

Patents (filed)

1. M. Meenu, J. Bhaumik, M. Garg, S. Kirar, A. K. Pujari Nanoencapsulation of anthocyanins extracted from food and agro-industrial waste using biocompatible materials and applications thereof, Indian patent application no: 202311083795.
2. A process for the biosynthesis of epilactose from lactose by employing a novel cellobiose 2-epimerase variant. Indian Patent Appl. No. 202311063125. Inventors: Singh SP, Singh AK
3. A process for the production of D-allose by employing a L-rhamnose isomerase variant identified from a thermal spring metagenome. Indian Patent Appl. No. 202311046749. Inventors: Singh SP, Sharma S
4. A process of production of D-allulose in a wide temperature and pH ranges by employing a novel D-allulose 3-epimerase variant. Indian Patent Appl. No. 202311012386. Inventors: Singh SP, Patel SN
5. One pot ozone assisted microconstituent dislodgement from biomass hydrolysate in bioprocessing system and use thereof. Indian Patent Appl. 202211066184. Inventors: Krishania M, Singh S
6. Process for the production of nanofilms through agro-biomass derived lignin and applications thereof. Indian Patent Appl. 202211070754. Inventors: Bhaumik J, Goswami S, Kirar S, Singh M, Mohne D
7. Synthesis of lignin based bio-nano-fertilizers and bio-nano-pesticides and applications thereof. Indian Patent Appl. No. 202211066111. Inventors: Bhaumik J, Kaur R, De A, Paul S, Pujari AK, Gogde K
8. A process for the fabrication of gelatin based novel bio composite with apple pomace derived nanocellulose for wound dressing application. Indian Patent Appl. 202211066603. Inventors: Goswami S, Rana H
9. A process for the preparation of guar gum based self-assembling hydrogel with apple pomace derived nanocellulose to absorb dye pollutants from waste water. Indian Patent, Appl. 202211066604. Inventors: wami S, Rana H, Anamika
10. Food grade dye from *Butea monosperma* (Lam.) Kuntze (Palash). Indian Patent Appl. No. 202211005755. Inventors: Mishra BB, Negi P, Pandey N, Jyoti, Singh U
11. A process for lactose hydrolysis and processing of milk and whey by employing a novel acid and cold active β -galactosidase. Indian Patent Appl. No. 202211022166. Inventors: Singh SP, Monika, Rai AK
12. A process of generating pectic oligosaccharides from pectin biomass by employing a novel endopolygalacturonase. Indian Patent Appl. No. 202211020358. Inventors: Singh SP, Sharma N
13. In situ enrichment of mosquito repellent para-menthane-3,8-diols in Citronella (*Cymbopogon winterianus*) essential oil, Indian Patent Appl. No. 202111012965. Inventor: Mishra BB, Singh M, Pandey N, Singh U
14. A process for the production of trehalose and trehalulose employing a novel trehalose synthase from thermal spring metagenome. Indian Patent Appl. No. 202111022212. Inventors: Singh SP, Agarwal N
15. Lignin based polypyrrole nanoformulations as highly effective antiviral agents against SARS-CoV-2. Indian Patent Appl. 202111014735, Inventors: Bhaumik J, Vrati S, Reddy YN, Chandna S, Paul S, Kaur R, Agarwal S, Chandru S.
16. A novel xylose isomerase from hot spring metagenome and uses thereof. Indian Patent Appl. No. 202011050295. Inventors: Singh SP, Patel SN

17. A method of hydrolysis of glycoside biomolecules by employing a novel β -glucosidase from a thermal spring metagenome. Indian Patent Appl. No. 202011037510. Inventors: Singh SP, Kaushal G
18. A novel process for the production of the anti-diabetic sugar, D-allulose, by using a D-allulose 3-epimerase of *Bacillus* sp. origin. Indian Patent Appl. No. 202011018495. Inventors: Singh SP, Patel SN
19. A method for the production of resistant starch from starch biomass employing a novel type 1 pullulanase from a hot spring metagenome. Indian Patent Appl. No. 202011013475. Inventors: Singh SP, Monika, Rai AK
20. One pot, greener synthesis of agri-biomass lignin derived fluorescent metal nanoclusters and applications thereof. Indian Patent Appl. 202011028996. Inventors: Bhaumik J, Thakur NS, Paul S, Reddy YN
21. Light activatable polypyrrolic metal organic framework composites and applications thereof. Indian Patent Appl. 202011028994. Inventors: Bhaumik J, Bhardwaj SK, Reddy YN, Kaur R
22. Curcumin fortified whey protein powder. Indian Patent Appl. 201911037518. Inventors: Mishra BB, Yadav SK, Kumar V, Pandey N, Singh M, Negi P
23. A method for the production of gamma-aminobutyrate (GABA) using a novel glutamate decarboxylase (GAD) gene, and uses thereof. Patent Appl. No. 201911030305. Inventors: Singh SP, Kumar J, Rai AK, Sahoo D
24. A process for efficient retting and bioscouring of plant biomass employing a novel alkaline tolerant pectate lyase. Patent Appl. No. 201911030029. Inventors: Singh SP, Sharma N, Rai AK, Sahoo D
25. A green strategy for the development of debittered dietary fibre rich edible powder from kinnow juice industry waste and uses thereof. Patent Appl. No. 201911017743. Inventors: Krishnia M, Singla G, Dalveer, Singh U.
26. A facile, green and high yielding process to synthesize lignin nanocarriers and evaluation of their functional properties thereof. Indian Patent Appl. No. 201911011852. Inventors: Bhaumik J, Thakur NS, Paul S
27. An improved process for isolation of 1,5-dihydroxy-3,8-dimethoxyxanthone from *Swertia paniculata*. Patent Appl. No. 201811028298. Inventors: Ahluwalia Mishra BB, Sangwan RS
28. Method for isolation of lignin from lignocellulosic biomass in acidic deep eutectic solvent through organic solvent extraction. Indian Patent Appl. No. 201811019330. Inventors: S. Elumalai, Sandeep Kumar, V. Ahluwalia.
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30. An improved process for isolation of 1,5-dihydroxy-3,8-dimethoxyxanthone from *Swertia paniculata*. Indian Patent Appl. No. 201811028298. Inventors: Ahluwalia V, Mishra BB, Sangwan RS.
31. A special beverage based on tomato fruit juice, coconut water and other additives. Indian Patent Appl. No. 201711028768. Inventors, Yadav SK, Mehta D, Dwivedi P.
32. Integrated as well as module(s) selective process for production of whey proteins, bacterial cellulose, calcium citrate and D-tagatose from liquid whey. Indian Patent Appl. No. 201711024828. Inventors: Kumar S, Sangwan RS, Kumar V, Sandhu PP, Rai SK, Narnolia LK, Jadaun JS.
33. An efficient process of production of bacterial cellulose from tomato juice using *Acetobacter pasteurians* strain RSV-4. Indian Patent Appl. No. 201711024694. Inventors: Kumar V, Sangwan RS, Jadaun J.S, Sharma DK, Prasad P, Mehta D.

34. A novel process of production of special and premium pectin preparation, named as Neopectin, from diversified bioresource through steps free from chemical treatments and uses thereof. Indian Patent Appl. No. 201711021690. Inventors: Sangwan RS, Sharma M, Patel SN, Singh U, Singh SP, Yadav SK, Sandhu PP.
35. Iron fortified or iron enriched turmeric as a value added product for dietary micronutrient supplement for improving iron nutrition and for alleviating or lessening malnutrition like iron deficiency anaemia malnutrition and for such other healthful uses and process of its preparation. Indian Patent Appl. No. 201711023123. Inventors: Sandhu PP, Sangwan RS, Singh U.
36. An improvised, sustainable and economical process for the synthesis of biomass derived lignin coated metal nanocomplexes and development of nanotherapeutic and nanodiagnostic conjugates thereof. Indian Patent Appl. No. 201711047253. Inventors: Bhaumik J, Chandna S, Sangwan RS.
37. A novel process of producing debittered edible fibre powder from the composite kinnow juice processing industry residues (exocarp, mesocarp, endocarp, juice sacs and seeds) and pulp residue after juice clarification. Indian Patent Appl. No. 201711007926. Inventors: Sangwan RS, Sandhu PP, Krishania M.
38. Process for enriched xylooligosaccharides production from secondary agri-residues through alkaline treatment. Indian Patent Appl. No. 201711007495. Inventors: Elumalai S, Sangwan RS, Kundu P, Kumar S, Ahluwalia V, Yadav SK