

Samudra Prosad Banik

Designation: Assistant Professor (WBES), Department of Microbiology



Educational qualification: M.Sc. Ph.D.
UGC-NET (JRF), 2003

About:

Did Masters from the Department of Biophysics & Molecular Biology at the University of Calcutta in 2003 and thereafter Ph.D. in fungal biotechnology from CSIR-Indian Institute of Chemical Biology, Kolkata in 2009. The title of his thesis was “Regulation of secretion of the sucrase-cellobiase coaggregate in secretory pathway of *Termitomyces clypeatus*. He has been the recipient of travel grant from International Rice Research Institute, Philippines, Teaching specialization is biophysics and molecular biology. Area of interest in research is 1) Biophysical characterization of glycosylated proteins and their implications in Type II diabetes and neurodegenerative disorders and 2) Biophysical characterization of industrially important fungal glycosidases in relation to production of cellulosic ethanol.

Current Teaching: Course instructor for Biophysics (Thermodynamics and Spectroscopy), Protein chemistry (amino acids and their general reactions, protein structure) Molecular Biology (DNA structure and organization, Central Dogma, Replication and Transcription, Transposons, Phage biology and Phage Genetics, applications of recombinant DNA technology), Microbiology (Evolution of microbial genome, History of development of Microbiology, potability of water) and Immunology (Generation of immune response).

Present Research interests: a) Native and non-native aggregation of proteins in presence of small molecule osmolytes. b) Structural and functional consequences of protein glycation.

Ph.D. student: Ahana Das (submitted thesis on 15th September, 2021 under the Department of Biochemistry, University of Calcutta). Title of thesis: “Studies on the effect of trehalose on secretion and stability of aggregation prone globular proteins”.

Research Grants:

2010- 2012: Principal Investigator “Isolation, partial purification and characterization of cellulolytic enzymes from a lemon isolate of filamentous fungus”, UGC (University Grants Commission) Minor Research Project, sanction no. F.PSW- 054/10-11 dt. 20.10.2010

2015-2018: Principal Investigator “Effect of trehalose on aggregation of fungal glycosidases” F No. 43-69/2014 (SR) dated 23rd July, 2015

Publications:

- 1) Ghosh R, **Banik SP.** (2021) Protective effect of Indomethacin on Vanadium-Induced Adrenocortical and Testicular damages in Rat. Toxicol Mech Methods. Aug 25:1-29. doi: 10.1080/15376516.2021.1973169. Epub ahead of print. PMID: 34431458.

- 2) Das, A., Basak, P., Pramanik, A., Majumder, R., Ghosh, A., Hazra, S., Guria, M., Bhattacharyya, M., & **Banik SP**. (2020). Ribosylation induced structural changes in Bovine Serum Albumin: understanding high dietary sugar induced protein aggregation and amyloid formation. *Heliyon*, 6(9), e05053.
- 3) Das A, Basak P, Pramanick A, Majumder R, Pal D, Ghosh A, Guria M, Bhattacharyya M, **Banik SP**. (2019) Trehalose mediated stabilisation of cellobiase aggregates from the filamentous fungus *Penicillium chrysogenum*, *International Journal of Biological Macromolecules*, 127: 365-375.
- 4) Das A, Basak P, Pattanayak R, Kar,T, Majumder, R., Pal, D, Bhattacharya A, Bhattacharyya, M., **Banik SP**. (2017) Trehalose induced structural modulation of Bovine Serum Albumin at ambient temperature, *International Journal of Biological Macromolecules* 105(1): 645-655.
- 5) Chowdhury S, **Banik SP**, Majumder R, Ghorai S, Pal S, Basak P, Khowala S (2017) Prevention of protein aggregation by extracellular fungal sucrase of *Termitomyces clypeatus* *Turkish Journal of Biochemistry* 42(3), pp. 355-364.
- 6) Majumder R, Banik, SP, Khowala, S. (2016) AkP from mushroom *Termitomyces clypeatus* is a proteoglycan specific protease with apoptotic effect on HepG2. *International Journal of Biological Macromolecules*. 91:198-207.
- 7) Majumder R, **Banik SP**, Khowala S (2015) Purification and characterization of a novel k-casein specific milk-clotting metalloprotease from *Termitomyces clypeatus* MTCC 5091. *Food Chemistry* 173: 441-448.
- 8) **Banik SP**, Mukherjee S, Pal S, Ghorai S, Majumder R, Khowala S (2015) Enhancement of extracellular cellobiase activity by reducing agents in the filamentous fungus *Termitomyces clypeatus*. *Biotechnology Letters* 37:175-181.
- 9) Majumder R, **Banik SP**, Khowala S (2014) Bioremediation by alkaline protease (AkP) from edible mushroom *Termitomyces clypeatus*: Optimization approach based on statistical design and characterization for diverse applications. *Journal of Chemical Technology and Biotechnology* 90: 1886-1896.
- 10) **Banik SP**, Bhattacharyya S, Ghorai S (2014) Isolation of a new *Penicillium chrysogenum* strain BF02 from agricultural soil of rural India producing a thermostable low Km cellobiase. *Journal of Microbiology, Biotechnology and Food Sciences* 3: 322-328.
- 11) Pal S, **Banik SP**, Khowala S. (2013) Mustard stalk and straw: a new source for production of lignocellulolytic enzymes by the fungus *Termitomyces clypeatus* and as a substrate for saccharification. *Industrial Crops and Products* 41: 283– 288.

- 12) **Banik SP**, Pal S, Ghorai S, Chowdhury S, Majumder R, Mukherjee S, Khowala S. (2012) *In situ* reversible aggregation of extracellular cellobiase in the filamentous fungus *Termitomyces clypeatus* Biotechnology and Bioprocess Engineering 17: 925-936. IF 1.278 (2012).
- 13) **Banik SP**, Pal S, Chowdhury S, Ghorai S, Khowala S. (2011) Evidence of an Alternative Route of Cellobiase Secretion in the Presence of Brefeldin A in the Filamentous Fungus *Termitomyces clypeatus* Journal of Microbiology and Biotechnology 21: 392–400.
- 14) Pal S, **Banik SP**, Ghorai S, Chowdhury S, Khowala S. (2011) Increased enzyme secretion by 2-deoxy-D-glucose in presence of succinate by suppression of metabolic enzymes in *Termitomyces clypeatus* Carbohydrate Research, 346: 2426-2431.
- 15) **Banik SP**, Pal S, Ghorai S, Majumder R, Mukherjee S, Chowdhury S Khowala (2011) Comparative elucidation of properties of sucrose-cellobiase co-aggregate produced in media containing sucrose by *Termitomyces clypeatus* Indian Journal of Biotechnology 10: 468-479.
- 16) Ghorai S, Pal S, Chowdhury S, **Banik SP**, Khowala S. (2010) Enhanced activity and stability of cellobiase (β -glucosidase:EC 3.2.1.21) produced in presence of 2-deoxy D-glucose from the fungus *Termitomyces clypeatus*, Carbohydrate Research 345: 1015-1022.
- 17) Pal S, **Banik SP**, Ghorai S, Chowdhury S, Khowala S. (2010) Purification and characterization of a thermostable intra-cellular β -glucosidase with transglycosylation properties from filamentous fungus *Termitomyces clypeatus* Bioresource Technology 101: 2412–2420.
- 18) **Banik SP**, Pal S, Ghorai S, Chowdhury S, Khowala S. (2009). Interference of sugars in the Coomassie blue G dye binding assay of proteins. Analytical Biochemistry 386: 113–115.
- 19) Ghorai S, **Banik SP**, Verma D, Chowdhury S, Mukherjee S, Khowala S. (2009) Fungal biotechnology in food and feed processing. Food Research International 42: 577-587.
- 20) Chowdhury S, Ghorai S, **Banik SP**, Pal S, Basak S, Khowala S. (2009) Characterization of a novel low molecular weight sucrose from filamentous fungus *Termitomyces clypeatus* Process Biochemistry 44: 1075-1082.

Chapters in books:

- 1) Ghosh R, Das A, Bandyopadhyay A, Majumder R, **Banik SP** (2020) Vanadium Toxicity Revisited: Striking the Right Balance between Potential New Generation Therapeutics and Adverse Side Effects. In. Bagchi D, Bagchi M. Metal Toxicology Handbook, CRC Press, pp Boca Raton, Florida
- 2) **Banik SP**, Bhattacharyya M, Ghosh R, Majumder R (2020) Glycation-induced protein aggregation and cellular toxicity: an insight into the disease realm of high dietary sugar intake,

In. Preuss HG, Bagchi D. Dietary Sugar, Salt and Fat in Human Health, pp 251-275 Academic Press, Cambridge

- 3) Ghosh R, **Banik SP** (2016) Dual Effects of Vanadium: Toxicity Analysis in Developing Therapeutic Lead-Ups. Food Toxicology In. Bagchi D, Swaroop A & Stohs SJ pp 337–354. CRC Press, Boca Raton, Florida
- 4) **Banik SP**, Khowala S, Pal, Mukherjee S. (2015) Proteomic approaches to identify novel therapeutics and nutraceuticals from filamentous fungi: Prospects and Challenges. In: Bagchi D, Swaroop A, Bagchi M editors. Genomics, proteomics and metabolomics in nutraceuticals & functional foods (2nd Edition) pp. 265-295, Wiley Blackwell. New Jersey.
- 5) Ghorai S, **Banik SP**, Verma D, Chowdhury S, Mukherjee S, Khowala S (2011) Food Ingredients | Fungal Biotechnology in Food and Feed Processing. In: Murray Moo-Young (ed.), Comprehensive Biotechnology, Second Edition, Vol 3, pp. 603–615. Elsevier.
- 6) Khowala S, Verma D, **Banik SP** (2009) Carbohydrates in an e book Biomolecules – Introduction Structure and Function in National Science Digital Library (NSDL) <http://nsdl.niscair.res.in/handle/123456789/802>.

Invited talks:

1. A popular lecture on “Recombinant DNA Technology: Accelerated Biotechnology” delivered in the one day Biotechnology workshop at Jagadis Bose National Science Talent Search, Kolkata on 25th September, 2018.
2. Research work entitled “Trehalose mediated stabilization of cellobiase aggregates from filamentous fungi – A cross-linking independent approach to improve cellulolytic enzyme efficiency” presented at the two day National Conference on Science and Technology: Rural Development organized by ISCA, 2020, Kolkata Chapter, Surendranath College, Kolkata on 20th-21st January, 2020.
3. A popular lecture on “Fun with Biotechnology: Why on earth should we know and study it?” delivered in the one day State level Biotechnology webinar organized by Jagadis Bose National Science Talent Search, Kolkata on 12th March, 2021.

Contact details:

Phone: +91 9874490243

E-mail: samudrapb@gmail.com

ORCID ID: <https://orcid.org/0000-0003-0075-7508>

Other information:

- Life member of Biotech Research Society of India.
- Life Member of Microbiologists Society, India.