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Vegetable wastes for the preparation of activated carbons and their application in the treatment of waste water

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Industrial activities generate solid, liquid, and gaseous wastes which negatively impact the environment, and, as such, there is a worldwide concern about reducing the pollution of the ground, water, and air. Furthermore, during the preparation and the consumption of food, tons of solid vegetable residues are discarded. One way of minimizing the negative impact of human activities is found in the recycling of both industrial and vegetable residues by developing sustainable technologies that reduce the generation of solid wastes, producing new low-cost materials that can be used in the treatment of industrial waste water. There are diverse techniques used to treat industrial effluents such as coagulation-flocculation, advanced oxidation and electrochemical processes, membrane filtration, and adsorption, among others. Adsorption using activated carbon has proven effective in the elimination of industrial pollutants present both in waste water and air. The materials which are commonly used to produce activated carbon are

wood, animal bones, coconut shell, and mineral carbon. The use of wood in the production of activated carbon generates unregulated logging of trees, and the extraction of mineral carbon originates devastation of the landscape leaving enormous holes, removed soil, and debris from exploitation in mines. Hence, the use of vegetable residues is a sustainable alternative in the preparation of activated carbons because, using waste materials such as prickly pear peels, broccoli stems, white and black sapote seeds, and avocado peels or seeds, as well as many others, it reduces the generation of solid residues. Furthermore, by carefully controlling the conditions of activation and carbonization, it is possible to prepare activated carbons with high specific surface areas which have proven highly efficient in the elimination of organic and inorganic compounds present in waste water such as dyes and heavy metals, respectively.

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