

Mustard seeds capable of lighting LEDs: IISER Pune

A team of scientists at Pune's IISER carried out an experiment using mustard seeds, sandwiched between a layer of plastic and a polymeric nano fibre pad, subjected them to mild force and found that electric power was generated.

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Spluttering of mustard seeds and the popping sound, when tempered with hot oil, is a common sight in Indian kitchens. But, what if the same dancing seeds were able to generate electricity, enough electricity to glow small LED bulbs?

A team of scientists at the Indian Institute of Science, Education and Research (IISER), Pune, has demonstrated the same. They carried out an experiment using mustard seeds, sandwiched between a layer of plastic and a polymeric nano fibre pad, subjected them to mild force and found that electric power was generated.

Led by senior physicist Satish Ogale, the researchers also carried out similar tests using flax and basil seeds, in an effort to harvest power by a Triboelectric Nanogenerator (TENG) device.

“Due to the ease of transferring electrical charges afforded by the natural seed surface to a mildly impacting soft material, we could generate usable electricity,” Ogale told [The Indian Express](#).

While the scientists have been working on identifying potential materials that will allow easy separation of charges, the idea of using mustard was purely an accidental one, the team lead claimed.

“It was just another day at home when I was playing in my kitchen with a plastic bottle that stored mustard seeds. As I shook the bottle, the seeds kept popping up, dancing and hitting the walls of the bottle. That is when I decided to experiment with them,” he said.

A series of tests using the three seeds revealed that mustard seeds produced maximum 334 MW/square metre electric power, followed by flax (324 MW/square metre) and basil (72mW/square metre).

“Our tests demonstrated that the electricity (after being converted from Alternate Current to Direct Current) generated from about two grams of mustard seeds could momentarily flash/light nearly 120 LED bulbs. Such power is enough to operate several low power devices used in wearable electronics,” said Sachin Kumar Singh,

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Among other applications, the power generated in this manner can also suit in lighting up smart gadgets, wearable devices and secure **Sign in** posts requiring low power for operations.

The biggest advantage of using such techniques, more commonly known as green chemistry, is that they are highly cost-effective in nature.

“This factor attracts industries the most as there is reasonably good power output received at much lower costs,” said Ogale, who explained that the chemical composition, structure, shape and morphology of the seeds play a vital role in the power generation.

“The crust or the surface layer of mustard offer better response to friction and it was found to be electrostatically more active than the other seeds used in the experiment,” said Ogale.

With India being one of the major producers of mustard and its significant use of mustard oil for cooking purposes, the work of the IISER team suggests that mild power generation is also possible from the residual waste after oil extraction process was complete.

“We achieved similar results from the residual waste collected after mustard oil was extracted,” said Singh.