Poultry Cook Plant

This facility processes, seasons, cooks, and flash-freezes poultry for the food industry and was trying to increase their production. Their previous wastewater system was limited in its ability to meet the discharge requirements to the local POTW (city) and was required to meet these more stringent limits as a condition of their expansion. To expand production, the facility was looking at a tremendous capital improvement cost to increase the size of their wastewater pretreatment treatment plant to handle the expected higher flows and loadings.

The facility had problems with levels of TDS/EC's, wet sludge that was expensive to dispose, poor coagulation/flocculation control, carryover of floc into their effluent, throughput limitations due to the poor coagulation/flocculation performance, high chemical costs, among others. In addition, the POTW is planning to levy surcharges for EC/TDS due to their noncompliance with their NPDES permit.

Prior Operations
On the average, the facility treated 200,000 gpd, operating 10-1/2 hours per day, 5-6 days per week. Wastewater from the various poultry-processing operations flows to a common sump and is then pumped through a rotary screen (to remove the large solids) and flows to a 180,000 gallon Equalization tank. The wastewater is pumped from the bottom of the EQ tank at 275-300 gpm to their DAF system. The wastewater was pH adjusted (in-line) with caustic or acid to meet the near neutral setpoint of 7-8 pH. After pH adjustment, an aluminum based inorganic/organic coagulant was added, followed by a cationic and anionic flocculants. The wastewater is mixed/flocculated in the DAF floc-tubes with dissolved air addition and the float solids rise to the surface. The solids are skimmed off and pumped to an 8,000 gallon holding tank and the treated liquid effluent flows to the city's wastewater facility.

The effluent water quality from the facility to the city averaged a flow of 200,000 gal/day, a BOD of 1,200 mg/L and a TSS of 500 mg/L.

Prior Process
The process used 5 chemicals: caustic, acid, coagulant, cationic flocculant, and an anionic flocculant. The operator spends several hours each day transporting, blending, mixing, and adjusting the feed rates of these different chemicals. The treatment process required tight pH control for effective coagulation/flocculation, but this is very difficult to maintain due to various products they process inside the plant. When the pH is out of the 7-8 pH range, the effluent water quality decreases and the resulting sludge is difficult to handle due to its wet and slimy nature.

The sludge was being hauled off at a great expense. The facility attempted to dewater the sludge, but the chemistry in use did not allow release of the water entrained in the sludge.

Prior Chemical Usage Rates
In an average month the processor used 8 drums each of caustic and acid; 3,300 gals of coagulant, and 2,000 lbs each of the cationic and anionic flocculants. In addition, there was an impending surcharge from the POTW for BOD, TSS, and EC's.

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Discharge Wastewater Quality

	Old Chemistry	Floccin	% Decrease
BOD	1,200 mg/L	250 mg/L	79%
TSS	500 mg/L	120 mg/L	76%
EC	1,700 umho/cm	1,300 umho/cm	24%
TDS	1,400 mg/L	950 mg/L	32%

The Trial using Floccin

Floccin Feeder with Supersack

The addition of the Floccin product required some small changes in the systems operation. In order to feed product into a pressurized line, the Floccin Feeder system was modified: the auger of a standard feeder was set to deliver product into a second "slurry tank." (Makeup water for the slurry tank was taken right from the wastewater line exiting the EQ tank.) After mixing, the slurry was pumped straight into the DAF feed line upstream of the flocculation tubes. The resultant effluent quality was greatly improved, as shown in the above table. The DAF cake was more consistent, much drier, less shear sensitive, and more easily dewatered than with the previous chemistry. The pH swings from 4.7 to 10.8 and the Floccin works very well even with these pH swings. With the increased solids content, sludge disposal costs were reduced.

Trial Results

The goals for the trial were:

- To optimize the treatment process and allow increased production without capital outlay.
- To simplify the wastewater treatment process, reducing the operators' workload and dangerous chemical exposure.
- To reduce the EC/TDS in the effluent and avoid/minimize proposed surcharges from the city.
- To increase the solids-content of the sludge and reduce sludge disposal costs.
- Reduce the overall treatment costs.


Daf with drier sludge

The trial was **successful** in meeting all of these objectives.

Benefits

The use of Floccin reduced the number of on-site chemicals from 5 to 2. Floccin works in a wide range of pH values (4.7 to 10.8) and is much easier to control; the operator simply adjusts one speed-control dial instead of several chemical feed pumps.

Soon after the trial, the facility started up a batter frying line that increases the BOD by 30% (part of the plant expansion). Integrated Engineer's reformulated a special product for the facility and reduced the Floccin usage rate 25% lower than the original Floccin. An additional cost savings was in the operation of the EQ tank and the use of carbon dioxide instead of acid to control the pH (also reduced the EC/TDS levels). Another area of savings was from the

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conservation of water in the plant processes reducing the water consumption 50% (200,000 gpd reduced to 100,000 gpd). The facility is also benefiting from the reduction in Insurance and Workman's Compensation premiums due to the elimination of the hazardous chemicals.

Conclusion

Floccin has been a real success story. It has simplified the system, allowing the poultry processor to run a more consistent process, obtain better quality effluent and sludge – with less operator intervention. The daily chemical/sludge hauling costs have been reduced by 34%. Best of all, the processor is free to move forward with increased production without the expense of expanding the wastewater treatment plant or buying additional capacity units from the POTW, and has reduced costs with lower surcharges.

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