

Peel potential

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Author(s): [Manupriya](#)

Bananas can filter heavy metals from water



Banana peel contains same elements as those found in traditionally used purifiers (Photo: EVAN LONG) BANANA peels may be notorious for causing slips in daily lives, but they can also prevent harmful chemicals from slipping into the body. Scientists from Brazil have found that the peel of the fruit can act as a filtration medium and pull heavy metals from water.

Metals such as lead and copper get introduced in water from sources like agricultural runoff and industrial wastes. Through water the heavy metals contaminate the soil and pose health risks. Lead is known to cause cancer. Traditionally silica, cellulose, and aluminum oxide are used to extract heavy metals from water. But these remediation strategies are expensive and have side effects.

Bananas, on the other hand, till now considered a fruit waste, are a safer option. Compounds in banana peels contain atoms of nitrogen, sulfur and organic compounds such as carboxylic acids—same as those found in traditionally used material. These acids have negative charge that can bind with metals in the water that usually have a positive charge.

Plant materials like sugarcane bagasse, peanut shells and apple waste are already used to extract metals from water. But they mostly require chemical modifications. Banana can act as an adsorbent (adhesion of heavy metals on the surface) without any chemical modifications.

Source: Industrial and Engineering Chemistry Research The team used a simple method to establish filtration properties of banana peels. They mixed 10 mg of minced banana peel (particle size 35-45 micrometres) in 10 ml of a water-based solution containing a known

concentration of metals. The mixture was then filtered and had a lower concentration of the metals.

They also compared the filtration capacity of the banana peel with other natural materials like peanut husk and saw dust. It was higher. “This is because of the higher levels of protein and reactive groups in the peels,” says Gustavo R de Castro, lead researcher. He notes that extraction capacity depends on the particle size. The smaller the particle size

Adsorption rate of purifiers

the more the surface area, hence greater filtration capacity.

Material type	Adsorption capacity (millimole/g)	
	Copper	Lead
Modified silica gel	0.447	0.380
Modified peanut husk	0.159	0.140
Sawdust	0.104	0.106
Minced banana peel	0.330	0.200

They found that a purifier made of layers of minced banana peel could be used up to 11 times without losing its metal-snagging properties. Synthetic material can be reused more times, but natural material is cheaper. In the study published in the February 16 issue of Industrial and Engineering Chemistry Research the scientists tested only two metals—lead and copper for filtration.

Castro is confident that metals such as cadmium, nickel and zinc will also be removed when they come in contact with the peel. “In fact the material can be used in industry for the treatment of effluent and will be a low-cost alternative,” he adds.