

ETHANOL

EDGE

Phibro
Ethanol Performance Group

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ENVIRONMENTAL STEWARDSHIP

With the movement to green, many industries are re-evaluating their use of chlorinated disinfectants due to potential negative impacts on the environment. Not unlike the ethanol industry, the paper industry has had to make substantial investments in the past and may continue to do so in the future. Further similarities were pointed out by Dr. Dennis Bayrock, Phibro's Ethanol Performance Group director of research and development. He has noted that the ethanol industry will be incorporating increased fiber in an effort to increase ethanol yield.

Chlorine is used during the paper production process to "bleach" the paper. As a bleaching agent, chlorine is effective. However, problems arise during the process because chlorine produces dioxins when it comes into contact with fiber. Dioxins are powerful carcinogens, which are harmful to humans and animals because they accumulate in the fatty tissues and can concentrate in the human food chain. The paper industry is being faced with strict controls limiting the discharge of dioxins in the range of 10-50 parts per quadrillion per public documents.



To minimize the formation of dioxins, many paper companies have begun using chlorine dioxide as a replacement for chlorine during the bleaching

process. In a typical paper mill, using chlorine dioxide produces 75 percent less dioxins than using chlorine. Even with this lower generation of dioxins, the paper industry will potentially need to make further changes to keep a green image with the public. This would require added processes to completely replace chlorine dioxide. Paper mills outside the United States are migrating to processes with no chlorine per the National Wildlife Foundation.

Ironically, at a time when some in the paper industry are moving away from using chlorine and chlorine derivatives, some in the ethanol industry are moving toward using it as a "new" antimicrobial in fermentation. For fermenters, chlorine dioxide is typically produced in the fermenter with sodium chlorite or in a generator.

Chlorine dioxide's effectiveness is derived from its ability to oxidize the cell membrane and nucleic acids in a microbe. This causes the cell membrane to lyse (burst) and halts metabolic processes within the bacteria. While dosing with chlorine dioxide can reduce the level of bacterial infection, many negative consequences can arise due to its use such as: corrosion of metals, increased sulfur content in DDG, decreased yeast health, and worker hazards from dried chlorite spills that may catch fire.

"The comparison between the paper and ethanol industries is natural since current dry mill ethanol processes contain fiber and future cellulosic ethanol fermentations will use more fiber as a feedstock," explains Bayrock. "The transition to

next generation ethanol plants will introduce corn stover and corn cobs that contain more lignin and will be more problematic with respect to dioxin formation. The level of dioxins produced and their possible inclusion in any co-products will need to be determined." Contamination by bacteria will continue to pose a challenge for fermentation-based plants. Choosing solutions that are effective and environmentally responsible keep plant managers and technical staff on the leading edge.

In summary, current and next generation ethanol processes will have even more similarities to a papermaking process and will need to understand the interaction of lignin fiber with the use of chlorine-based antimicrobials. Today much is yet to be understood about use of alternative antimicrobials. It is a delicate balance that needs to be managed in order to provide the ethanol industry with a green image.

NEWS:

HEIDI DOERING-RESCH HAS BEEN APPOINTED NUTRITIONAL SPECIALIST

Heidi Doering-Resch has joined Phibro's Ethanol Performance Group as a nutritional specialist. Doering-Resch is based in Minnesota and will work with our field sales organization to provide LACTROL® customers with nutrient profiles and other services related to DDG co-products. Prior to joining Phibro, she had held various positions utilizing her knowledge and experience in livestock nutrition. Doering-Resch graduated from South Dakota State University with a master's degree in animal science.



PHIBROCHEM'S ETHANOL PERFORMANCE GROUP OPENS NEW LAB

PhibroChem's Ethanol Performance Group is pleased to announce the opening of its new laboratory at the University Enterprise Labs (UEL) in St. Paul, Minnesota. This new laboratory further expands our industry-leading research and development capabilities. It focuses on the creation of novel products and process solutions for the ethanol fermentation industry. It is also a customer service facility featuring a state-of-the-art diagnostic lab committed to providing recommendations for improved process performance in ethanol plants.



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