

Sweet lime oils defeat pests

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Citrus peel and pulp is a growing waste problem in the food industry and in the home. However, there is potential to extract something useful from it. Work in the *International Journal of Environment and Waste*

Management describes a simple steam distillation method that uses a domestic pressure cooker to extract useful essential oils from the peel of sweet lime (mosambi, Citrus limetta).

Waste mosambi peel can be obtained in huge quantities from the many fruit juice shops around the state of Delhi and elsewhere and where people make juice in their homes. The research shows how these extracted essential oils have antifungal, larvicidal, insecticidal and [antimicrobial activity](#) and so could represent a useful source of inexpensive products for crop protection, domestic pest control and cleaning, and more.

Using [waste](#) streams from the [food industry](#) as a source of raw materials for other industries is on the rise. To be truly beneficial in terms of the environment, however, the extraction of useful materials from such waste has to approach carbon neutrality and be largely non-polluting itself. Chemists Tripti Kumari and Nandana Pal Chowdhury of the University of Delhi and Ritika Chauhan of Bharati Vidyapeeth's College of Engineering in New Delhi, India, have used a relatively environment-friendly steam distillation followed by solvent extraction with hexane to access the essential oils from mosambi peel. "The reported method of extraction produces zero waste, is energy efficient and gives a good yield," the team writes.

The team demonstrated antibacterial activity of the extracted [essential oils](#) against bacteria including *Bacillus subtilis* and *Rhodococcus equi*. The same oils also showed activity against strains of fungi, such as *Aspergillus flavus* and *Alternaria carthami*. The extracts also show lethal activity against mosquito and cockroach larvae. The researchers suggest that appropriately adapted to preclude the need for the organic solvent step, it might be possible to develop a domestic approach to making such essential oil products from citrus peel in the home. This would, they suggest, bring science home and provide an effective alternative to costly

manufactured sprays and products.

More information: Tripti Kumari et al, Eco-friendly extraction of Mosambi (*Citrus limetta*) essential oil from waste fruit peels and its potential use as a larvicidal, insecticidal and antimicrobial agent, *International Journal of Environment and Waste Management* (2022). [DOI: 10.1504/IJEW.2022.122683](https://doi.org/10.1504/IJEW.2022.122683)

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