Reduction of Daily Operating Expenses for Animal Manure Treatment ID# 2017-4662





Technology Summary

This imporoved MAPHEX system recycles the spent diatomaceous earth as the filtration media in a mechanical separation process using a rotating drum. Most of the N remains in the dissolved phase, which can be applied as liquid fertilizer for crops. The low P bulk solids are separated by an auger press and may be used for livestock bedding or compacted into a solid, compact, stackable form (i.e. brick) suitable as a conveniently transportable fertilizer. Chemical treatment converts the dissolved P into a particle which is subsequently removed along with fine solids between 0.5 and about twenty-five micrometer diameter and diatomaceous earth, which are rejuvenated by heat or an additional chemical treatment. The inventors demonstrated that recycling of the diatomaceous earth three times resulted in an approximate sixty percent (60%) reduction in the per gallon treatment cost.

Application & Market Utility

This invention improved upon the MAPHEX system described in PSU Invention No. 4193 and related peer-reviewed publications. The inventors reduced the invention to practice using spent diatomaceous earth as the filtration media. However, the invention extends to other temperature resistant materials used in food and beverage production, water purification, as well as for production of pharmaceuticals, plastics, paints and biodiesel.

Next Steps

Evaluation of working prototype(s) at working dairy farms.

TECHNOLOGY READINESS LEVEL 4-7

Seeking

Licensing | Research

Keywords

- Manure Phosphorus Extraction (MAPHEX)
- Nitrogen (N) and Phosphorus (P)
- Animal Management
- Dairy
- Pigs, Poultry

Researchers

Alex Hristov Distinguished Professor of Animal Nutrition Online Bio Website

Clint Church

<u>Online Bio</u> <u>Website</u>

Other Researchers

Originating College

College of Agricultural Sciences

Office of Technology Management Contact

Matthew Smith mds126@psu.edu 814-863-1122



Invent Penn State is a Commonwealth-wide initiative to spur economic development, job creation, and student career success. Invent Penn State blends entrepreneurship-focused academic programs, business startup training and incubation, funding for commercialization, and university-community collaborations to facilitate the challenging process of turning research discoveries into valuable products and services that can benefit Pennsylvanians and humankind. Learn more at invent.psu.edu.

Penn State is an equal opportunity, affirmative action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability or protected veteran status.