

## NYSP21 Supports Kreher's Farm with Improved Management of Wastewater from Egg Farm Operations

An Upstate New York family farm since 1924, Kreher's Farm Fresh Eggs, LLC (Kreher's) has three different egg farms located in Clarence, Basom, and Wolcott, New York that produce conventional, nutritionally enhanced, cage-free and organic eggs. In addition to producing their own line of "Kreher's" brand shell eggs, they are a franchise producer for Eggland's Best brand and support several private brands for retailers, food service and wholesale distributors.

### CHALLENGE

Kreher's has an egg washing operation at the Clarence, New York location that washes eggs from that site, including the organic farm, as well as eggs brought in from other locations. A Vegetative Treatment Area (VTA) is used to accept and treat the wastewater generated in the egg washing room. At the start of this project, Kreher's was generating about 2,500 gallons of process wastewater per day, and increased that volume by about 1,000 gallons per day after starting to wash the plastic flats that carry the eggs. Additionally, there are six hen houses that are washed once per year and growing houses that are washed about 3 times per year. Each washing may span seven days and can generate on average 30,000-50,000 gallons of additional wastewater, which is currently land-spread.

Kreher's identified two reasons for wanting to minimize and remove nutrient loading in the farms wastewater streams. First, concentrated animal feeding operation (CAFO) audits indicated that the levels of phosphorous loading in the VTA soil is too high. Secondly, there have been discussions among stakeholders that the current practice of land-spreading barn wash wastewater will no longer be allowed in the winter months.

### SOLUTION

Kreher's requested assistance from the New York State Pollution Prevention Institute (NYSP21) to identify reasonable options for reducing nutrient load, particularly phosphorous from disposal to the VTA. NYSP21 also investigated treatment options for barn wash wastewater.

Weekly samples of egg wash wastewater were taken over the course of six weeks. During this time, two barn washing events occurred, during which daily samples of wash water were taken. The samples were all analyzed to understand the nutrient content, with a focus on nitrogen and phosphorous levels.

To address the levels of nutrients found, both source reduction opportunities and nutrient removal opportunities were investigated and reported. NYSP21 analyzed the cleaning products used in the egg washing operation, as well as the frequency and volume of egg-breakage occurring, to understand the contribution to the nutrient levels in the egg wash wastewater from each. Additionally, treatment options for both wastewater streams were investigated and summarized based on nutrient loading and wastewater volumes from both washing operations.

### CHALLENGE

- Kreher's wanted to identify reasonable options for reducing nutrient load, particularly phosphorous from disposal to the Vegetative Treatment Area (VTA)

### SOLUTION

- Weekly samples of egg wash wastewater were taken over a six week period, which were analyzed to understand nutrient content
- NYSP21 analyzed the cleaning products used in the egg washing operation, as well as the frequency and volume of egg-breakage occurring
- Treatment options for both wastewater streams were investigated and summarized by NYSP21

### RESULTS

- NYSP21 outlined several options to consider for removal of nutrients from both barn and egg wash wastewater
- Two treatment options were outlined for management of the barn wash water: on and off-site anaerobic digestion
- Although the Basom and Wolcott locations were not part of this project, these sites are subject to the same regulations and could potentially benefit from the worked conducted

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### RESULTS

NYSP2I outlined several options to consider for removal of nutrients from both barn and egg wash wastewater, each with different removal abilities and costs. Lowering egg breakage frequency in the egg washroom shows the highest potential for prevention of nutrients entering the egg wash wastewater, while replacement of cleaning soaps could provide a minimal reduction (11% and 3% for phosphorus and nitrogen). After source reduction, two treatment options were identified for nutrient removal from the egg wash wastewater. The first option, physical/chemical treatment with a dissolved air flotation unit, may be capable of up to 50% nutrient removal, while the second option, biological treatment with a clarification unit is more expensive but may be capable of up to 90% nutrient removal.

Before moving forward with any one option for treatment of the egg wash wastewater, Kreher's will need to define targets for total nitrogen and total phosphorous concentration, and conduct treatability studies on these alternatives to confirm actual removal efficiencies. This will help to make the appropriate choice in terms of balancing efficacy and cost.

Two treatment options were also outlined for management of the barn wash water: on and off-site anaerobic digestion. Due to the high variable nature of the barn washing events, on-site treatment would likely need to be oversized for the typical wastewater volumes, leading to underutilization the majority of the year. Off-site shipment of barn wash wastewater in the months that land spreading isn't available is likely the most cost competitive option for barn wash wastewater treatment.

Although the Basom and Wolcott locations were not part of this project, these sites are subject to the same regulations and could potentially benefit from the worked conducted.

"Our primary objective in pursuing this project was to identify the reasonable options that exist for our farm in reducing the nutrient load from our egg washing and barn washing processes. We care about the environment because we are in it for the long haul. We are pleased to have a multitude of options available to us."

- Hal J. Kreher, Partner  
Kreher's Farm Fresh Eggs, LLC

## NYSP2I PARTNERS



New York Manufacturing Extension Partnership

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