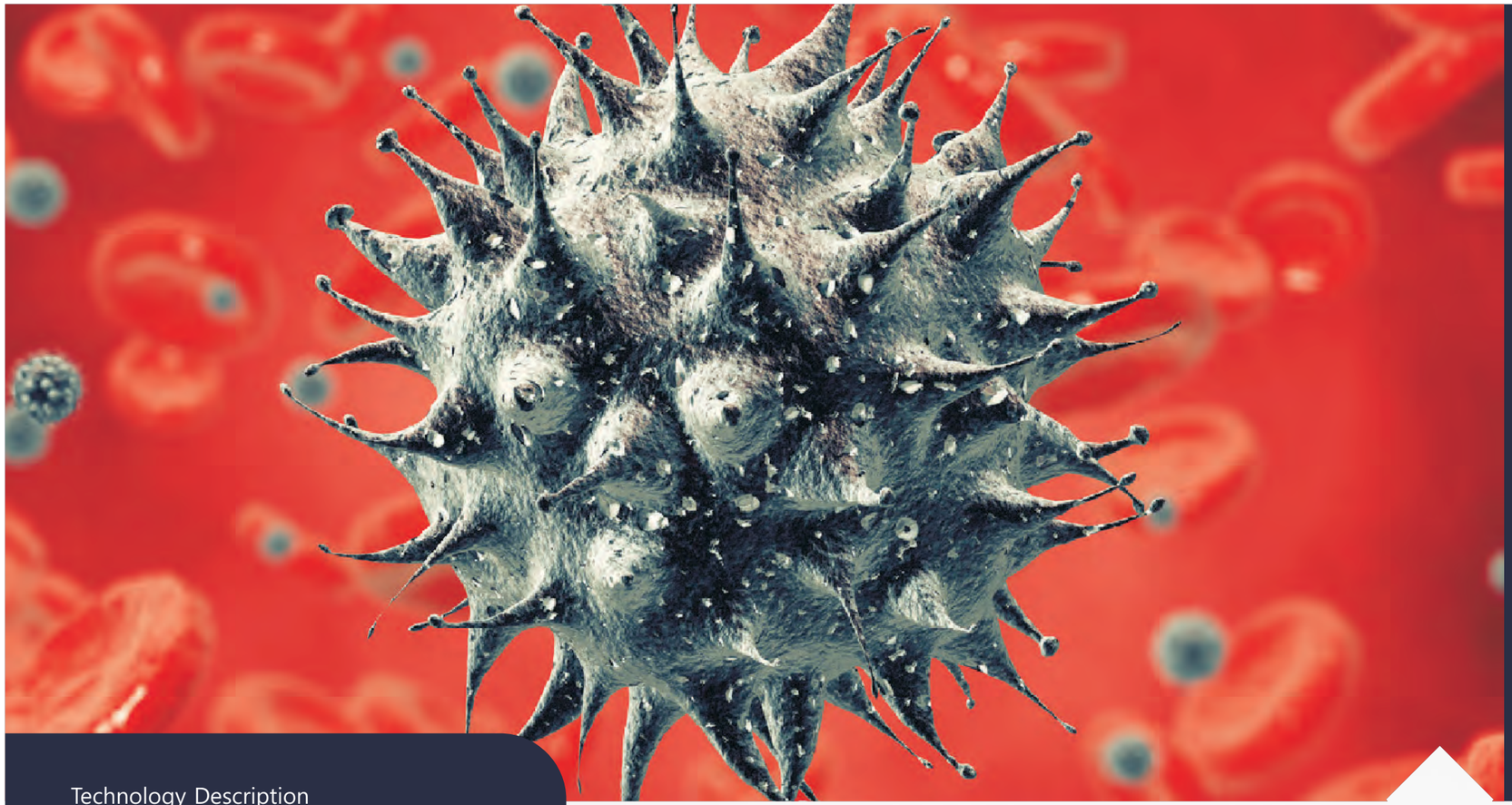


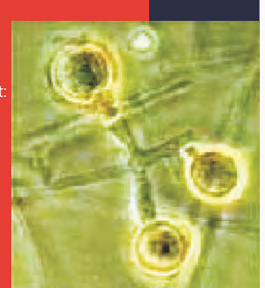
Xylanase Hyper-Producing Thermophilic Fungal Strain

Technology Description

It is hereby claimed that a thermophilic fungal strain has been developed by screening and selection amongst the wild type strains of Thermomyces lanuginosus, isolated from the composting soils of Amritsar (India). It is further claimed that developed strain CM11 produces one of the highest cellulase free xylanase. The xylanase (2800 units/ml) is produced maximally in shake flask culture in a complex medium containing corn cobs, yeast extract, mineral salt solution after 6 days of incubation at 45oC under shaking conditions (180 rpm). The optimization was carried out by response surface methodology using Box-Behnken design of experiments. The optimized levels were validated using

Name Of institute:
Guru Nanak Dev University,
Amritsar Stage of development:
Ready for commercialization
Patent status: No

Scientific Experts:
Dr. BS. Chadha



Background

In paper and pulp industry where the application of cellulase free thermostable xylanase (10 U/g pulp) as produced by this strain can reduce the use of chlorine that results in highly polluted effluent. Since this strain produces high level of xylanase the amount of required enzyme is reduced appreciably when compared to other sources of xylanases. Furthermore the application of this enzyme improves the pulp brightness without affecting the physical properties of the pulp as it is cellulase free. In addition the enzyme is stable at alkaline pH that is required for bleaching of pulp.
Supplementation of xylanase to animal and poultry feed @300 U/Kg enhances milk, egg and meat production. Addition of xylanse to the dough can improve the bread volume and improves taste. The xylanases can also be employed for production of xylooligosaccharides (XOS) from agro-residues which has health benefits. The use of this enzyme in biorefinery can be helpful in

Benefits / Utility

Paper and pulp industry where it is used for pre-bleaching of the pulp (mitigating environmental pollution caused by chlorine used in bleaching process), in the feed industry (addition of xylanase to the feed @ 300 U/Kg enhances the milk and meat production), in production of xylo-oligosaccharides (XOS) from agro-residues such as rice straw, corn cobs, bagasse, etc., that have pre-biotic (functional food) properties. These XOS find application as supplements in the fermented milk and yoghurts (food industry). In addition purified XOS like xylobiose, xylotriose, xylotetraose which are high grade specialty chemicals. The use of xylanase can improve the dough properties of bread and improves the bread volume by 15% besides improving the

Country

India

Scalability

The technology has been tested at shake flask level (250 ml) and being validated at bench scale lab fermenter. The production is scalable to the pilot/industrial levels by the license holders (enzyme manufacturers).

Business and Commercial Potential

Xylanases present in the market are from mesophilic fungal sources with different technical specification and are inferior to the said strain in terms of enzyme activity and stability at high temperature. The strain developed in this study is better from technical as well as commercial view point.
Market potential: The enzyme has great market potential in the industries in paper pulp, feed, food, and bioconversion of

Potential investors to this technical innovation

Enzyme industries, food and feed industries.

Dr. BS. Chadha
chadhabs@yahoo.com

Financials

VALUE OF THE TECHNOLOGY: Project cost: variable depending on the existing facility eg., the enzyme manufacturers only need to buy strain. For in-house producers may invest depending on their enzyme need. Innovating team/organization's margin 15%=Rs 1,50,000/- for first licensee Tech commercialization fee to be charged from one licensee= Rs 5,00,000/- Financial Required: Fix assets (Land and Building)= 2000sq yards Machinery = Rs. 120 lakhs Others= Rs. 42.00 lakhs Pre-operative expenses : Rs. 21.30 lakhs Cost: Rs. 50-70 lakhs.Energy Requirement: 5-10 Kwh

Target Market / Customer

Potential Clients: Enzyme manufacturers, food /feed and biorefinery interested in in house enzyme production.

Limiting factors for large scale commercialization

This technology can be easily adopted by the commercial enzyme producers. However for the in-house production by paper and pulp, food, feed, bioconversion industries they would require fermentation

Social impact of the technology

It will result in the introduction of commercial viable source of xylanase that can reduce the cost of the final product as well as overcoming the environmental pollution.

Any other relevant information

Use of culture and its containment during the production and processing may require environmental clearance.