

研究论文

# 有机砷饲料添加剂对猪场周围及农田环境污染的调查研究

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**摘要** 对广东省长期使用阿散酸为饲料添加剂的15个大型猪场的周围环境及农田进行了调查, 结果表明: 猪场内长期施用猪粪为肥料的甘薯根内的总砷含量已为国家规定最高检出限 (0.5 mg/kg) 的3~6倍; 甘薯地土壤的砷含量介于25.83~55.54 mg/kg, 远远大于自然界最高砷含量的背景值 (15 mg/kg); 而且甘薯的各种组织的总砷含量与土壤砷含量成正比。绝大多数猪场鱼塘水的砷含量已超过渔业水质标准0.05mg/L; 虽然鱼肌肉的总砷含量未超过国家规定标准0.5 mg/kg, 但是在鱼的可食性组织脂肪、脑的总砷含量却远远超标, 约为肌肉组织中3~4倍。猪场排污口附近的土壤, 砷污染范围介于200~500m之间; 其中在距排污口约5m、50m的土壤, 砷的含量远超过自然界的砷含量的最高背景值15 mg/kg。长期施用猪粪作为肥料的稻田, 大多数土壤砷含量已超过国家规定的最高标准; 另外, 水稻有一定的砷富集能力, 而且水稻各种组织的砷含量与土壤的砷含量也存在明显的正相关。

关键词 [阿散酸](#) [猪场](#) [环境污染](#) [调查研究](#)

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## Investigation on the pollution of organoarsenical additives to animal feed in the surroundings and farmland near hog farms

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**Abstract** Arsenic is one of the most relevant global environmental toxicants. It can be accumulated in plants and animals, and can eventually be transferred to human beings. Chronic arsenic poisoning can cause serious health problems including cancers, hyperkeratosis, restrictive lung disease, and ischaemic heart disease. Research on environmental fate of arsenic has thus received increasing attention in recent years. Organic arsenic compounds (e.g., roxarsone and arsanilic acid) are widely added to animal feed to promote growth rates by controlling parasitic diseases. The resulting arsenic-bearing wastes are currently introduced to the environment (soil, pond, and river) or used to fertilize croplands. However, little is known about the environmental fate of these compounds and their environmental and health impacts.

The pollution of surroundings and farmlands around 15 hog farms used arsanilic acid as pig feed additives were investigated in Guangdong province, China. Study results showed that concentrations of arsenic in sweet potato harvested from contaminated field had reached a level of 3~6 times higher than the maximal residue limit (MRL) of 0.5 mg/kg based on the current national standard. Arsenic concentrations in soil for growing sweet potato were 25.83~55.54 mg/kg, which highly exceeded the maximal background level of 15mg/kg in soil as defined in the national standard. Moreover, arsenic concentrations in different tissues of the sweet potato directly related to arsenic concentrations in the soil. The arsenic concentrations in fish pond water exceeded the standard of fishery water quality of 0.05 mg/kg. Although arsenic concentrations in fish muscle samples did not reach the maximal residue limit(0.5 mg/kg), other edible fish tissues such as brain and fat reached a residual level of 3~4 times higher than those in the muscle. The results also showed that the range of arsenic pollution was within 200~500 meters from the pig farms, and pollutant conce

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concentrations in soil samples collected about 5m and 50m away from drainage holes had exceeded the 15 mg/kg maximal background limit. Most of rice fields with long history of receiving swine feces as fertilizer had exceeded the established maximal limit (15 mg/kg). In addition, study results suggested that rice had the ability of concentrating the arsenic. Furthermore, the arsenic concentrations in different tissues of rice presented significantly positive correlation to the concentrations in the soil.

**Key words** [arsanilic acid](#) \_ [hog farm](#) \_ [environmental pollution](#) \_ [investigation](#)

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