



10 things to know about the hexanal project

Many farmers in developing countries lose up to half of their produce after harvest. Much of it spoils before it gets to the market.

Hexanal, a natural compound found in all fruits, helps prevent spoilage. An international research team based at the University of Guelph has developed advanced technology using hexanal to help improve the environment, economy and society.

1. Natural



Hexanal is naturally found in all fruits and vegetables.

When a fruit begins to ripen, it releases various enzymes to accelerate the process as the fruit membrane, or skin, starts to degrade and soften.

This acceleration differs between climacteric fruits such as bananas and mangoes that continue to ripen

after harvest and non-climacteric ones, such as grapes and strawberries, which ripen no further after being picked.

Faster ripening in climacteric fruits makes it more difficult to keep them fresh during shipping worldwide. Applying hexanal at the correct stage slows degradation and lengthens shelf life.

2. Safe



Hexanal has been extensively tested and approved by the

United States Food and Drug Administration (FDA).

Researchers tested hexanal on a variety of organisms, such as soil microbes, honeybees and humans. No diseases or harmful effects resulted.

Hexanal is considered safe for all species and does not alter the role of organisms in ecological chains. In fact, trees sprayed with hexanal have been shown to grow thicker canopy covers, and soil organisms such as earthworms have become more robust.

3. Advanced



Hexanal for fruit treatment is generally used as a mixture called enhanced freshness formulation (EFF).

Although EFF is the main product used for fruit treatment, many other methods also deliver hexanal molecules to fruit membranes. Ultra-thin nano-fibres loaded with hexanal easily penetrate membrane pores. This “green” nanotechnology leaves no harmful by-products or traces of original EFF.

4. Longer Storage



Fruit treated with hexanal lasts significantly longer than untreated fruit, even at room temperature. Depending on conditions, shelf life may be extended by a few days or up to four weeks.

5. Dynamic



Fruit may be treated with hexanal using

sprays, dips, vapours, wraps, sachets and stickers. All wraps, sachets and stickers are made from FDA-approved polymers.

Different methods work better than others for climacteric or non-climacteric fruits. Spraying works better with mangoes, while dipping works better with bananas.

Diverse methods allow growers to treat fruit appropriately, develop marketing strategies for their crops and use hexanal more efficiently.

6. Beneficial



Hexanal extends the shelf life of fruit, reduces food waste and supports economies.

It also yields fresher and healthier-looking plants and trees, encourages more beneficial insects and improves conditions for soil microbes.

Hexanal has also been shown to work as an antimicrobial agent, preventing plant diseases caused by bacteria that affect fruits.

7. Impactful



The hexanal project helps improve fruit availability and

consumption, and helps boost economies, food security and sovereignty in countries around the world.

Producers can sell products for a reasonable price as the quality of hexanal-treated fruit declines less rapidly than that of untreated commodities.

That means more income for producers and their families and, ultimately, economic benefits for their country.

In Trinidad and Tobago, consumers have benefited from replacing potatoes with EFF-treated green papayas as healthful snacks in school nutrition programs.

8. Cost-effective



Using very low quantities of hexanal in the

formulation means treatment is easily affordable. Employed as a dip treatment, the same batch may be reused up to 10 times. When EFF is produced commercially, it will become affordable even for small farmers from developing countries.

9. International



Some 60 researchers and 29 graduate students

are working on the hexanal project along with more than 5,000 farmers in six countries in Asia, Africa and South America. National policy-makers in Asia and Africa are recognizing the potential societal, economic and agricultural benefits of this product.

10. Futuristic



Because of the high demand for hexanal, this project may involve many more farmers, and other fruits, elsewhere in the world.

Nanotech products mentioned above are yet to be fully licensed and commercialized. When these products enter the market in the next few years, hexanal will become even more important in food security.



The hexanal project is led by researchers from the University of Guelph, Dept of Plant Agriculture.

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