

Use of rice straw and pine wood as filters in water treatment process

CSIC has developed a procedure for the production of activated carbon filters from rice straw and pine wood shavings for the elimination of emerging organic pollutants in water. The procedure generates filters with greater efficiency than commercial ones and, additionally, enables the valorization of a low-cost mixture of residual biomasses.

Industrial partners are being sought to collaborate through a patent licence agreement.

An offer for Patent Licensing

Description of the technology

In recent years one of the most demanded applications of activated carbon is, due to its great adsorption power, its use in purification processes participating in the removal of organic pollutants present in water intended for human consumption.

The activated carbon synthesis process involves two well-defined steps: i) carbonization/pyrolysis of the precursor and ii) physical or chemical activation of the carbon. Chemical activation is the most common form in today's commercial activated carbons. Although it is effective, it presents two major disadvantages. On the one hand, it produces the release of toxic and reactive gases and, on the other hand, it is necessary to verify the removal of the activating substance when the process is finished.

The present invention, based on an initial stage of pyrolysis of rice straw and recycled pine wood shavings in the absence of oxygen and a second stage of physical activation, enables to obtain, overcoming the disadvantages mentioned above by not using oxidant chemical agents, activated carbon filters in a granular form with great water purification capacity in a sustainable way.



The new procedure enables to obtain, in a sustainable way, an activated carbon with great ability in water purification processes in areas as diverse as purification, mining, agriculture, food industry, wastewater treatment, etc.

Innovations and advantages

- The procedure enables recycle and revalue a low-cost residual biomass.
- By avoiding the use of chemical oxidant agents, a safer and more sustainable procedure is achieved.
- The activated carbon obtained has more retention sites for organic pollutants per unit weight than commercial granular activated carbons (GAC) enabling a higher performance in the removal of organic pollutants (neutral, anionic and cationic) than GAC.
- The developed material has a special interest in the removal of the so-called emerging pollutants, which, even in very low concentrations, can be harmful to health.

Patent Status

Spanish patent application with option for international extension

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