RESEARCH ABSTRACT

INTERNATIONAL TRADE

Title: **Depletion of penicillin G residues in sows after intramuscular injection**

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Investigators: Weilin L. Shelver
Sara J. Lupton
David J. Newman
David J. Smith

Institutions: USDA ARS Biosciences Research Laboratory, Fargo, ND 58102-2765
Dept. Animal Sciences, North Dakota State University, Fargo, ND 58108- 6050

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Scientific Abstract

Heavy sows (n=126) were treated with penicillin G procaine at a 5x dose (33,000 IU/kg) for 3 consecutive days by intramuscular (IM) injection using 3 separate patterns (treatments) of drug administration (42 animals each). Treatments differed by pattern and volume of penicillin G procaine administration. Sets of 6 animals per treatment were each slaughtered 5, 10, 15, 20, 25, 32, and 39 days after the last treatment; skeletal muscle, kidney, serum, liver, and urine were collected for penicillin G analysis by the Charm-KIS rapid screening assay and by LC-MS/MS. The Charm-KIS rapid screening assay reliably detected penicillin G residues in kidney juice and in urine, but false positive results were noted when the screening assay was used for skeletal muscle. The limits of detection for the Charm-KIS test were 20, 30, 20, 30, and 100 ppb for kidney, muscle, urine, serum, and liver, respectively. Urine was an excellent surrogate matrix for the detection of penicillin in kidney as assay results between the two matrices were highly consistent. Serum results did not correlate with kidney results at latter withdrawal periods. Penicillin residues in skeletal muscle averaged 23.5 ± 10.5 ppb at withdrawal day 5 for all treatments, but averaged 3,762 ± 1,932 ppb in kidney. By 15 days of withdrawal, skeletal muscle penicillin G residues were quantifiable in only one treated hog (3.4 ppb) but were easily detected in kidneys of 50% of the treated hogs, with kidney residues in all hogs averaging 119 ± 199 ppb (mean includes 8 non-detects counted at ½ the limit of detection). Using a hypothetical tolerance of 50 ppb and a ln-linear depletion model, the withdrawal period required for penicillin depletion to 50 ppb in skeletal muscle was 11 days, whereas a 47 day withdrawal period was required for kidney residues to deplete to 50 ppb. Using the 25 ppb FSIS action level for penicillin G as a tolerance, the withdrawal periods for muscle and kidney would be 13 and 51 days, respectively. The FARAD recommended withdrawal period of 15 days for hogs treated with extra-label doses of penicillin is adequate for skeletal muscle, but is inadequate for kidney. Slaughter of penicillin treated hogs after a 15 day withdrawal period, with edible offal (kidney and liver) discard would ensure the human food safety of skeletal muscle.