

Biofibers in the 21st Century

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A biofiber is any fiber that has been made by Nature. They include silk, cotton, lignocellulosics, proteins, collagen, and bone. For this discussion, only lignocellulosics will be covered. There are many types of biofibers and each will find a level of market acceptance and support based on appropriate applications taking into account regional inventories, processing technology and energy, product development, performance, and quality assurance. The largest source of biofibers, for most countries, is wood fiber and that is projected to be true for many years to come. Some countries, however, have very little wood left and have turned to utilizing other types of biofibers for products.

Up until about 1920, the world greatly depended on the use of biofibers for many applications. With the coming of synthetic fibers, plastics, high performance metals, and ceramics, biofibers lost market share. There is renewed interest in biofibers for the 21st century due to concerns about the limitations of non-renewable resources, the high cost of energy, recycling, sustainability, the environment, and an expanding world population.

Biofibers have been traditionally used for textiles, pulp and paper, packaging, composites, filters, sorbents, geotextiles, fuel, and chemicals. Of these products, those keeping pace with world population growth are textiles, pulp and paper, packaging, and chemicals. Sectors growing faster than world population are energy and materials consumption, and clean water. That is to say, that increased demand for energy, materials and clean water are growing faster than the population increase. The fastest growing population type in the world is the middle class and their demand for materials is growing. For example, in the United States in 1970, the average size of a single family home was 140 square meter. In 1990, this had risen to 193 square meter and it is projected that by the year 2050, the average size will be 240 square meter.

The demand for energy has caused an increase in energy prices and it is projected that energy costs will continue to increase over then next decade. For this reason, reducing energy used in all biofiber processing is a major goal of the industry in the future. The demand for clean water is also on the rise due to more world wide chemical use and increased pollution.

Using these trends as indicators of future opportunities in the biofiber sector, there is moderate projected growth (keeping pace with population growth) in textiles, pulp and paper, packaging, fuels, and chemicals but high projected growth in materials. The growth potential of the use of biofibers as filters, sorbent and geotextiles is not clear at this time.

The largest single potential growth in the use of biofibers is in the materials sector. Issues, barriers and trends will include fiber supply (primary, secondary, waste, reused, and recycled), land use, biodiversity, carbon sequestration, reducing energy is all aspects of biofiber use (growing, harvesting, collection, sorting, drying, shipping, storage, processing, and fractionation), competing materials, durability, sustainability, life cycle assessment, quality assurance, binders, environmental quality, codes and standards, performance targets, tradition, marketing, appropriate use, and biotechnology.

