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Production of silk-like proteins in plants

Description of Technology: The invention provides methods for the production of silks and silk-like proteins (SLP's) in green plants. Expression of SLP's has been achieved in both seed and leaf tissue in green plants.

Patent Listing:

1. **US Patent No. 6965060**, Issued November 15, 2005, "Production of silk-like proteins in plants"
   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=6965060.PN.&OS=PN/6965060&RS=PN/6965060

Market Potential: Increasing demands for materials and fabrics that are both light-weight and flexible without compromising strength and durability has created a need for new fibers possessing higher tolerances for such properties as elasticity, denier, tensile strength and modulus. The search for a better fiber has led to the investigation of fibers produced in nature, some of which possess remarkable qualities. One of those fibers is silk, a group of externally spun fibrous protein secretions.

Traditional silk production from silkworm involves growing mulberry leaves, raising silkworm, harvesting cocoons, and processing of silk fibers. It is labor intensive and time consuming and therefore prohibitively expensive. The natural defects of the silkworm silk, such as the tendency to wrinkle and the irregularity of fiber diameter further limits its application. Similarly, the mass production of the dragline silk from spiders is not plausible because only small amounts are available from each spider. Furthermore, multiple forms of spider silks are produced simultaneously by any given spider. The resulting mixture has less application than a single isolated silk because the different spider silk proteins have different properties and are not easily separated. Thus, the prospect of producing commercial quantities of spider silk from a natural source is not a practical one and there remains a need for an alternate mode of production.

By using molecular recombination techniques, one can introduce foreign genes or artificially synthesized DNA fragments into different host organisms for the purpose of expressing desired protein products in commercially useful quantities. Such methods usually involve joining appropriate fragments of DNA to a vector molecule, which is then introduced into a recipient organism by transformation. Transformants are selected using a selectable marker on the vector, or by a genetic or biochemical screen to identify the cloned fragment.

Benefits:

- Method for the production of silk-like proteins in a green plant

Applications:

- Molecular Biology and plant genetics
- Garment Industry

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