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Biosynthetic routes for linear diacids from fatty acids feedstocks

Jose M Laplaza
Verdezyne Inc, USA

Linear α,ω-dicarboxylic acids have multiple applications in polymers such as polyamides, polyurethanes and polyesters. The majority of these diacids are derived from non-renewables fossil-based feedstocks. Verdezyne has developed technology that produces diacids derived from renewable feedstocks such as vegetable oils. Our first commercial target is BIOLON(TM) dodecanedioic acid (DDDA). This twelve-carbon diacid is used to produce nylon 6, 12, an engineered plastic for applications requiring special properties such as high chemical, moisture and abrasion resistance. We will discuss the technology, feedstock, and commercialization of this molecule. New technology is also being developed that allows the feedstock flexibility to produce different diacids from a variety of vegetable oils and their low-value side streams. We will show examples of producing different diacids such as adipic acid and suberic acid from a variety of different feedstocks. This technology will allow the concept of a biorefinery as seen in the corn industry to be implemented in vegetable crops such as soybean oil and palm oil.

jlaplaza@verdezyne.com

A new end-of-life alternative for flexible packages: TIPA's novel biocompostable films and laminates

Itai Pelled
TIPA Corp, Israel

Sixty six percent of the packaging waste by volume (50% by weight) is contributed by food packaging. It is, by far, the dominant worldwide contributor to waste. The food waste packaging is divided in general into rigid and flexible packaging. In terms of end-of-life solution, whilst rigid packaging, mostly manufactured from a single material, can be addressed by collecting the waste and recycle the materials, no sustainable solution was set forth to date for the flexible packaging. These packaging are being manufactured using several materials and thus the recycle solutions are inapplicable. The current biodegradable solutions, however, suffer from several key limitations that preclude their widespread commercial use: (i) poor barrier properties, (ii) limited mechanical properties, and (iii) raw materials cost. TIPA Corp., targeted this flexible packaging challenge in order to deliver to the brand owners and convertors flexible packaging films and laminates that could replace the existing plastic materials with similar properties and without requiring to perform any adaption to the production lines. It is well established that bioplastics present with low barrier to water and oxygen transmission and limited mechanical properties. TIPA Corp. employed several biodegradable polymer admixtures to generate biocompostable flexible film presenting with undetected values for the oxygen transmission and with water transmission of approximately 1 g/m^2/day at 38 deg C, RH 90%. These barrier properties are comparable with some of the current conventional plastic commercial products. Furthermore, the mechanical properties of TIPAs' films in terms of Young's modulus, elongation, tear & impact resistance, as well as transparency is in line with conventional rather than compostable polymer-based products. The change in bioplastics production capabilities and regulations revolving waste, at least in the Western Societies, affected the raw material costs, but only to a limited extent. It is conceivable; however, that the aforementioned constrains of the current bioplastics products on the market had limited their market cap. The current proposed solution by TIPA brings higher value to the food packaging industry and together with the demand by end-customers and regulations for such end-of-life products, it may be translated to larger volumes of raw materials, which in turn will lead to raw materials cost reduction. Taken together, TIPA products offer valid packaging solutions that meet the requirements of flexible food packaging combined with an efficient end-of-life solution. This sustainable packaging will contribute to reducing resource wastage and environmental impact, whilst providing economic and social benefits.

itai@tipa-corp.com