GMO pigs could reduce nitrogen and phosphorus pollution up to 45%

In pig production, inefficient feed digestion causes excessive nutrients such as phosphorus and nitrogen to be released to the environment. To address the issue of environmental emissions, we established transgenic pigs harboring a single-copy quad-cistronic transgene and simultaneously expressing three microbial enzymes, ?-glucanase, xylanase, and phytase in the salivary glands. All the transgenic enzymes were successfully expressed, and the digestion of non-starch polysaccharides (NSPs) and phytate in the feedstuff was enhanced.

Fecal nitrogen and phosphorus outputs in the transgenic pigs were reduced by 23.2–45.8%, and growth rate improved by 23.0% (gilts) and 24.4% (boars) compared with that of age-matched wild-type littermates under the same dietary treatment. The transgenic pigs showed an 11.5–14.5% improvement in feed conversion rate compared with the wild-type pigs.

These findings indicate that the transgenic pigs are promising resources for improving feed efficiency and reducing environmental impact.

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This genetic strategy offers a very valuable biological solution for inefficient feed digestion and environmental emissions due to the global expansion of the livestock industry.

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