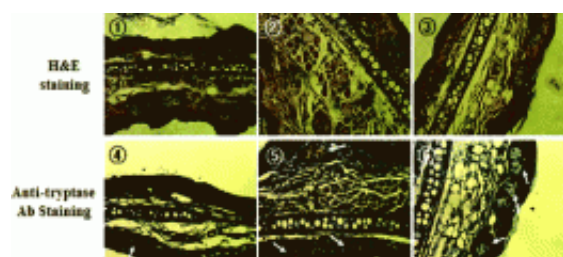


# 'Liquid smoke' from rice shows potential health benefits

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Liquid smoke flavoring made from hickory and other wood — a mainstay flavoring and anti-bacterial agent for the prepared food industry and home kitchens — may get a competitor that seems to be packed with antioxidant, antiallergenic and anti-inflammatory substances, according to a new study in *ACS' Journal of Agricultural and Food Chemistry*. It is the first analysis of liquid smoke produced from rice hulls, the hard, inedible coverings of rice grains.

Mendel Friedman, Seok Hyun Nam and colleagues explain that wood from trees is typically used to produce liquid smoke, added to meat and other foods for a smoky taste. But other types of plants can also be burned to make the popular seasoning. Rice is a prime candidate, with 680 millions tons produced worldwide each year. Hulls account for 136 million tons of that amount and often go to waste. The researchers wondered rice hulls could be put to good use in a liquid form as a food

flavoring, and did the first studies needed to determine if rice hull smoke is safe enough for food use.

The scientists found that liquid smoke from rice hulls may be healthful. Their tests on laboratory cell cultures found that liquid rice hull smoke worked as an antioxidant that could help fight off diseases. It also helped prevent inflammation, which is associated with many different health problems did not trigger an allergic response. "New food uses of a major agricultural byproduct may benefit the environment, farmers, and consumers," the report stated. "However, it is necessary to demonstrate that rice hull smoke is safe. The present study was designed to contribute to this assessment."

**More information:** "Composition of Liquid Rice Hull Smoke and Anti-Inflammatory Effects in Mice" J. Agric. Food Chem., 2011, 59 (9), pp 4570–4581

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### Abstract

A new liquid rice hull smoke extract with a smoky aroma and sugar-like odor prepared by pyrolysis of rice hulls followed by liquefaction of the resulting smoke contained 161 compounds characterized by GC/MS. Antioxidative, antiallergic, and anti-inflammatory activities of the extract were assessed in vitro and in vivo. At pH 5, the extract inhibited 1-diphenyl-2-picrylhydrazyl (DPPH) free radicals and suppressed nitric oxide (NO) and  $\beta$ -hexosaminidase releases from lipopolysaccharide (LPS)-induced RAW264.7 mouse macrophage leukemia cells and ionophore A23187-stimulated RBL-2H3 rat basophilic cells without significant cytotoxicity. 12-O-Tetradecanoylphorbol-13-acetate (TPA) was applied to the ears of CD-1 mice to induce inflammation (edema), which was accompanied by increases in a series of biomarkers. Topical application of 1% of the extract as well as feeding mice a standard diet with 1% extract for two weeks significantly reduced the expression of

biomarkers associated with the TPA-induced inflammation. These include tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), IL-1 $\beta$ , interleukin-1 $\beta$  (IL-1 $\beta$ ), interleukin-6 (IL-6), leukotriene B4 (LTB4), prostaglandin E2 (PGE2), myeloperoxidase (MPO). These in vitro and in vivo findings demonstrate the potential value of rice hull smoke extract derived from a major agricultural byproduct to serve as a new biomaterial for the improvement of food quality and safety and the environment.

Provided by American Chemical Society

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