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EFFECT OF HYDROGEN PEROXIDE ON GROWTH AND TAXOL PRODUCTION IN SUSPENSION-CULTURED HAZELNUT (*CORYLUS AVELLANA* L.) CELLS

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Increasing lines of evidence support the idea that reactive oxygen species (ROS) function as signaling molecules that mediate responses to various stimuli [1]. Before the activation of *de novo* synthesis of secondary metabolites, the ROS production is also observed in elicitor-induced cell cultures [2]. Nevertheless, reports relating H₂O₂ from the oxidative burst to biosynthesis of second metabolites, have been contradictory, even with respect to experiments performed on the same plant species [3,4]. In the present work, the effects of H₂O₂ on growth and taxol production in hazelnut cells are investigated. Hydrogen peroxide concentrations were 13, 26 and 52 mM in culture medium. The cells were treated with hydrogen peroxide on day 8 of subculture and were harvested on day 14. Growth and biomass production, protein content, electrolyte leakage, total dissolved solute, pH changes and taxol (extracellular and cell-associated) accumulation were evaluated. Results showed that there was a significant difference between H₂O₂ concentrations on growth and biomass production in treated cultures and the parameters significantly decreased by 13 and 52 mM of H₂O₂, compared to that of the control cultures, although unaffected by 26 mM of H₂O₂. Medium pH was more alkalized under effect of 13 and 52 mM of H₂O₂ and electrolyte leakage, protein content as well as total dissolved solute also more enhanced by the concentrations and other H₂O₂ concentration (26 mM) actually had effect similar to control. Taxol production also affected by H₂O₂ and maximum content of total taxol (50 µg/g dry weight) observed under effect of 26 mM of H₂O₂. While highest cell-associated taxol achieved by 26 mM of H₂O₂, most extracellular taxol measured at 52 mM concentration of H₂O₂. Significant enhancement of taxol release was observed under 13 and 52 mM concentrations of H₂O₂, which were 71% and 67%, respectively. Present results indicated the effectiveness of elicitation by H₂O₂ on taxol accumulation in cell cultures of hazelnut. This is the first report of H₂O₂ elicitation on taxol production by cells of *C. avellana*.

References

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HERBAL SUPPLEMENTS MAY CAUSE DANGEROUS DRUG INTERACTIONS IN ORTHOPAEDIC SURGERY PATIENTS

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Complementary and alternative medical (CAM) treatments such as herbal supplements have become increasingly popular in the United States. However, many of these products can have serious and potentially harmful side effects when combined with medications prescribed during and after surgery. Many herbal products are marketed as "natural" or "homeopathic," which may lead consumers to assume the products are safe, even when taken with prescription medicines. Dr. Rispler noted, "Herbal supplements can have a negative impact on patients both before and following surgery, and may interact with conventional medicines used to manage chronic conditions." Many of the most popular herbal supplements used today can have serious side effects when combined with prescription medicines. For example: Feverfew (used for migraine prevention), ginger, cranberry, St. John's Wort and ginseng can interact with the anti-clotting drug warfarin; Feverfew, ginger, and ginkgo can interact with aspirin; Garlic can interfere with anti-clotting medications and the immunosuppressant drug cyclosporine (prevents transplant rejection); Valerian (used as a sedative) can intensify anesthetics; and St. John's Wort can interact with immunosuppressive drugs and potentially lead to transplant rejection. Herbal products marketed for osteoarthritis also can pose serious risks when combined with prescription medications. For example: Glucosamine, chondroitin and flavocoxid can affect clotting agents; Black cohosh can interact with the cancer drug tamoxifen; and Cat's claw can interact with clotting agents, blood pressure medications and cyclosporine. Most surgery-related side effects can be avoided by stopping the CAM product at least one to two weeks prior to surgery and during the postoperative period while prescription medications such as blood thinners or antibiotics are being used. The problem arises when physicians do not know that a patient is using a CAM product, Dr. Rispler said. To help ensure physicians are aware of the products their patients may be using, Dr. Rispler also recommends including CAM product-use questions on health/medical assessment forms to encourage patient disclosure. "By opening up a conversation on the use of herbal medications around the time of surgery and compiling a complete list of all prescribed and self-prescribed medications and supplements, patients and physicians may be able to work together to decrease the risk of complications that can occur during and following surgery," Dr. Rispler said.

References

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