ADDISPERSE
Innovative Additive Solutions

INDUSTRIAL HEMP MARKET OPPORTUNITIES IN PLASTICS

THE DEVELOPMENT AND INTRODUCTION OF MICRO HEMP AND MICRO HURD FIBER

To understand the potential of Industrial Hemp (fiber and hurd) in the plastic market, it is important to understand the dramatic changes that are occurring in the plastics markets today. The majority of all plastic products in the market place today are based on oil and natural gas. As a result of increasing social, environmental and regulatory pressures, suppliers of plastic products, film (packaging and agricultural), automotive parts, containers, bottles, toys, filament for 3D printing, fixtures, parts for construction, medical products, disposable and structural parts are under tremendous pressure to supply products and parts that are more sustainable, environmentally safer, eliminate growing health concerns related to micro plastic particles found in our eco system and food supply and reduce dependence on oil based plastics. This is not an easy task. Producers and supplier of oil and natural gas based plastics, such as polyethylene, polypropylene, ABS, and polystyrene, have spent many years refining their products to meet the physical properties, process requirements, design and cost needs for companies that make products that are in the market place today. Equipment suppliers and converters have modified equipment and processes to manufacture quality products at the lowest possible cost. It is also important to understand that all products made from plastic contain additives. Additives are used and needed to reduce manufacturing costs, protect finished products during their life cycle, add desired color and appearance and modify the physical properties of the products to meet all of the requirements of the market place.

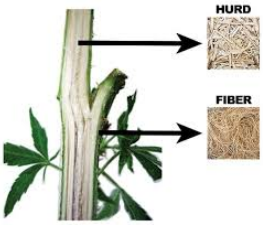
The challenges confronting the plastics Industry are many, complex and have and will continue to require significant technical and capital investments. Some of the most immediate approaches used to confront the issues at hand are the increased use of recycled plastics, the use of natural fillers in petroleum based plastics, the development of bio based plastic compounds to replace petroleum based plastics and the development of biodegradable compounds (that do not develop micro plastics particles) for single use applications. The most intensive technical and product development areas are related to the development of bio based compounds to replace petroleum based plastics and the development of biodegradable compounds for single use applications. Not to diminish the importance of recycling, bio based compounds and biodegradable single use compounds are the best short and long term solutions to many of the challenges the plastics industry is facing today.

Many biopolymers and biodegradable polymers do not have the physical properties to compete with petroleum based plastics in todays market. Biopolymer and additive producers world wide are working intensively to meet the challenge. The US is not a leader in this area, in fact most of the innovation, technology, additives, compounds and products have been developed by companies in Europe and Asia. Natural fibers, specifically Industrial hemp fiber, have the potential of accelerating the replacement of petroleum based plastics in the US and the world plastic market. Mother Nature has supplied a raw material feed stock (Industrial Hemp), that if modified, can dramatically improve the physical properties of biopolymers and biodegradable polymers (specifically flexural strength, tensile strength and heat distortion temperature), and accelerate the replacement of petroleum based plastics.

Through the joint development efforts of P3N Technology, Addisperse Tech. and AFAB Engineering

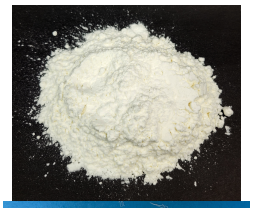
NEW MICRO HEMP AND MICRO HURD FIBER HAVE BEEN DEVELOPED

Our new Micro Hemp Fibers are based on Industrial Hemp grown in the US. The addition of our new micro hemp or micro hurd fibers to biopolymers and biodegradable compounds will accelerate the replacement of petroleum based polymers and compounds in the world wide plastic industry.



HURD CHIPS TO MICRO HURD FIBER.
(< 1mm)

HEMP FIBER TO MICRO HEMP FIBER.
(3 to 5 mm)



ADDISPERSE TECHNOLOGY IS CURRENTLY DEVELOPING and OFFERING NEW COMPOSITES, CONTAINING MICRO HEMP FIBER, FOR;

APPLICATIONS IN BIOPLASTIC - PLA COMPOSITES

* Automotive composites - door inter-liners and under the dash components
* Toys - game parts, figures, trucks, beach toys
* Containers - bottles (for vitamins and pharmaceuticals)
* 3D Filaments - general purpose and for structural applications (displays and furniture)
* Structural molded parts - bowls, tooth brush handles, camping accessories,
* Tokens and novelties (promotional items)
* High temperature applications - cups, trays, food packing (microwave applications)

APPLICATIONS IN BIODEGRADABLE SINGLE USE PRODUCTS - PHA AND PBS COMPOSITES

* Cups - Stadium and general drinking cups.
* Utensils - multi and single use applications
* Trays - medical and general food use
* Plates - reusable and single use
* Agricultural - netting for soil erosion control
* Straws - marine degradable
* Tree spikes, tags, ties and protective sheet

APPLICATIONS IN PETROLEUM BASED PLASTICS - PP AND HDPE COMPOSITES

* Automotive - replacement of glass fiber PP
* Furniture - recycled HDPE lawn and garden chairs and tables
* Construction - road bedding HDPE molded parts
* Sheet - wall partitions and separators

Exploring

* Cast polyester - edge and corner reenforcement
* TPE/TPO Elastomers - wheels, pads and bumpers
* Structural adhesives - wood and paper composites.