# SUSTAINABLE SOURCING

MAKING PERSONAL CARE ECO-FRIENDLY

# As consumer demand for products that are naturally-sourced and sustainable continues to increase, BIOTECHNOLOGY CAN HELP companies meet this demand.

Using biotechnology, many personal care products can be made using a range of renewable, sustainable resources, including agricultural feedstocks, like corn or wheat, industrial and agricultural waste, such as carbon or methane, and microbes like algae.



Because these ingredients are produced using **BIO-BASED PROCESSES**, they are often **LESS TOXIC** and carry a smaller environmental footprint than the same ingredients made from fossil fuels.

Today, there are countless personal care products that can be made using bio-based ingredients and, as **NEW INNOVATIONS HAPPEN**, that number will only increase.

Many of these products can qualify for USDA's Certified Biobased Product label, which certifies a **MINIMAL PERCENTAGE OF BIO-BASED MATERIAL** in the product.

Look for this symbol which identifies USDA Certified Biobased Products



### EXAMPLES OF PERSONAL CARE PRODUCTS developed using sustainably sourced ingredients include:



#### SKIN PRODUCTS

a. Through biotechnology, carbon from industrial processes can be captured, recycled and fermented using microbes to create renewable non-toxic Isopropanol, a common alcohol used to extract and purify oils found in skin care products, such as acne treatments.

b. Sugar from corn as well as carbon-rich gases (CO, CO2, methane) can be used to make exfoliating microbeads commonly found in skin and face cleansing products. These microbeads are biodegradable and reduce environmental impact. Recently, traditional microbeads have been banned in certain regions because of their negative impact on the environment and inability to biodegrade.

#### HAIR CARE PRODUCTS

Sugar from corn can also be used to make butylene glycol, a common humectant found in many hair care products to retain moisture, such as in shampoos and conditioners. Naturally sourced butylene glycol can be a viable alternative to petroleum-based butylene glycol.

#### PERFUMES/COLOGNES

Using synthetic biology, carbon-rich gases can be used to develop esters, a class of chemical compounds used to create certain aromas and fragrances in perfumes and cosmetics. By capturing and recycling these gases to be converted to esters instead of going into the atmosphere, environmental impact is reduced.

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#### MOISTURIZERS/LOTIONS

a. Glycerin, a by-product of biodiesel production, can be used to create propylene glycol, a chemical compound that can be used in lotions and moisturizers to help penetrate skin.

#### b. Sugarcane-derived squalane

can be used to formulate nontoxic moisturizers and as the key ingredient in many consumer clean beauty products. Previously, squalane was typically sourced from shark livers and olives, which are unreliable sources in creating a consistent quality for the ingredient.



#### COSMETIC PRODUCTS

Algae can be used to create beta carotene, a yellow/orange pigment present within vegetables like carrots, giving them their rich color. Beta carotene from algae can be used in various cosmetic products, such as foundational makeup to provide yellow/ orange pigments to skin.



#### SOAPS

Sugar from crops like corn and wheat can be fermented using yeast to create renewable bio-succinic acid, which is commonly used as an emollient or fragrance carrier in various skin creams and lotions. Succinic acid is effective in combating acne and reducing skin flakiness and wrinkles.

## THE BENEFITS

- Helps companies build on the U.S. bio-based economy - an economy that USDA estimates contributes to \$393 billion to the overall U.S. economy, generating 4.223 million jobs.
- Creates products with less toxicity, making them safer to human health, and less environmental impact than products with petroleum-based ingredients.
- Enables companies to repurpose underutilized resources like carbon from industrial processes, thus reducing environmental impact.
- Is more sustainable than using ingredients derived from fossil fuels.
- Meets increasing consumer demands for products that are naturally-sourced and sustainable.