



Makran Your Partner in Purification, Not Just a Material Supplier

In purification and filtration processes, the challenge is not merely selecting a carbon material.

Quality control, performance stability, filter lifetime, long-term costs are critical factors that directly impact system performance.

Makran, with pistachio shell-based carbon, does not simply offer a product.

We stand alongside you to ensure that adsorption, purification, and filtration are predictable, controllable, and sustainable.

How **Makran** Work With You

- Selecting the appropriate grade based on real application requirements
- Ensuring consistent quality through reliable, continuous supply
- Reducing the risks associated with replacing carbons
- Providing technical customization tailored to your filtration system
- Supporting testing, pilot trials, and filter performance optimization

Our goal is to transform carbon from a potential risk point in your system into a reliable and trusted component of the purification process.

This is a partnership, not just a purchase.

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THE REAL CHALLENGE IN PURIFICATION AND FILTRATION

Common Market Challenges:

- High cost of activated carbons
- Quality fluctuations between different batches
- Rapid saturation and short filter lifespan
- Lack of transparency in technical specifications

Our Solution:

Pistachio shell-based carbon that is reliable, cost-effective, and controllable for adsorption and purification processes.



A BIO-BASED SOLUTION: PISTACHIO SHELL CARBON



Pistachio shell carbon = a bio-based platform for adsorption and filtration

This product:

- Is not just activated carbon
- Is not merely a physical filter
- Is an engineerable carbon adsorbent for purification applications

• Available in the following forms:

- • Activated carbon
- • Semi-activated carbon
- • Pre-treatment media

PRODUCTION PROCESS AND TECHNICAL NATURE

- Pistachio shell carbon:
- Produced from natural pistachio shells
 - Controlled carbonization
 - Multi-scale porosity (Micro / Meso)
 - Free of toxic additives

No resin, no synthetic binder

Temperature	EDS	SEM	Suitable for which needs
450 °C	Low ash, nutrients still preserved	Large and less developed pores, structure still relatively fibrous	Initial adsorption of odors and organic matter, suitable for household or small-scale filters, for water with low contamination.
550 °C	Controlled ash, some elements reduced	Balanced porosity with medium pores, suitable sponge, like structure	Strong adsorption of organic matter and odors, RO membrane protection, medium-scale industrial filters, for semi-industrial water.
650 °C	Very fine and dense pores, stable and durable structure	Slightly higher ash, reduction of surface nutrients	Industrial filters with high contaminant load, intensive RO membrane protection, laboratories and R&D, for sensitive industrial water.

KEY TECHNICAL SPECIFICATIONS (TECHNICAL SPECS)

General specifications available:

- Specific surface area (BET): adjustable
- Iodine number: suitable for organic compound adsorption
- Ash content: low and controlled
- Moisture: industrial standard
- pH: neutral to slightly alkaline
- Apparent density: stable
- Mechanical hardness: suitable for column filters

Laboratory analysis can be provided for each batch



Structural Advantages of the Raw Material

- Fibrous texture → stable porosity
- Multi-layered structure → gradual and uniform adsorption
- Less fragmentation compared to some low-cost carbons
- Better pore distribution

Result:

Longer filter lifespan

APPLICATIONS AND ADVANTAGES

Main Applications in Purification

Pistachio shell carbon is suitable for:

- Industrial water treatment
- Removal of color, odor, and taste
- Adsorption of organic compounds (VOCs)
- Removal of heavy metals (after activation)
- Pre-treatment of wastewater
- Air and gas filters
- RO and UF units (protective bed)

Advantages Compared to Common Market Carbons

- ✓ Bio-based and renewable
- ✓ True customization capability
- ✓ Quality stability
- ✓ Continuous domestic supply
- ✓ Lower carbon footprint

A smart alternative, not just a cheap one



ADVANTAGES FOR R&D AND FILTER MANUFACTURERS

Pistachio shell carbon:

- Suitable for testing filter formulations
- Surface and pore structure can be modified
- Enables selective adsorption adjustment
- Ideal for developing custom filters

A materials platform, not just an adsorbent

Pistachio shell carbon in purification:

- Is not a consumable material
- Is a sustainable supply solution

A choice that allows both cost control and predictable quality



THANK YOU

Collaboration Model

- Direct sales of pistachio shell carbon (purification and filtration grade)
- Long-term supply partnership (Supply Agreement)
- Joint product development (Co-Development)
- Supply for customer's private label

Supply Framework

- Continuous and planned supply for industrial use
- Availability from semi-industrial to industrial scale
- Quality consistency across production batches
- Provision of technical specifications and laboratory analysis for each batch



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