Specific Yeasts developed for Modern Ethanol Production

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Summary

In support of the rapidly growing fuel ethanol industry, new and exciting technologies for ethanol production from grain have been developed. Yeasts have been at the centre of these advances. Yeasts for ethanol production are subjected to new and different conditions and expectations with each innovative process alteration introduced by ethanol plant design and engineering companies. Driven by the explosive growth of the North American dry grind corn fuel ethanol market, modern yeast selection and production technologies have led to valuable specialty yeast products suited for today’s ethanol production facilities. As a result, the ethanol producer has a number of viable commercial yeast product options to choose from. The optimal yeast choice for each facility depends on a number of interrelated factors; decisions are getting more complicated - and more critical - as ethanol production technologies mature.

First, before selecting a yeast product format, one must consider how the yeast will be handled prior to ethanol fermentation:

- What is the distance from the yeast production site to the ethanol plant?
- Is refrigerated yeast storage available?
- Are automated dosing systems preferred? Are they available?
- Will in-plant yeast conditioning or propagation be employed? If so, what is the main goal of this step?
- Will daily yeast usage be steady or inconsistent?

Next, before selecting a yeast strain, process design characteristics and fermentation conditions should be taken into consideration:

- What is the feedstock, e.g., corn (purified starch, fractionated or whole ground?), milo, wheat, barley, rye?
- Is the process designed for batch or continuous fermentation?
- How much thin stillage will be recycled into the fermentor, and what additional and potentially harmful water streams are reutilized?
- What are the fermentation conditions and expected results (i.e., time, temperature, pH, solids level, added nutrients, % alcohol)?
- How effective are sanitation procedures and antimicrobial treatments? Are bacterial or wild yeast infections a problem?

Additional considerations such as workforce cost and capabilities, operating philosophy, and commodity prices can impact how a plant is operated, and therefore which commercial yeast product — a combination of format and strain — is optimal. Responses to these questions and considerations can impact yeast in a number of ways. A review of the critical attributes of the main categories of available yeast products will reveal guidelines for yeast selection for optimal plant operation. Emphasis will be placed on new technology, including comparisons of yeast strains, production and quality control parameters, formulations, packaging and delivery systems. Yeast choices have a significant impact on each ethanol plant’s profitability.
Beamer-Presentation shown at the meeting.

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