

MATERIALS

The Whole Cow

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Pulse

MaterialConnexion
BEAUTYSTREAMS



Intro

Continuing the focus on food from last month, it is worth considering the significant use that cows have beyond just meat and milk. Over our long relationship with these marvelous animals (since about 8,000 BC by some accounts) we have learned to utilize almost the entire anatomy, including some life-saving solutions beyond just plumping our faces with collagen. Insulin, the adrenal glands, and cartilage are all useful, as is the gelatin (cue marshmallows, caramels, gummies, and jams) and tallow (for body creams, cosmetics, soaps, and toothpaste), and that's before we even get to the hide. However, whether vegetarian or vegan or just concerned about the size of the carbon footprint created by burping bovines there is a clear case to be made for reducing our reliance on this resource. We know that cutting meat from our diets can reduce emission from between 5-30% globally depending upon whom you ask, and there are a host of new technologies to help us off our addiction to cows, from ground beef substitutes such as Beyond Meat and Impossible Foods to the DNA-engineered leather alternatives from companies such as Modern Meadow. But for now, the meat industry continues to thrive, and so it makes sense to utilize as much of the remaining parts of the animal so as to reduce waste and preserve other resources while still promoting alternatives and planning for a future without burgers and steaks.

BEAUTYSTREAMS

Kanecaron™ by Kaneka

Think actual fibers made from the same stuff that is used in fillers. This "regenerated collagen" fiber called [Kanecaron™](#) developed by [Kaneka](#) has a very smooth surface and a unique softness and also readily absorbs and releases moisture aiding in dye uptake, which results in deep colors. Other properties include anti-bacterial behavior as well as a natural fire-retardancy. For this, rawhide leather is solubilized, stabilized, and non-collagen components are removed. The solution is then concentrated and wet-spun into filaments. After drying, the filaments are crimped and cut into staple fibers which are milky white in color.



Kollamat® by BADER®

Offering a more sustainable alternative to some molded plastics, this leather manufacturer, well known in Europe for supplying automotive upholstery, is now supplying leather fiber-reinforced biopolymer resins for various potential applications. The leather is chopped and shredded into fiber and up to 80% of the moisture is removed to retard aging. A special process is used to compound the leather, resin, color, and additives into moldable pellets which can then be molded like plastics. The parts have a warm, leather-like feel and low shrinkage, offer a highly accurate surface resolution and even smell a little of what they came from – leather. The material, dubbed [Kollamat®](#), can be foamed and also combined with many different polymers other than biopolymers, including TPE, EVA, PVC, LDPE, PS, or rubbers. What's more, it is produced with a comparatively low energy input, substitutes 30-65% of plastics, and can be produced partly or completely from biological resources.

Biocompatible Cow Bone



Within medicine, there has been an increased interest in the use of cow bone thanks to its biocompatibility and because it can naturally biodegrade in the human body (as well as out in the environment). The parts are rigid, hard, and can be shaped into buttons or other formats. They are produced with 97% hydroxyapatite, which is the main constituent of bone, sourced from cleaned and dried cow carcasses that are obtained from local markets, boiled to remove fats, calcined at high temperatures to remove all organic matter, then crushed into fine powder. The powder can then be pressed into forms such as a button using high pressure and is sintered also at high temperatures to densify the part. It is produced in an off-white color (the natural hue of the hydroxyapatite) and has been approved for medical applications. It is even used in brain surgery.



Gelatex

Though currently focusing more on nano-fibrous spinning for tissue engineering, [Gelatex](#) has also managed to create a leather-like textile that is chemically identical to and feels like leather, but is manufactured from the low value meat waste rather than from its hide, enabling up to 3-5 times more material from the same animal. The characteristics of the material, such as texture, water resistance, and thickness, can be customized upon request and it is supplied in rolls with a width of approximately 20 in (50 cm) and natural colors (i.e. brown, tan, and olive). The material is easily scalable, sustainable, and cost-efficient, coming in at about half the price of leather.

And in case you were thinking that there are still some parts of the cow that have not been mentioned, [Mandy den Elzen](#), a Dutch artist for many years has been quietly using all the unexpected parts, including all the different stomach compartments (rumen, reticulum, omasum, and the abomasum if you were curious) as well as the testicles of bulls in her explorations of humans' relationship with the beautiful and wondrous beasts we consume. "She sees through the layers which obscure the object – both the actual layers of blood and grime when it hangs in the slaughterhouse, and any layers of cultural or social notion that say that a cow stomach cannot be an object of beauty. She looks at the material itself and sees structures, patterns, textures, and possibilities," according to art historians.



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Andrew Dent, Ph.D., is one of the world's leading authorities on materials for the design sector. He is EVP of Research at Material ConneXion, a global materials library and consultancy that helps Fortune 500 to start-up companies take their products to the next level through innovative material solutions.

To learn more: MaterialConneXion.com.