

Defining “Natural,” Redefining “Waste”

Boosting natural and sustainable formulations via waste streams.

Colby Underwood, Co-CEO and Chief Business Officer, Blue Marble Biomaterials



Today’s supermarkets and grocery stores are utterly amazing, yet stupendously confusing. The global marketplace and its lightning fast supply chains allow us to enjoy fresh seafood from oceans thousands of miles away. Fruits and vegetables from countries on the other side of the equator. Personal care products made from the oil of seeds in countries we may not be able to find on a map. Most of all, the supermarkets and grocery stores of the 21st century offer consumers something relatively new yet incredibly powerful: choice.

Proliferation of Product Options

In only one generation, the West has transitioned from general stores, where there were maybe one or two choices of a certain product, to mega, big-box stores, where there are dozens of choices for a single product. For example, during a recent stroll down the hair care aisle of the Fred Meyer near my house I counted more than 25 different shampoo choices.

How do consumers choose one product over another? Increasingly, people around the world are selecting products based on a single word on the product packaging: natural. Natural lip balm? That’s on aisle four. Natural soda pop? Try aisle 17. Natural air fresheners? Next to the cleaning supplies. Oh, and some of those cleaning supplies are natural as well. But what does “natural” really mean? That all depends on who you ask.

Defining “Natural”

The average consumer assumes that the word “natural” means better for you, environmentally friendly, artificial ingredient-free, non-toxic or, simply, derived from nature. The reality is that the definition of natural depends on which government, which company, which distributor or which consumer you ask.

The U.S. government has a very different definition of natural compared to the EU administrators. Packaged food manufacturers have definitions of natural that range from reasonable to outlandish. I personally know of one multinational food manufacturer that crafted its own definition of natural.

How does one determine if a manufactured product they are purchasing is truly natural? The frustrating answer is that one cannot. While many products we see on supermarket shelves today have a country of origin, the ingredients that were used to manufacture that product do not have their country of origins listed. Which means that the consumer has no way to determine what laws or rules were applied to said ingredient, which obviously creates the conundrum of “is this product really natural?”

Unfortunately, the term natural has been widely misused, leaving the global consumer community ignorant as to what

they are putting into or onto their bodies. In the not so distant future, consumers will grow frustrated with the lack of a global standard of natural and will begin looking for alternatives. As a result, what is needed today is a worldwide, agreed-upon definition of what natural should represent. This movement should begin with those that supply ingredients to consumer packaged goods manufacturers.

Conventional Ingredient Challenges

Many consumers are unaware of how chemicals are produced and deployed in their packaged goods. More than 90% of all manufactured products on supermarket shelves contain one or more chemicals. Today, most of those chemicals are petroleum-derived—refined from crude oil. When crude oil is extracted from the ground, it is refined into a multitude of products including gasoline, diesel, kerosene, polymers, mercaptans and specialty chemicals.

But how is that crude oil actually made? With three key stages. One: Biomass becomes buried over thousands of years as a result of geologic activity. Two: As the biomass is pushed deeper underground, heat and pressure begin to build. Three: A consortia of bacteria starts to break down the biomass and, over thousands or millions of years, depending on who you ask, crude oil is produced. Effectively, Earth processes “waste” into crude oil that humans extract and refine into thousands of ingredients that are used to produce the majority of the manufactured goods we consume today.

As global consumers become more educated about what they are putting into and onto their bodies, the demand for consumer goods produced with non-petroleum alternatives will grow exponentially. In order to meet that demand, industries must reevaluate their perceptions regarding “waste” and the immense financial value they are simply casting aside each day.

Biochemicals from Waste

Drop-in replacement, specialty biochemicals for flavors and fragrances can help multinational consumer packaged goods manufacturers offer natural (per U.S. and EU definitions, when available) and sustainable food, beverage and personal care products. These products, in turn, can develop trust and latency with consumers. How can these biochemicals be produced efficiently? By valorizing what people call “waste” into cost-competitive, direct-replacement ingredients.

If the term “waste” makes you want to run for the hills, hold on a moment. Humans generate the most waste of any species. Much of this matter has an intrinsic value that is often overlooked or ignored due to how people define the word “waste.” Many

people view waste as a material that is expended, of no value, unwanted or unusable. I say, why waste biomass?

Valuable biochemicals can be produced from biomass side streams or co-products (what we commonly call waste) from the food and beverage, agricultural and forestry industries by using fermentation and extraction technologies (see **F-1**). In order to achieve needed market share, biochemical producers must manufacture products that are cost-competitive compared to their petroleum counterparts. That necessarily excludes feedstocks that are deemed to be of high value because of the immense demand in other marketplaces (ex: eggs, wheat, barley, pine heartwood, milk, carrots, blueberries and, of course, petroleum). Instead, primary starting materials must be derived from the waste streams of the processing of the previously listed feedstocks (ex: wheat chaff, tomato skins, pine needles from logged trees, whey from cheese manufacturers, or spent grains from the brewing industry).

The types of ingredients that can be derived from such processes include sulfur compounds such as thiols and mercaptans, subcritical and supercritical extracts, savory odorants such as thioesters, fruity scents such as esters, and terpenes, including phellandrene, caryophyllene, d-limonene and myrcene. In addition to being natural, these ingredients can be food-grade and even vegan-friendly.

Taking into account consumer trends and the impacts of emerging fermentation and extraction technologies, industries need to redefine the negative connotation assigned to “waste.”

F-1. An overview of producing ingredients from waste streams



Next time you watch the garbage truck pick up your yard waste container and take it away to a composting facility, realize that the biomass in your yard waste container could have been used to produce natural chemicals that could be worth \$50.00, \$100.00 or even more.

Address correspondence to Colby Underwood, Co-CEO/Chief Business Officer, Blue Marble Biomaterials; colby.underwood@bluemarblebio.com.

To purchase a copy of this article or others, visit www.PerfumerFlavorist.com/magazine. 