Nexant

Technology and Costs

TECH 2019S2: Detergent Alcohols

Detergent Alcohols is one in a series of reports published as part of Nexant's 2019 Technoeconomics – Energy & Chemicals (TECH) program.

Overview

Detergent alcohols are long-chain alcohols containing between 12 and 18 carbon atoms produced commercially from both synthetic (mainly olefins) and natural feedstocks (primarily palm kernel oil). Detergent alcohols are typically processed further into cleansing agents used in products such as washing machine liquid, industrial detergent and hair shampoo.

Most of the world's detergent alcohol production capacity is located in Southeast Asia, as it is the major palm kernel oil-producing region. The largest and most mature markets are North America and Western Europe. Both regions contain synthetic capacity as well as fatty alcohol capacity. The global capacity landscape is dynamic, with investment in new capacity, based on competitive ethylene, in the United States, whilst older plants in Europe have closed and uncompetitive plants in Asia operate intermittently.

Detergent alcohol producers are influenced by consumer trends and pressure from retailers on their suppliers to reduce the price. For example, one recent trend, which has constrained demand growth in the United States slightly, is consumers opting for washing machine pods over washing machine liquids (as pods use less detergent per wash). Increasing public awareness of sustainability concerns regarding the use of palm oil and hydrocarbon feedstocks has the potential to affect demand in the future.

The objective of this TECH report is to address key questions such as:

- What are the major technologies used for detergent alcohol production, and how do they differ?
- What are the current and historical costs of both synthetic and fatty alcohol technologies?
- What is the potential effect of the new Air Liquide (Lurgi) LP3 process on the industry cost curve?
- How does shale gas influence the strategic environment for new detergent alcohol investment in the U.S. and oversupply in palm kernel oil feedstocks in Asia?
- How could environmental concerns, such as palm oil plantations and deforestation for fatty alcohol processes and the use of unrenewable hydrocarbon feedstocks in synthetic processes, impact the industry?

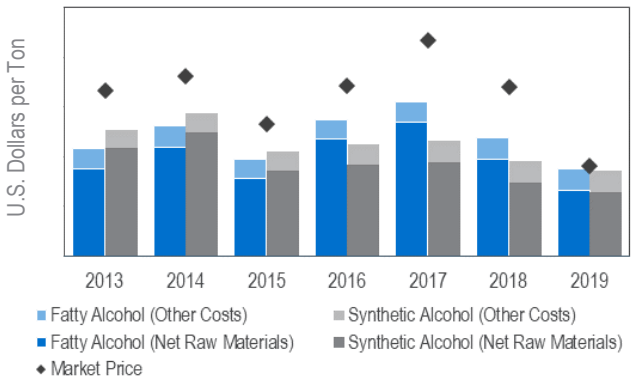
Commercial Technologies

Synthetic processes evaluated in this report include the Ziegler Alfol process, conventional oxo-process and the modified oxo-process. Various fatty alcohol technologies licensed by Air Liquide (Lurgi) and JM's Davy are also evaluated. Feedstocks for synthetic processes include ethylene, paraffins and other olefins. Feedstocks for fatty alcohol processes include palm kernel oil, coconut oil, vegetable oils and tallow.

Process Economics

The process economics of the major synthetic and fatty alcohol processes are estimated and compared. Various configurations, such as the Air Liquide "LP3" process improvement, are also evaluated. Detergent alcohol plants produce large quantities of coproducts, and therefore, the value of these coproducts has a massive impact on overall process economics.

Historical Competitiveness of Synthetic and Fatty Alcohols Processes (USGC)



Commercial Overview

The importance of commercial and strategic aspects such as upstream and downstream integration, supply chain management, product requirements, regional markets and feedstock advantage are discussed.

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The TECH program (formerly known as PERP) is globally recognized as the industry standard source of process evaluations of existing, new and emerging of interest to the energy and chemical industries.

TECH's comprehensive studies include detailed technology analyses, process economics, as well as commercial overviews and industry trends. Reports typically cover:

- Trends in chemical technology
- Strategic/business overviews
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- Chemistry
- Process flow diagrams and descriptions of established/conventional, new and emerging processes
- Process economics – comparative costs of production estimates for different technologies across various geographic regions
- Overview of product applications and markets for new as well as established products
- Regional supply and demand balances for product, including capacity tables of plants in each region
- Regulatory and environmental issues where relevant

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Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program (formerly known as PERP), the Biorenewable Insights program (BI), the Sector Technology Analysis, and the new Cost Curve Analysis. These programs provide comparative economics of different process routes and technologies in various geographic regions.

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