Delaware Economic Development Office dedo.delaware.gov Innovation@work.

Maize glutathione-S-transferase enzymes

Description of Technology: This intention is in the field of plant molecular biology. More specifically, this invention pertains to nucleic acid fragments encoding maize glutathione-S-transferase (GST) enzymes involved in the detoxification of xenobiotic compounds in plants and seeds.

Patent Listing:

1. **US Patent No.** 5,962,229, Issued on October 5, 1999, "Maize glutathione-S-transferase enzymes." http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=5,962,229.PN.&OS=PN/5,962,229&RS=PN/5,962,229

2. **US Patent No.** 6,096,504, Issued on August 1, 2000, "Maize glutathione-S-transferase enzymes." http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=2&f=G&l=50&co1=AND&d=PTXT&s1=6,096,504&OS=6,096,504&RS=6,096,504

Market Potential: Glutathione S-transferases (GSTs; EC 2.5.1.18) catalyze the nucleophilic attack of the thiol group of GSH to various electrophilic substrates. Their functions and regulation in plants has been recently reviewed (Marrs et al., Annu Rev Plant Physiol Plant Mol Biol 47:127-58 (1996); Droog, F. J Plant Growth Regul 16:95-107, (1997)). They are present at every stage of plant development from early embryogenesis to senescence and in every tissue class examined. The agents that have been shown to cause an increase in GST levels have the potential to cause oxidative destruction in plants, suggesting a role for GSTs in the protection from oxidative damage. In addition to their role in the protection from oxidative damage, GSTs have the ability to nonenzymatically bind certain small molecules, such as auxin (Zettl et al., PNAS 91:689-693, (1994)) and perhaps regulate their bioavailability. Furthermore the addition of GSH to a molecule serves as an "address" to send that molecule to the plant vacuole (Marrs et al., Nature 375:397-400, (1995)). GSTs have also been implicated in the detoxification of certain herbicides. Maize GSTs have been well characterized in relation to herbicide metabolism.

Manipulation of nucleic acid fragments encoding soybean GST to use in screening in assays, the creation of herbicide-tolerant transgenic plants, and altered production of GST enzymes depend on the heretofore unrealized isolation of nucleic acid fragments that encode all or a substantial portion of a soybean GST enzyme.

Benefits:

- Nonenzymatically bind certain small molecules.
- Regulate bioavailability of certain small molecules.
- Protect from oxidative damage.
- Detoxification of certain herbicides.

Applications:

- Screenings in assays.
- Creating herbicide-tolerant transgenic plants

Contact:
Delaware Economic Development Office
Direct: (302) 577-8477, Fax: (302) 577-8499