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Trust, transparency and biorenewable surfactants

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ABSTRACT

As consumers become more concerned with the products used in, on and around them, ingredient and product manufacturers are sharing more information on the compositions of personal care and home cleaning products and the origins of the ingredients used. Through labeling, website communication and certifications, manufacturers are providing transparency to ensure the trust of consumers. Innovations in surfactants derived from biorenewable sources also connect with consumers' desire for more natural and sustainable products.

If you asked a consumer to sum up their expectations of personal care and home care products, I believe they would agree with the statement, "Provide a benefit and do no harm," meaning do no harm to people, the environment or future generations. That is a considerable ask for a shampoo or a laundry detergent! However, that is our challenge. Consumers are not buying products just to perform a task, they are scrutinizing the companies that make these products and the ingredients they use.

According to a recent study by Mintel, 55% of consumers in the United States expect brands to be a force for positive change and 58% say they avoid brands that they believe act unethically (1). Euromonitor International describes this trend as "Mindful Consumerism" "All natural" and "Clean label" claims are becoming increasingly commonplace due to consumers' growing prioritization of well-being and healthy living (2).

Euromonitor International's 2017 Global Consumer Trends Survey of consumers' purchasing habits and views on environmental issues found that: 26% of respondents stated that buying eco- or ethically-conscious products makes them feel good (3); greater than 30% of the respondents desired "all natural ingredients" as a sought-after claim in skincare; greater than 20% desired "plant/botanically derived ingredients"; and 20% desired "all organic ingredients" (4).

A review of Mintel data for global consumer product launches in beauty and personal care, and household segments reveals an increase of natural, ethical and environmental claims, 43% and 20% respectively, between 2013 and 2016 (5).

Natural, ethical and environmental claims are now so prevalent that 48% of the global personal care and 54% of the global home care products launched in 2017 had at least one of these claims (6).

To address this trend, product manufacturers are looking to ingredient suppliers to provide information on the origins and pedigrees of the ingredients used in personal care and home cleaning products. Surfactant ingredient manufacturers are responding. In the next few paragraphs, I will highlight some of the biorenewable surfactants available, new technologies developed and how this all fits into the narrative of trust and transparency within the personal care and home cleaning industry.

For decades, the surfactant industry has offered naturally-derived alkylpolyglucosides to the market. These foaming and cleaning nonionic surfactants are derived from vegetable oils. Although a synthetic ingredient by strict definition, all of the carbons in the ingredient are derived from a biorenewable resource such as corn, coconut or palm.

A more recent entry into the nonionic category are "100% biorenewable" ethoxylated surfactants. Traditionally, this class of surfactants uses ethylene oxide derived from petroleum sources. In October 2017, Croda commissioned a manufacturing plant in Delaware to produce ethylene oxide derived from biorenewable ethanol (7). They will offer "100% biorenewable," carbon-based alcohol ethoxylates, polyethylene glycols (PEGs) and PEG-esters to the North American market. Others such as India Glycols have been producing ethylene oxide derived from ethanol since the mid 1990's (8).

Sodium lauryl sulfate and sodium coco-sulfate also contain 100% biorenewable carbon and are used in home cleaning products for detergency and foam. However, in personal care, these sulfated surfactants are being replaced by milder anionic ingredients. Collectively referred to as amino-acid based anionics, these ingredients are touted for their mildness and natural source. They are derived from biorenewable fatty acids and naturally-derived amino acids. These carbons are sometimes referred to as "green" carbons because they contain carbons sourced from renewable plant materials, as opposed to "black" carbons that come from petroleum sources.

Alkanolamide surfactants based on diethanolamine (DEA) and monoethanolamine (MEA) have a high percentage of their carbons derived from renewable resources, >75% and >85% respectively (9). However, due to its toxicity, any unreacted DEA in these products are a concern to some manufacturers. Alternatives have been introduced in the market that provide equal or better performance properties, are still high in bio-based renewable carbon and do not have the toxicity concerns associated with DEA. These alternatives include alkyldimethylamides introduced by Stepan Company (10) and alkylglucamides introduced by Clariant (11). Both surfactant families contain >85% biorenewable carbon.

It is not just the raw material sourcing of surfactants that are becoming "greener," so too are the manufacturing processes. Many surfactant and emollient esters that are used in personal care are based on 100% biorenewable carbon but produced through classical synthetic manufacturing routes. For several years now, esters manufactured through enzyme-based, bio-catalytic processes have been available from Evonik Industries AG (12). These processes arguably are closer to those occurring in nature than traditional chemical manufacturing.

The most natural manufacturing process would be for nature to make surfactants directly. Sphorolipids and rhamnolipids are examples of bio-surfactants produced by microorganisms through fermentation. Bio-surfactants are currently being used in hard surface cleaners, laundry detergents and personal care products, and are offered by several companies (13). Providing naturally-derived surfactants is only part of the story. Consumers want to know that safe and natural ingredients are being used in the personal and home care products they purchase.

While personal care products have included the ingredients on the label for years, the ingredient information provided on home cleaning products has been shared as ranges of chemical families, as seen in Europe, or on a voluntary basis as seen in the U.S. Regulators are more active in supporting consumers' right to know and new laws are being enacted to improve the transparency of the ingredients used in consumer products. The most recent example is California Senate Bill No. 258 enacted on Oct. 15, 2017 (14). This legislation requires, among other things, a manufacturer of a designated product sold in the state of California to disclose on the product label and on the manufacturer's website, information related to chemicals contained in the designated product. "Designated product" is defined in part as "a finished product that is an air care product, automotive product, general cleaning product, or a polish or floor maintenance product used primarily for janitorial, domestic, or institutional cleaning purposes" (15). The online ingredient disclosure requirements will apply starting Jan. 1, 2020 and label information disclosure requirements will apply starting Jan. 1, 2021.

Many product manufacturers are not waiting for regulation and use the concepts of "natural" and "renewable" as fundamental marketing platforms to proactively differentiate their products and have been sharing ingredient information all along. Surfactant companies provide both the product manufacturers and third-party certifiers information on the bio-content of their ingredients, toxicity data and manufacturing processes used. This transparency of ingredient suppliers flows through to the consumer by personal and home care manufacturers' commitments and the certifications they obtain.

To aid consumers in identifying products that are based on biorenewable ingredients, product manufacturers may set defining criteria and self-report on their websites. An additional option is to use third-party certifications to distinguish natural and safer products. The COSMOS-standard, ECOCERT, Green Seal and United States Department of Agriculture (USDA) Organic are just a few of the certifications that product manufacturers can obtain to provide consumers assurances that a product's ingredients and packaging have been reviewed and found to meet the certifying body's criteria.

Personal care and home care product manufacturers, ingredient manufacturers, regulators and non-governmental organizations (NGOs) are all working to provide consumers the trust and assurance they desire in the products they use in their homes every day. Innovations in biorenewable surfactants by ingredient manufacturers are an important tool in addressing the natural, mild and sustainable ingredients of today and tomorrow.

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ABOUT THE AUTHOR

Terri Germain is the North America Business Development Manager in Stepan Company's Consumer Products Group. She has more than 30 years of R&D and marketing experience in surfactants and their many uses. Stepan is a leading manufacturer of surfactants and antimicrobials, with recent product launches of biorenewable ingredients as sulfate-free options, solvent alternatives, structured liquids, fragrance solubilization and skin-feel additives.

