

PALMFI - THE FIRST TEXTILE FIBER PRODUCT IN EGYPT FROM DATE PALM FROND AND FRUIT STALKS

Mohamad Midani, Associate Professor at College of Textiles, North Carolina State University, and CEO of Valorizen (Egypt) has been [awarded the 2024 DNFI Innovation in Natural Fibres Research Award for the development of PalmFil® the World's First Date Palm Fibres](#). The process

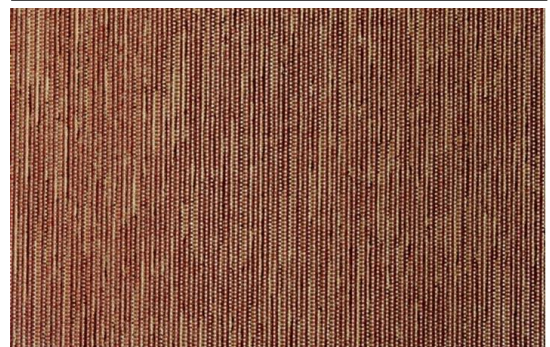


could result in a substantial increase in the world supply of natural fibres. Mohamad Midani conducts his research in Cairo, Egypt and PalmFil creates value out of the large quantities of underutilized byproducts of the 140 million date palms (FAO), which are otherwise open field burned.

PalmFil is the world's first textile fibers and reinforcements extracted from the byproducts of pruning of date palms, such as the frond and fruit stalks. Palm fibers are embedded inside the stalks and surrounded by a complex natural binder, making it difficult to extract the fibers without breakage or damage. The PalmFil® patented process delignifies and fibrillates those fiber vascular bundles using an environmental-conscious mechanical-chemical-biological method. The method transforms date palm waste (potentially 5 mil tons dry weight annually) into high-value textile fibers, thus expanding the palette of sustainable natural fibers.



The multi-step extraction process involves 1) preparing the palm fronds biomass to increase the surface area for further treatment, 2) treating the biomass with a mild alkaline solution to partly dissolve the gum using a closed loop chemical recovery process, and 3) mechanical scraping to remove gum and to fibrillate the coarse-hollow fiber vascular bundles without breaking them. If a cottonized fibre type is desired, an additional treatment with a custom enzyme mix is applied.



The PalmFil® fiber extraction process has been validated on a pilot level and is being scaling up to an industrial level through licensing agreements in Egypt, Tunisia and Saudi Arabia. Further, the PalmFil® extraction technology can be applied to other palm species, including oil palm, coconut palm, doum palm and bamboo, showcasing its versatile application. PalmFil® fiber has been blended with cotton to produce textiles. The fibres can also be used to produce insulation materials, biodegradable packaging, automotive composites, and floor laminates and rugs as well for mattresses.



[The website summarizes how the production and use of PalmFil can bring the following benefits:](#)

- **Sustainable & Biodegradable.** PalmFil is obtained from renewable bioresources and it does not cause deforestation or compete with food production. It is 100% biodegradable and compostable, and has the ability to naturally degrade into its basic constituents and return back into the environment. It is a native cellulose, unlike regenerated cellulose that has issues with solvent recovery. PalmFil is carbon dioxide neutral and it preserves the local farming cultures and technical heritage
- **Abundant.** Date palm is the main element of flora in the MENA region, with very high populations in Saudi Arabia, Iran, UAE, Iraq, Egypt and Algeria. Their estimated global population is 140 mil palms, generating 4.8 mil tons/year byproducts of pruning. The estimated fiber availability from those byproducts is 1.3 million tons/year, ranking third after cotton and jute. Palm pruning is performed year round, hence consistent supply with no seasonality issues.
- **Economical.** PalmFil is obtained from palm byproducts, and do not require extra investment in water, fertilizer, pesticide or land. Those byproducts are often regarded as agriculture waste, with zero price in field. The valorization of these byproducts can provide extra source of income to palm growers, and can generate thousands of decent jobs. In addition to, creating entire value chain within rural communities
- **Strong.** PalmFil specific tensile strength is 5times higher than structural steel, and equal to those of flax, hemp and sisal. Its vibration damping and acoustical insulation is higher than those of glass and carbon and with thermal insulation higher than carbon. PalmFil has cellulose purity up to 70% and thermal stability up to 226 ty up to 226 °C.
- **Light Weight & Safe.** PalmFil is 50% lighter than glass fiber, and 8% lighter than flax and hemp. It is safe for working health and does not require special personal protective equipment while handling. It also does not erode machine parts and production tools.
- **Bonding & Blending.** PalmFil has protruding side fibrils that create mechanical interlocks in a composite matrix. It can be easily blended with other long fibers such as flax, sisal, and abaca, or it could be chopped and blended with hemp, kenaf, and jute. PalmFil is compatible with existing spinning and weaving technologies of hard vegetable fibers

PalmFil Technology contributes to Circular Bioeconomy. PalmFil is based on a proprietary technology for extracting long pure textile fibers from the date palm byproducts such as fronds and fruit branches. The process delignifies and fibrillates the vascular bundles and eliminates the hollow lumens without causing any damage or breakage to the fibrils.

PalmFil creates value out of the large quantities of underutilized byproducts of the 140 million date palms (FAO), which are otherwise open field burned. It expands the palette of natural fibers and increases the biodiversity of fiber crops. Resulting in larger, more sustainable, and economical supply, which supports and encourages the industrial shift back to natural fibers. The PalmFil website underlines that the [Food and Agriculture Organization of the United Nations \(FAO\) regards date palm as one of the most important resources of the future because:](#)

- It is highly tolerant to difficult environmental conditions.
- It is very important for food and nutrition security in deserts and drylands.
- Its by-products are considered renewable resources of lignocellulosic materials.



- The utilization of its byproducts is part of a long technical heritage.
- It is the main source of livelihood for the big proportion of the world population.

There are more than 140 million date palms mostly concentrated in the Middle East and North Africa, generating more than 4.8 million tonnes (dry weight) of by-products of pruning every year that is regarded as agriculture waste. These by-products can be transformed into 1.3 million tonnes of natural textile fibres annually, ranking third after cotton and jute.

Palmfil is developed by [Valorizen Research and Innovation Center](#) which is based in Cairo and is specialized in developing, scaling up and commercializing technologies to valorize sustainable materials. It is the research arm and owned subsidiary of UK-based Scaleup Innovations Holdings Limited. Valorizen operates in areas including biomass valorization, waste valorization, as well as knowledge valorization. PalmFil is the Valorizen's flagship project.

The novel PalmFil fiber was well received by the scientific community. It was featured in research and review articles in some of the most prestigious scientific journals in the field. PalmFil was also well accepted by the industrial community in Egypt, and it has been processed on a full industrial scale spinning line at the Egyptian Industrial Center of Flax. It was also of high interest to one of the largest sisal and abaca spinning companies in the Middle East, Canal Rope Company an affiliate of the Suez Canal Authority in Egypt.

PalmFil contributes to the circular bioeconomy following a closed loop cycle from cradle to cradle. PalmFil extraction technology could be applied to byproducts of other palm species such as oil palm, sugar palm, doum palm as well as other agriculture byproducts such as broomcorn.

The Team of PalmFil believes that there is a very promising future for their novel class of natural textile fiber and they are seeking partnership to further develop, scale-up, and commercialize PalmFil fiber technology. The scope of partnership includes but is not limited to Licensing/ technology transfer, support further development, sponsor building a pilot production unit. Possible partners include automotive companies, developmental organizations, government agencies, and research funding organizations.

To know more

[News DNFI website](#)

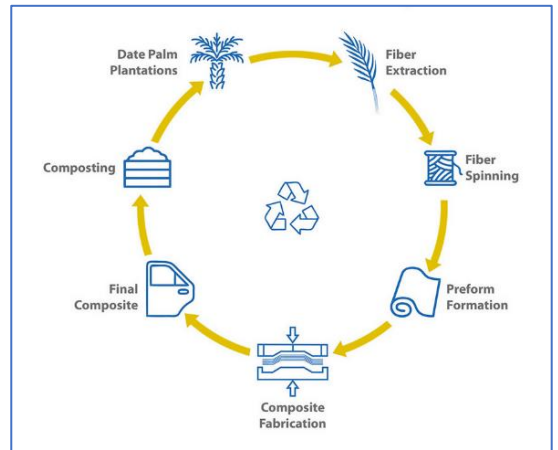
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[FAO Proposal for an International Year of Date Palm](#)

