

REFERENCES

REFERENCES

- Aam, B., B. Heggset, E., Norberg, A., Sørli, M., Varum, K., & Eijsink, V. (2010). Production of Chitooligosaccharides and Their Potential Applications in Medicine. *Marine Drugs*, 8, 1482-1517. doi:10.3390/md8051482
- Costa, S., Almeida, A., Castro, A., & Domingues, L. (2014). Fusion tags for protein solubility, purification and immunogenicity in Escherichia coli: the novel Fh8 system. *Front Microbiol*, 5, 63. doi:10.3389/fmicb.2014.00063
- Dahiya, N., Tewari, R., & Hoondal, G. S. (2006). Biotechnological aspects of chitinolytic enzymes: a review. *Applied Microbiology and Biotechnology*, 71(6), 773-782. doi:10.1007/s00253-005-0183-7
- Fang, Z., Cong, W., Zhou, H., Zhang, J., & Wang, M. (2024). Biological activities, mechanisms and applications of chitooligosaccharides in the food industry. *Journal of Functional Foods*, 116, 106219. doi:<https://doi.org/10.1016/j.jff.2024.106219>
- Fox, J. D., Kapust, R. B., & Waugh, D. S. (2001). Single amino acid substitutions on the surface of Escherichia coli maltose-binding protein can have a profound impact on the solubility of fusion proteins. *Protein Sci*, 10(3), 622-630. doi:10.1110/ps.45201
- Hackman, R. H., & Goldberg, M. (1965). Studies on chitin. VI. The nature of alpha- and beta-chitins. *Aust J Biol Sci*, 18(4), 935-946. doi:10.1071/bi9650935
- Harish Prashanth, K. V., & Tharanathan, R. N. (2007). Chitin/chitosan: modifications and their unlimited application potential—an overview. *Trends in Food Science & Technology*, 18(3), 117-131. doi:<https://doi.org/10.1016/j.tifs.2006.10.022>
- Hoie, M. H., Kiehl, E. N., Petersen, B., Nielsen, M., Winther, O., Nielsen, H., . . . Marcatili, P. (2022). NetSurfP-3.0: accurate and fast prediction of protein structural features by protein language models and deep learning. *Nucleic Acids Res*, 50(W1), W510-W515. doi:10.1093/nar/gkac439

- Hsu, S.-K., Chung, Y.-C., Chang, C.-T., & Sung, H.-Y. (2012). Purification and Characterization of Two Chitosanase Isoforms from the Sheaths of Bamboo Shoots. *Journal of Agricultural and Food Chemistry*, 60(2), 649-657. doi:10.1021/jf203976x
- Jagadish, C. R., Fabien, S., Stéphane, G., & Ada, F. (2017). Solubility of Chitin: Solvents, Solution Behaviors and Their Related Mechanisms. In X. Zhenbo (Ed.), *Solubility of Polysaccharides* (pp. Ch. 7). Rijeka: IntechOpen.
- Jitprasertwong, P., Khamphio, M., Petsrichuang, P., Eijsink, V. G. H., Poolsri, W., Muanprasat, C., . . . Yamabhai, M. (2021). Anti-inflammatory activity of soluble chito-oligosaccharides (CHOS) on VitD3-induced human THP-1 monocytes. *PLOS ONE*, 16(2), e0246381. doi:10.1371/journal.pone.0246381
- Kaczmarek, M. B., Struszczyk-Swita, K., Li, X., Szczęśna-Antczak, M., & Daroch, M. (2019). Enzymatic Modifications of Chitin, Chitosan, and Chitooligosaccharides. *Frontiers in Bioengineering and Biotechnology*, 7(243). doi:10.3389/fbioe.2019.00243
- Kapust, R. B., & Waugh, D. S. (2000). Controlled intracellular processing of fusion proteins by TEV protease. *Protein Expr Purif*, 19(2), 312-318. doi:10.1006/prep.2000.1251
- Kelley, L. A., Mezulis, S., Yates, C. M., Wass, M. N., & Sternberg, M. J. (2015). The Phyre2 web portal for protein modeling, prediction and analysis. *Nat Protoc*, 10(6), 845-858. doi:10.1038/nprot.2015.053
- Khoushab, F., & Yamabhai, M. (2010). Chitin Research Revisited. *Marine Drugs*, 8, 1988-2012. doi:10.3390/md8071988
- Kimple, M. E., Brill, A. L., & Pasker, R. L. (2013). Overview of affinity tags for protein purification. *Current protocols in protein science*, 73, 9.9.1-9.9.23. doi:10.1002/0471140864.ps0909s73
- Laemmli, U. K. (1970). Cleavage of Structural Proteins during the Assembly of the Head of Bacteriophage T4. *Nature*, 227(5259), 680-685. doi:10.1038/227680a0
- Liaqat, F., & Eltem, R. (2018). Chitooligosaccharides and their biological activities: A comprehensive review. *Carbohydrate Polymers*, 184. doi:10.1016/j.carbpol.2017.12.067

- Liu, Y.-L., Jiang, S., Ke, Z.-M., Wu, H.-S., Chi, C.-W., & Guo, Z.-Y. (2009). Recombinant expression of a chitosanase and its application in chitosan oligosaccharide production. *Carbohydrate Research*, 344(6), 815-819.
doi:<https://doi.org/10.1016/j.carres.2009.01.027>
- Ming, M., Kuroiwa, T., Ichikawa, S., Sato, S., & Mukataka, S. (2006). Production of chitosan oligosaccharides by chitosanase directly immobilized on an agar gel-coated multidisk impeller. *Biochemical Engineering Journal*, 28(3), 289-294.
doi:<https://doi.org/10.1016/j.bej.2005.11.015>
- Moura, C. M. d., Moura, J. M. d., Soares, N. M., & Pinto, L. A. d. A. (2011). Evaluation of molar weight and deacetylation degree of chitosan during chitin deacetylation reaction: Used to produce biofilm. *Chemical Engineering and Processing: Process Intensification*, 50(4), 351-355.
doi:<https://doi.org/10.1016/j.cep.2011.03.003>
- Muzzarelli, R. A. A. (1996). Chitosan-based dietary foods. *Carbohydrate Polymers*, 29(4), 309-316. doi:[https://doi.org/10.1016/S0144-8617\(96\)00033-1](https://doi.org/10.1016/S0144-8617(96)00033-1)
- Naveed, M., Phil, L., Sohail, M., Hasnat, M., Baig, M. M. F. A., Ihsan, A. U., . . . Zhou, Q.-G. (2019). Chitosan oligosaccharide (COS): An overview. *International Journal of Biological Macromolecules*, 129, 827-843.
doi:<https://doi.org/10.1016/j.ijbiomac.2019.01.192>
- Ngo, D.-H., & Kim, S.-K. (2014). Chapter Two - Antioxidant Effects of Chitin, Chitosan, and Their Derivatives. In S.-K. Kim (Ed.), *Advances in Food and Nutrition Research* (Vol. 73, pp. 15-31): Academic Press.
- Olempska-Beer, Z., Merker, R., Ditto, M., & Dinovi, M. (2006). Food-processing enzymes from recombinant microorganisms--a review. *Regulatory toxicology and pharmacology : RTP*, 45, 144-158. doi:10.1016/j.yrtph.2006.05.001
- Olempska-Beer, Z. S., Merker, R. I., Ditto, M. D., & DiNovi, M. J. (2006). Food-processing enzymes from recombinant microorganisms--a review. *Regul Toxicol Pharmacol*, 45(2), 144-158. doi:10.1016/j.yrtph.2006.05.001
- Pechsrichuang, P., Songsiririthigul, C., Haltrich, D., Roytrakul, S., Namvijtr, P., Bonaparte, N., & Yamabhai, M. (2016). OmpA signal peptide leads to heterogenous secretion of B. subtilis chitosanase enzyme from E. coli

- expression system. *SpringerPlus*, 5(1), 1200-1200. doi:10.1186/s40064-016-2893-y
- Pechsrichuang, P., Yoohat, K., & Yamabhai, M. (2013). Production of recombinant *Bacillus subtilis* chitosanase, suitable for biosynthesis of chitosan-oligosaccharides. *Bioresource Technology*, 127, 407-414.
- Phil, L., Naveed, M., Mohammad, I. S., Bo, L., & Bin, D. (2018). Chitooligosaccharide: An evaluation of physicochemical and biological properties with the proposition for determination of thermal degradation products. *Biomedicine & Pharmacotherapy*, 102, 438-451.
doi:<https://doi.org/10.1016/j.biopha.2018.03.108>
- Pillai, C. K. S., Paul, W., & Sharma, C. P. (2009). Chitin and chitosan polymers: Chemistry, solubility and fiber formation. *Progress in Polymer Science*, 34(7), 641-678. doi:<https://doi.org/10.1016/j.progpolymsci.2009.04.001>
- Reuten, R., Nikodemus, D., Oliveira, M. B., Patel, T. R., Brachvogel, B., Breloy, I., . . . Koch, M. (2016). Maltose-Binding Protein (MBP), a Secretion-Enhancing Tag for Mammalian Protein Expression Systems. *PLOS ONE*, 11(3), e0152386.
doi:10.1371/journal.pone.0152386
- Rudall, K. M. (1963). The Chitin/Protein Complexes of Insect Cuticles. In J. W. L. Beament, J. E. Treherne, & V. B. Wigglesworth (Eds.), *Advances in Insect Physiology* (Vol. 1, pp. 257-313): Academic Press.
- Sak-Ubol, S., Namvijitr, P., Pechsrichuang, P., Haltrich, D., Nguyen, T. H., Mathiesen, G., . . . Yamabhai, M. (2016). Secretory production of a beta-mannanase and a chitosanase using a *Lactobacillus plantarum* expression system. *Microb Cell Fact*, 15, 81. doi:10.1186/s12934-016-0481-z
- Sinha, S., Chand, S., & Tripathi, P. (2016). Recent Progress in Chitosanase Production of Monomer-Free Chitooligosaccharides: Bioprocess Strategies and Future Applications. *Applied Biochemistry and Biotechnology*, 180(5), 883-899.
doi:10.1007/s12010-016-2140-6
- Thadathil, N., & Velappan, S. P. (2014). Recent developments in chitosanase research and its biotechnological applications: A review. *Food Chemistry*, 150, 392-399.
doi:<https://doi.org/10.1016/j.foodchem.2013.10.083>

- Vo, T.-S., Ngo, D.-H., Kang, K.-H., Jung, W.-K., & Kim, S.-K. (2015). The beneficial properties of marine polysaccharides in alleviation of allergic responses. *Molecular Nutrition & Food Research*, 59(1), 129-138.
doi:<https://doi.org/10.1002/mnfr.201400412>
- Wang, S.-L., Tseng, W.-N., & Liang, T.-W. (2011). Biodegradation of shellfish wastes and production of chitosanases by a squid pen-assimilating bacterium, *Acinetobacter calcoaceticus* TKU024. *Biodegradation*, 22(5), 939-948.
doi:10.1007/s10532-011-9453-5
- Wenzel, M., Müller, A., Siemann-Herzberg, M., & Altenbuchner, J. (2011). Self-Inducible *Bacillus subtilis* Expression System for Reliable and Inexpensive Protein Production by High-Cell-Density Fermentation. *Applied and Environmental Microbiology*, 77, 6419-6425. doi:10.1128/AEM.05219-11
- Xu, Y., Yang, H., Huang, Z., Li, Y., He, Q., Tu, Z., . . . Ren, W. (2018). A peptide/maltose-binding protein fusion protein used to replace the traditional antigen for immunological detection of deoxynivalenol in food and feed. *Food Chemistry*, 268, 242-248.
- Yamabhai, M., Khamphio, M., Min, T. T., Soem, C. N., Cuong, N. C., Aprilia, W. R., . . . Eijssink, V. G. H. (2024). Valorization of shrimp processing waste-derived chitosan into anti-inflammatory chitosan-oligosaccharides (CHOS). *Carbohydrate Polymers*, 324, 121546.
doi:<https://doi.org/10.1016/j.carbpol.2023.121546>
- Zainol Abidin, N. A., Kormin, F., Zainol Abidin, N. A., Mohamed Anuar, N. A. F., & Abu Bakar, M. F. (2020). The Potential of Insects as Alternative Sources of Chitin: An Overview on the Chemical Method of Extraction from Various Sources. *International journal of molecular sciences*, 21(14). doi:10.3390/ijms21144978
- Zhou, Z., Zhao, S., Wang, S., Li, X., Su, L., Ma, Y., . . . Song, J. (2015). Extracellular Overexpression of Chitosanase from *Bacillus* sp. TS in *Escherichia coli*. *Applied Biochemistry and Biotechnology*, 175(7), 3271-3286. doi:10.1007/s12010-015-1494-5
- Zitouni, M., Fortin, M., Scheerle, R. K., Letzel, T., Matteau, D., Rodrigue, S., & Brzezinski, R. (2013). Biochemical and molecular characterization of a

thermostable chitosanase produced by the strain *Paenibacillus* sp. 1794 newly isolated from compost. *Applied Microbiology and Biotechnology*, 97(13), 5801-5813. doi:10.1007/s00253-012-4483-4