Contribution ID: **204** Type: **Oral**

Disposition of Tritium Labeled Diaveridine in Pigs, Broilers and Rats

As a sulfonamide antibacterial synergist, Diaveridine (DVD) is widely used for the prevention and treatment of avian coccidiosis and intestinal infection of animals. The metabolic profiles and tissue depletion of DVD in pigs, broilers, and rats were investigated to define the marker residue and target organ of DVD in pigs and broilers based on radiation tracing and high-resolution mass spectrometry technologies and provide the scientific basis for the formulation of food safety standards. The [3H] diaveridine was synthesized from 3-bromo-4, 5 Dimethoxybenzaldehyde, and varied by mass spectrometry and nuclear magnetic resonance. DVD was excreted rapidly in three animals. The excretion rate reached more than 90% on 7 days after administration. In addition to the parent drug (DVD0), 3 metabolites (DVD1, DVD2, and DVD4), 4 metabolites (DVD1, DVD2, DVD3, and DVD4), and 4 metabolites (DVD1, DVD2, DVD3, and DVD5) were also detected in pigs, broilers, and rats, respectively. Demethylation, binding to glucuronic acid after demethylation, α-C hydroxylation, amino binding to glucuronic acid, and binding to glucuronic acid after demethylation were the main metabolic pathways of DVD in three animals. DVD was widely distributed in pigs and broilers, and all tissues tested were highly radioactive. The radioactive compounds persisted the longest time in the kidneys of pigs and broilers, and the parent drug DVD0 persisted the longest time in the kidneys of pigs and broilers. Therefore, the kidney is the residual target tissue of DVD in pig and broiler and DVD0 was identified as a residual marker. The present research provided important fundamental data for the food safety evaluation of DVD, and will improve the formulation of the maximum residue limits of DVD in pigs and broilers.
Keywords: [3H] diaveridine; metabolism; distribution; residue marker; residue target

Affiliation

Huazhong Agricultural University

Country

中国

Email address

huanglingli@mail.hzau.edu.cn

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Chemical residues and contaminants in food and feed

Primary authors: HUANG, Lingli (Huazhong Agricultural University); Ms XU, Xiangyue (Huazhong Agricultural University)

Co-authors: Ms WEN, Lihua (Huazhong Agricultural University); Mr WANG, Liye (Huazhong Agricultural University); Mr PAN, Yuanhu (Huazhong Agricultural University)

Presenter: HUANG, Lingli (Huazhong Agricultural University)

Track Classification: Chemical residues and contaminants in food and feed