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## **Activated Carbon from Mine Leftovers**

*by John Eberlee*

Scientists in Medellin, Colombia, collaborating with Canadian researchers, have created a promising new activated carbon industry out of a chronic waste disposal problem.

Activated carbon is a highly porous substance prized as a filtration agent. The material has dozens of uses. It can clarify wine and purify water. It is a staple of the food processing, beverage and pharmaceutical industries. And it is even used in protective gear such as gas masks. Traditionally, Colombia has imported most of the activated carbon it consumes, an estimated 2000 tonnes each year. But the country also produces coal. Sensing an opportunity, Professor Jaime Aguirre, of the National University of Colombia (NUC), approached IDRC with a plan to convert the mining industry's leftovers, called coal fines, into charcoal.

"It sounded like a good idea," says Stuart Barton, a scientist at Royal Military College in Kingston, Ontario, who reviewed the proposal for IDRC. Coal fines are sandy particles too small to burn and a nuisance to dispose of. More importantly, they are a suitable starting material for making carbon.

"You can make activated charcoal from all sorts of things, including peach pits and coconut shells. What's required is a material of natural origin that has an inherent pore structure," he says. With input from Professor Henry Becker, a chemical engineer at Queen's University in Kingston, Dr Barton and Dr Aguirre designed a "fluidized bed" system for generating activated charcoal continuously. The process, which has been patented in Colombia, involves first charring the coal fines to expose their pores, and then steaming the pores open. During both stages of this process, the fines are suspended on a stream of very hot gases.

Success is measured by the porosity of the final product, says Dr Barton. "If you've done a good job, the surface area will have increased from under 100 square metres per gram to 1000 square metres per gram."

Using a pilot-scale reactor, Dr Aguirre and his colleagues have long since mastered the fluidized bed technique and are now in the process of building a commercial-scale plant. In a related development, the city of Medellin is proposing the construction of a water purification plant based on charcoal filtration.

As a result of his work in Colombia, Dr Barton expresses more optimism about the country's future, particularly with new industries, such as activated carbon, laying roots.

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