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Technische Universität München

News Release

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Healthier fruits through yeast extracts

How TUM researchers are employing natural substances to improve fruit growing

It sounds like every gardeners dream come true: A purely organic crop protection product that safeguards apples and pears from disease without chemicals – while at the same time improving the nutritional value of the fruits. This is precisely what agronomists at the Technische Universität München (TUM) are working on. They are researching a yeast extract that is both an environmentally friendly pesticide and a quality booster for the treated fruits. The scientists will be on hand at the Bavarian Agriculture Festival in Munich (20 – 28 September) to answer questions about these and other research projects.

Fruit growers dread fire blight and apple scab. These plant diseases are generally treated using industrial agents: Antibiotics and chemical-synthetic pesticides are the pesticides of choice. Organic fruit growers rely on yeast preparations instead. But so far they have not really been satisfied with the organic alternatives because the natural substances tend to be unreliable in their effect. TUM researchers from the Unit of Fruit Science at the Center for Life and Food Sciences Weihenstephan are tackling the problem: They are deciphering the environmentally-friendly pesticide's mode of action – and hope to standardize it in a way that will allow the preparation to be deployed on a large scale.

To this end the researchers are investigating crop protection products based on the yeast fungus *Aureobasidium pullulans*. In experiments they are close to unraveling why this yeast protects fruit from fire blight and apple scab: Apparently the special yeasts can stimulate the defensive metabolism of fruit trees. In the process, natural defensive substances are concentrated in plants – in apples and pears these are specific flavonoids and phenols. These so-called bioactive ingredients enable fruit trees to ward off diseases and to weather environmental stress using a kind of self-produced protective shield.

At the same time, bioactive plant compounds are also very useful for humans: Nutritional medicine studies have shown that these natural antigens act as antioxidants and radical scavengers and can thereby protect our bodies' cells from cancer. Thus, a treatment with yeast extract can make fruits healthier in two ways: first on the tree – and then with regard to human health. A welcome side effect is that fruit treated in this way contains absolutely no chemical pesticide residues. However, for the yeast fungus to unfold its double effect it must

Technische Universität München **Corporate Communications Center** **80290 München** **www.tum.de**

Dr. Ulrich Marsch	Head of Corporate Communications	+49.89.289.22778	marsch@zv.tum.de
Jana Bodický M.A.	Media Relations	+49.8161.71.5403	bodicky@zv.tum.de

be applied pre-emptively: This is the only way it can trigger the creation of the protective substances in fruits via a complicated cascade of signals.

Fruit growth researchers at the Center for Life and Food Sciences Weihenstephan of the TUM are now concentrating on putting their findings into practice. Using a proprietary laboratory process, they are analyzing yeast preparations that are already on the market and test the most promising mixtures in the field on apple and pear trees. Their goal: the reproducible manufacture of a reliably effective yeast preparation. “I imagine it will still be a number of years before we are ready,” says Prof. Treutter of the Unit of Fruit Science at the TUM. “But we are already certain that this environmentally-friendly process will improve the nutritional value of fruits and, at the same time, revolutionize plant growing.”

Prof. Treutter will be available on 27 and 28 September at the Bavarian Agriculture Festival to provide visitors and journalists with details of this and further research projects. Please visit us at the booth of the Technische Universität München in Hall 7 at the Theresienwiese in Munich, Booth No. 7067. We will be on site every day between 9 am and 6 pm.

Contact:

Prof. Dieter Treutter
Unit of Fruit Science
Technische Universität München
85354 Freising
Tel: 08161 / 71 - 3753
E-Mail: dieter.treutter@wzw.tum.de
www.wzw.tum.de/ob

Dr. Susanne Rühmann
Unit of Fruit Science
Technische Universität München
85354 Freising
Tel: 08161 / 71 - 3129
E-Mail: susanne.ruehmann@wzw.tum.de
www.wzw.tum.de/ob

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Photo descriptions:
kallus.jpg: Model system for measuring defensive strength: When the undifferentiated callus cells (yellow) are treated with yeast extract (orange) they create bioactive polyphenols. (Copyright: TUM)

apfelblueten.tif: Endangered apple blossom: Spring-like weather conditions allow the fire blight pathogen to grow. Insects carry the disease from tree to tree. (Copyright: TUM)

Technische Universität München (TUM) is one of Europe's leading technical universities. It has roughly 420 professors, 6,500 academic and non-academic staff (including those at the university hospital "Rechts der Isar"), and 22,000 students. It focuses on the engineering sciences, natural sciences, life sciences, medicine, and economic sciences. After winning numerous awards, it was selected as an "Elite University" in 2006 by the Science Council (Wissenschaftsrat) and the German Research Foundation (DFG). The university's global network includes an outpost in Singapore. TUM is dedicated to the ideal of a top-level research based entrepreneurial university. http://www.tum.de

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