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The process of germination in seeds leads to human insulin like proteins

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Diabetes is a global health problem and this research may provide safe and cost effective Insulin like proteins and functional foods from edible legume and cereal seeds. This research reports a cost effective alternative source for Insulin. A few reports are there on the presence of insulin-like proteins in plants since 1923, after the discovery of insulin in animals. The oldest report on the existence of insulin-like hormone in various plant materials was given by J.B.Collip in 1923. He reported its hypoglycemic activity and suggested the name 'glucokinin' for it. Growing diabetic population and the complications associated with diabetes stimulates the search for new drug targets and more efficient drugs with less adverse effect. The standard drugs which are widely used for diabetes all over the world were derived from plants. This is in the case of metformin, which is developed from biguanides present in the leaves of the legume plant Galega officinalis (Bailey1989), salacinol, an á-glucosidase inhibitor extracted from the roots of Salacia reticulata (Yoshikawa 1997), and cryptolepine, an indoloquinolene alkaloid isolated from the leaves of Cryptolepis sanguinolenta (Luo J 1998). No research was done after this pioneering work of the 1920s. And the silence was broken when Khanna and collaborators reported on the presence of insulin in plants and patented a process for its production from the fruits of Momordica charantia (bitter gourd) (Khanna 1976). Insulin like proteins is detected in various plants and microbes after that showing similar functions as that of vertebrate insulin. Isolated Insulin like proteins (glucokinin) detected and quantified by ELISA shows its structural/sequence similarity with insulin of animal origin. I observed that sprouts of Glycine max are amazing blood sugar regulators (Manju Pathak, 2005). Further it was observed that Insulin like proteins is the outcome of the process of germination in seeds; (Manju Pathak and Danik M, 2011); Potential users of the new product are all the diabetic patients. Problems in the availability and compatibility of animal insulin in treating diabetes in humans resulted in the development of human insulin of recombinant DNA origin in bacterial and yeast expression systems. But high production cost, low yield and the need of the robust techniques in the downstream processing and to minimize contaminations involved in the production of the recombinant human insulin makes it expensive for the users. The new product will be cost effective because the plants can be cultivated extensively in a cheaper way according to the demand. Oral hypoglycemic drugs are shown to have many side effects. Preliminary results in animal models prove the hypoglycemic activity of the plant insulin. New product developed under this project by designing and testing various formulations and combinations will be as efficient as insulin in market. The search for improved insulin formulations that reproduce as closely as possible the physiological profile resulting from endogenous insulin secretion is the expected outcome. Substantial efforts will be taken for the development of non-invasive methods of insulin administration. The efforts in this research is to develop a new product which will be non invasive and will be as efficient as insulin in market.

Biography

Manju Pathak has completed her Ph.D at the age of 27 years from University of Delhi. She carried her postdoctoral research from National Centre for Cell Science, Pune. Presently she is Professor, Biotechnology at Amity University, Noida. She has three granted patents and has published more than 30 papers in reputed journals. Her technology was selected in top sixty technologies by Department of Science and Technology, Govt. of India (DST) and IC2, University of Texas, USA in 2010. She licensed her patent to Futureceuticals, USA, in 2006 for some time.

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