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Production and partial characterization of a thermostable amylase from Bacillus firmus strain isolated from bhairon ghati of trikuta hills

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An extracellular amylase producing strain designated as SMVDU-1 was isolated from Bhairon Ghati of Trikuta Hills located in the state of J&K.The strain was identified as Bacillus firmus by 16S rDNA sequencing.The enzyme production was optimized using various Carbon sources and it was found that soluble starch and wheat bran increased the enzyme production up to 151% and 220% respectively as compared to Luria Bertani broth.The growth profile of the strain was studied at 35°Cfor 72 hours and it was found that the enzyme production was best after 24 hours of growth. The amylase enzyme from the supernatant of SMVDU-1 was partially purified and characterized.

The enzyme showed optimum activity at a temperature of 65°C and pH 7.0. The temperature stability of the enzyme was found to be in the range of range of 45°C -80°C and the pH stability is in the range of 6.0 – 8.0.

Effect of metal ions like Ca^{2+}, Mn^{2+}, Mg^{2+}, Cu^{2+}, and Ag^{2+} on enzyme activity was studied and it was found that Mn^{2+} and Ca^{2+} ions at a concentration of 2mM increased the enzyme activity considerably.

Effect of inhibitors on enzyme activity was also studied and it was found that 50% of the enzyme activity was retained when SDS was used at a concentration of 2%. EDTA at a concentration of 1mM and 5mM was found to decrease the enzyme activity.

From the above studies it may be concluded that the enzyme under investigation could be exploited for biotechnological applications because of its temperature optima and temperature stability and thermostable amylases have a great role to play in starch industry.

Keywords: Thermostable amylase, Trikuta Hills, Bacillus firmus.

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Tissue engineered fish swim bladder scaffolds for repair of full thickness skin defects

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Extensive or irreversible damages to skin necessitate immediate coverage using skin substitutes to aid repair and regeneration. Tissue engineering skin, based on the concept of a cell–matrix construct, has been a significant advancement in the field of wound healing. In the present study decellularization of fish swim bladder (FSB) was done with 0.5% ionic biological detergent. Light microscopic and scanning electron microscopic examination revealed complete loss of cellularity and loosening of collagen fibers. Bone marrow derived mesenchymal stem like cells of rat (R-BMSc) and goat (G-BMSc) were seeded over decellularized fish swim bladder. These tissue engineered grafts have been implanted for wound repair on the 7th day of cell seeding. The efficacies of these tissue engineered grafts were tested in the repair of full thickness skin defects in rat model. The study was conducted on thirty two clinically healthy adult rats of either sex. The animals were randomly divided into 4 groups of eight animals each. One 2×2 cm^2 size full thickness skin wound was created on the dorsum of each animal for assessing the healing potential of tissue engineered scaffolds. The defects of groups II, III and IV were repaired immediately with acellular FSB scaffold, G-BMSc seeded scaffolds and R-BMSc seeded scaffolds. Group I animals were treated as control where wounds were left open. The wound healing was studied for a period of 28 days. It was found that acellular fish swim bladder seeded with bone marrow derived mesenchymal stem like cells of goat and rat were found to be a novel biomaterials which have amphipathic character in full thickness skin repair and enhances wound healing. The detail results will be discussed at the time of presentation.

Biography

Remya V has completd her B.V.Sc. & A.H degree in 2009 from College of Veterinary and Animal Sciences, Mannuthy, Kerala. She received Junior Research Fellowship from Indian Council of Agricultural Research to pursue post graduation in Veterinary Surgery at Deemed University, Indian Veterinary Research Institute, Izatnagar. She is the Member of Kerala Veterinary Council and presently pursuing her post graduation from Deemed University, Indian Veterinary Research Institute, Izatnagar.

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