BRC Science Highlight
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Impact of Fractionation Process on the Technical and Economic Viability of Corn Dry Grind Ethanol Process

Background/objective

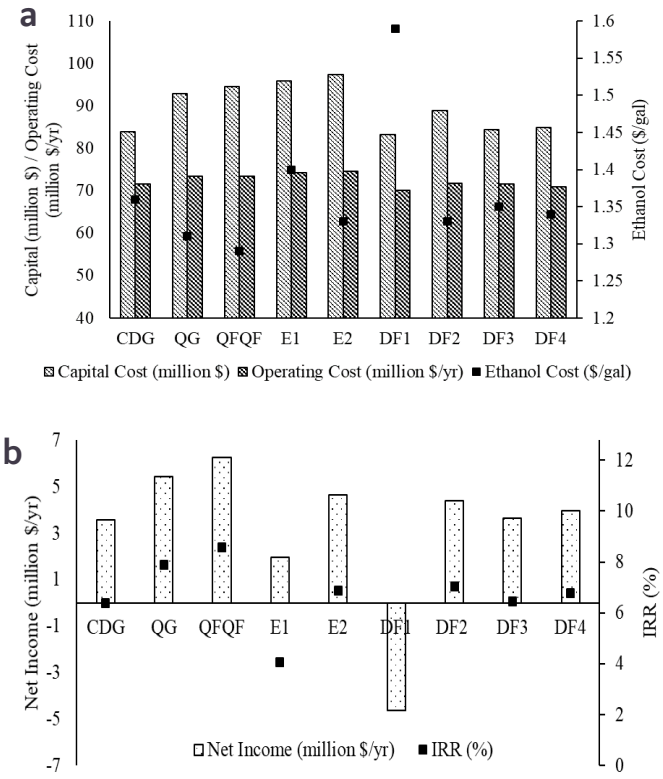
Incorporating fractionation techniques in the corn dry grind process increases coproduct number, quality, and value, generates feedstock for cellulosic ethanol production, and increases potential profitability. However, many variables influence techno-economic viability of these processes, and a consistent comparison is lacking. Here, researchers developed process models for front-end corn fractionation technologies in the dry grind ethanol process and compared conventional and modified dry grind processes in terms of process yields and economic feasibility.

Approach

- Designed comprehensive process models comparing the conventional dry grind process with four each wet- and dry-fractionation processes using the SuperPro Designer.
- Conducted sensitivity analysis on model results.

Results

- Wet fractionation process separating germ and fiber (QGQF) was the most economically sustainable of the options studied.
- High-value coproducts such as DDGS and germ improved profitability of most fractionation processes compared to the conventional process.
- Corn fiber contributes little to revenue, but it serves as a promising raw material for cellulosic ethanol production.



Impact of fractionation process on capital, operating and ethanol costs (a) and internal rate of return (IRR) (b).

Significance

This study provides a basis for understanding the factors that contribute to the economics of nine candidate corn-processing methods. These methods may be modified to inform feedstock processing for biofuel production.

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