

# Eco-Based Fire Logs

## An Environmentally Friendly Invention From ARS

**A**rificial logs that create a cheerful and welcoming winter blaze in your fireplace might someday be made from a perhaps surprising source: grass clippings.

Mowing front and backyard lawns, plus fields at parks, schools, and other city and suburban landscapes, “creates tons of clippings that typically end up in landfills,” says Agricultural Research Service chemist Syed H. Imam. “This raw material is abundant, ubiquitous, and available free of charge from many landfills that need to free up more space for other waste.”

In tests conducted at the ARS Western Regional Research Center in Albany, California, near San Francisco, Imam and colleagues have shown that lawn clippings can be mixed with other natural compounds to yield eco-friendly fire logs that burn brightly and evenly. The same formula can also be used to produce pellets ready for the hopper of your pellet-burning stove or fire-starting sticks for using with firewood at a campfire.

Unlike many products manufactured today for burning in your fireplace, pellet stove, or campfire, the bio-based fire logs

that Imam’s team developed contain no petroleum-derived chemicals. That means the eco-logs burn cleaner, emitting fewer potentially polluting volatile organic compounds, or VOCs, Imam says.

Clippings make up about 20 to 60 percent of the composition of the logs, by weight. About 40 to 80 percent is made up of any of a number of plant-derived waxes or oils, referred to as “binders.” They add durability and help the logs, pellets, or sticks retain their shape. Binders also boost the energy value of the log and extend its burn time.

All of the binders that Imam’s team worked with, including rice wax and soy wax, are for the most part, commonly available, he notes.

Adding a small amount of a mineral oxidizer—up to 2 percent by weight—helps the logs ignite quickly and keeps the color and height of the flames consistent. Imam’s group chose potassium chlorate for this purpose.

Though the Albany team’s focus was on grass clippings, the logs can also be made from agricultural-harvest leftovers, such as rice straw, corncobs, or cornstalk residue. Manufacturing

some other kinds of bio-based fire logs requires high temperatures. That’s not the case with the logs from Imam’s team.

“The grass clippings or other plant materials need to be dried to a moisture content of 15 percent or less,” Imam says, “and the wax needs to be softened so that it will be evenly distributed throughout the log.” This can be accomplished at relatively low temperatures (40° to 45°C) in conjunction with shear forces created during the mixing and molding of the materials.

Imam and collaborators Roxana H. Imam, a former intern at the Albany center; and Jimmy C. Dorsey of New Venture Ideas, Inc., Pittsburg, California, are seeking a patent for their invention.—By **Marcia Wood, ARS.**

*This research is part of Quality and Utilization of Agricultural Products, an ARS national program (#306) described at [www.nps.ars.usda.gov](http://www.nps.ars.usda.gov).*

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Developed by ARS, this burning bio-based log is made of grass clippings and contains no petroleum-derived chemicals.





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