



Grown Sustainable Construction Materials.

How date-palm waste and fungi could give the Kingdom a homegrown supply of sustainable building materials.



WORDS

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Vision 2030 wants the Kingdom to build green. The materials to do it may already be growing in its palm groves.



Vision 2030 has set Saudi Arabia's construction sector on an unambiguous course towards sustainability. Giga-projects are pursuing LEED certification alongside Mostadam, the Kingdom's own green building rating system, and environmental performance has moved from aspiration to contractual expectation.

The supply side tells a different story. Domestic manufacturing of sustainable and bio-based products remains thin, so much of what specifiers call for is imported. That dependence adds cost, lengthens lead times and, on programmes with little room for slippage, puts delivery at risk. Closing the gap means producing these materials in the Kingdom, and one of the most promising routes lies in a discipline still unfamiliar to much of the industry: bio-design.

WHERE ARCHITECTURE MEETS BIOLOGY

At its simplest, bio-design is the meeting point of architecture and biology. It starts from the premise that every building sits within a natural landscape, and that designers should look to that landscape for both inspiration and material.

The idea is hardly new to the region. The coral-stone houses of Historic Jeddah, built from stone hewn from red sea and known locally as mangabi, are a centuries-old lesson in building with what nature provides.

Every building sits within a natural landscape.

Modern technology carries the same logic further. Bio-based materials are composites derived from biological sources, and among the most promising is a pairing of mycelium, the threadlike root network of fungi, with agricultural waste. As the mycelium grows through the waste, it binds the mass into lightweight blocks and panels with good thermal properties, which makes insulation one of the most immediate applications.



200,000 –
1,000,000

TONNES OF PALM BIOMASS A YEAR

The Range of published estimates for the Kingdom. Much of it is burned or discarded.

In Saudi Arabia, the obvious feedstock is the date palm. Organisations such as the Saudi Investment Recycling Company (SIRC) and the National Center for Waste Management (MWAN) are working to draw waste streams like this into the circular economy.

Treating palm residue as a raw material rather than a disposal problem changes the calculation entirely. It becomes the foundation of a domestic supply chain: abundant, renewable and available close to the projects that need it.

READY TO REPLACE
CONVENTIONAL MATERIALS?

Can bio-based products stand in for conventional building materials at scale? Not yet, though the trajectory is encouraging.

The performance case is gathering weight. Laboratory studies of mycelium-based insulation have recorded thermal conductivity comparable to mineral wool and expanded polystyrene, and continued research and development will build confidence in long-term behaviour. Set against rock wool, which is produced by melting rock at high

temperatures, an insulant grown from palm waste offers a markedly different environmental profile.

The real obstacle is manufacturing. Mycelium must be cultivated in controlled, sterile conditions, which demands specialised laboratories, equipment and expertise. It cannot be grown in an ordinary facility, and scaling up calls for investment in process as much as in plant. Those demands drive cost, and cost explains why uptake remains limited.

A NATIONAL AMBITION, A
LOCAL OPPORTUNITY

The timing is favourable. With giga-projects pursuing LEED and Mostadam certification, demand for sustainable materials looks set to climb. At the same time, local content requirements, overseen by the Local Content and Government Procurement Authority, increasingly reward products manufactured in the Kingdom. Together, those pressures give Saudi entrepreneurs and manufacturers a clear incentive to invest in bio-based production now, ahead of the demand curve.



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GROWN VS MADE

Mycelium + palm Rock wool		
Origin	Farm waste, grown	Rock, melted at high heat
Thermal	Comparable in lab studies	Established benchmark
Hurdle	Sterile production, cost	Energy intensive

FOR DESIGN TEAMS

- 01 Specify bio-based alternatives where performance allows.
- 02 Back pilot applications on suitable projects.
- 03 Work with emerging local producers to build the evidence base.

Vision 2030 asks every part of the sector to move towards sustainability. The materials to get there may already be growing in the Kingdom's palm groves.