

WASTE REDUCTION IN EGG PROCESSING

William C. Merka
Extension Poultry Scientist
The University of Georgia
Department of Poultry Science
4 Towers Building
Athens, GA 30602-4356

Small food processors who have wastewater problems have a severe financial disadvantage in solving these problems due to the high initial capital cost of wastewater pretreatment systems. To operate these systems they must have a trained operator to operate the pre-treatment system. This is an additional cost. To minimize this financial burden, a feasible approach is to reduce the water use and wastewater loading in the processing plant.

A small company that hard cooks and peels eggs was faced with this problem. The BOD concentration could exceed the violation limit of the municipality by a factor of approximately six times. The municipality had served notice to the company that they would cease sewer service if the company did not come into compliance. The municipality, however, agreed to allow the company to try the minimization-conservation approach.

With the conservation-minimization approach approved by the municipality, the company received assistance from Extension Specialists at The University of Georgia, in identifying and correcting those operations which caused excessive organics to be discharged into the waste and those times and operations which use excessive water.

CONSERVATION - MINIMIZATION PROCEDURES

Plant observation determined situations which caused excessive organics in the waste stream.

1. Eggs were brought in on stacked pallets. They were held to allow the eggs to age so that internal quality decreased and an egg with improved peeling characteristics was processed. No attempt was made to determine if eggs had lost sufficient internal quality to

produce eggs with favorable peeling characteristics. To predict peelability, candling of eggs prior to processing was instituted so that there would not be excessive waste due to poor peeling eggs. Candling eggs not only reduced loss eggs but also produced a greater yield of the most valuable product, whole hard cooked eggs.

2. More efficient handling of the citric acid preservation liquid not only reduced waste load but also prevented the low pH citric acid preservation media from destroying the microbes in the biological septic tank treatment system. Review of municipal sampling records revealed that when wastewater exceeded municipal violation limits by five to six times the pH was also below violation limits. To prevent violation due to the citric acid in the waste stream, the person who took the egg waste for pig feed agreed to also take the citric acid solution.
3. Prior to minimization, water used in the cracking unit which contained pieces of broken eggs was allowed to flow into the floor drains. To prevent this source of loading, a vibrating screen was used to recover pieces of cooked eggs from the waste stream. Water from the shaker screen was allowed to settle in a small catchment basin, so that material passing could be captured and sent to the pig man rather than being discharged into the municipal sewer.
4. Screens were constructed and placed into the floor drains to prevent wasted product from entering the waste stream.
5. Equipment was adjusted to prevent product loss. One major point of product loss to the drain was two transfer belts. The gap between the two belts was too large so that smaller eggs would fall into this gap and be crushed onto the floor. By simply placing the belts closer together, floor waste was reduced and more product was recovered for sale.
6. Training of plant personnel was conducted so that they would realize that product wasted to the drain was the cause of the problem. Dry clean-up procedures of floor waste was instituted. This not only reduced wastewater strength but also reduced water use.
7. Constant management attention to product loss produced some interesting results. Eggs were peeled by hand after being discharged onto a belt by the egg cracker. A large amount of floor waste was produced at a work station of a very short peeler. The peeler had to work at shoulder height, whereas, the other peelers worked at waist to

chest height. Providing a stand to the short peeler reduced floor waste at that station.

RESULTS

Using these techniques and constant management attention, water use was reduced by 80 percent and the wastewater strength was reduced to the point that the municipality allowed the plant to continue to operate. Using the minimization approach, the company recovered an additional 300 pounds of eggs each day for sale. Reduction of municipal fines for violations, reduction in water and sewer charges, and enhanced product recovery increased the profitability of the company.

The unsolicited letter on the following page, reprinted with the company's permission, attests to the efficacy of conservation-minimization and the satisfaction of the company with the results.