salmonella*-positive samples included 37 (46%) intestinal samples, 25 (31%) brain samples, 9 (11%) heart samples, 8 (9%) liver samples, and 2 (2%) kidney samples. High levels of *Salmonella* contamination of intestinal samples is not a surprising result, since it is a common component of normal intestinal microflora. In fact, *Salmonella*'s presence in the intestine likely acts as a source for contaminating other tissues in the processing plant environment. The high rate of *Salmonella* positives in the brain samples can likely be attributed to the non-standardized harvesting methods for brain. If we focus on the higher value variety meats

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including liver, heart and kidney, 10 out of the 15 plants did not have any positive *Salmonella* tests for these variety meats. In fact, two processing plants accounted for 15 of the 19 (79%) *Salmonella*-positive tests in liver, heart and kidney. Consistent with the observation that microbiological contamination of heart, liver and kidney is relatively low, we found 14 out of the 15 plants did not have any positive *Yersinia* tests and 15 out of 15 plants did not have $APC > 10^7$. These results indicate that most of pork processing plants are doing well at minimizing microbiological contamination of liver, heart and kidney. In summary, the primary benefits of this research study to pork producers include: 1) This survey of the microbiological status of pork variety meats establishes a baseline for future improvements in the production of offal products for export, 2) The result of this study demonstrate that the heart, liver and kidney as currently harvested by a large majority of processing plants are relatively clear of microbiological contamination, 3) *Salmonella* is by far the biggest microbiological problem for variety meat production; therefore, efforts to reduce *Salmonella* at all stages in pork production would be beneficial to the marketing of variety meats to export markets, and 4) Harvesting intestine and brain as edible offal will require additional work to reduce *Salmonella* contamination.