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Influence of the pre-treatment of nanofibers obtained from mushrooms on the mechanical properties of the paper)
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Abstract
The influence of the pre-treatment process (freezing, drying) on the tensile properties of chitin paper obtained from nanofibers of three commercial species of fungi: Oyster mushrooms (P. ostreatus), enoki (F. velutipes) and shiitake (L. edodes) was investigated. The chitin nanofibers were extracted by a mild alkaline process. The highest tensile strength was observed for paper obtained from fresh mushrooms fibers, which may result from the lack of the chitin fiber modification. Freezing and drying processes have been found to reduce the strength of the paper, possibly due to ice crystal formation and the keratinization effect of the nanofibers, respectively. The paper obtained from enoki fungus nanofibers was characterized by the highest tensile strength, which may be due to the very long fiber. However, in terms of elongation at break, the best results were obtained with oyster mushrooms nanofibers, probably due to the relatively shorter chitin fiber. The long enoki nanofibers can therefore be used as a good reinforcement of the paper.

Author Keywords
Chitin nanofiber; Chitin paper; Fungal-based chitin

Index Keywords
Chitin, Fibers, Freezing, Fungi, Molluscs, Tensile strength; Alkaline process, Chitin fibers, Chitin nanofiber, Chitin paper, Fiber modification, Fungal-based chitin, High-tensile strength, Oyster mushroom, Pre-treatments, Pretreatment process; Nanofibers

References

- Guo, Y., Duan, B., Zhou, J.
  (2014) *Cellulose*, 21, p. 1781.
- Wysokowski, M., Petrenko, I., Stelling, A.
  (2015) *Polymers*, 7, p. 235.
- Khor, E.
  The Sources and Production of Chitin
  (2001) *Chitin: Fulfilling a Biomaterials Promise*, p. 63.
  Elsevier
- Ifuku, S., Nomura, R., Morimoto, M.
  (2011) *Materials (Basel)*, 4, p. 1417.
- Erdogan, S., Kaya, M., Akata, I.
  Chitin extraction and chitosan production from cell wall of two mushroom species (Lactarius vellereus and Phyllophora ribis)
  (2016) *Materials from The 6th International Advances in Applied Physics and Materials Science Congress & Exhibition*, p. 1809.
  1-3 June

- Nawawi, W., Lee, K.-Y., Kontturi, E.
(2019) *ACS Sustainable Chemistry & Engineering*, 7, p. 6492.

- Xiao, J., Zhang, M., Wang, W.
(2020) *Int J Biol Macromol*, 164, p. 4628.

- Salehinik, F., Behzad, T., Zamani, A.
(2021) *Int J Biol Macromol*, 167, p. 1126.

- Kollar, R., Reinhold, B.B., Petrakova, E.
(1997) *The Journal of Biological Chemistry*, 272, p. 17762.

- Sietsma, J.H., Wessels, J.G.H.
(1979) *Journal of General Microbiology*, 114, p. 99.

- Hartland, R.P., Vermeulen, C.A., Klis, F.M.
(1994) *Yeast*, 10, p. 1591.

- Heux, L.B., Desbrieres, J., Versali, M.F, Rinaudo, M.
(2000) *Biomacromolecules*, 1, p. 746.
J

- Gaderer, R., Seidl-Seiboth, V., Kappel, L.
(2017) *Current Biotechnology*, 6, p. 178.

- Sietsma, J.H., Wessels, J.G.H.
(1977) *Biochimica et Biophysica Acta*, 496, p. 225.

- Haneef, M., Ceseracciu, L., Canale, C.
(2017) *Scientific Reports*, 7, p. 41292.

- Jones, M.P., Weiland, K., Kujundzic, M.
(2019) *Biomacromolecules*, 20, p. 3513.

- Yousefi, N., Jones, M.P., Bismarck, A.
(2021) *Carbohydrate Polymers*, 253, p. 117273.

- Tian, Y., Zhao, Y., Huang, J.
(2016) *Food Chem*, 197, p. 714.

- Berk, Z.
Freeze drying (lyophilization) and freeze concentration
(2018) *Food Process Engineering and Technology*, pp. 567-581.

- Li, T., Lee, J.-W., Luo, L.
(2018) *Applied Biological Chemistry*, 61, p. 257.

- Chen, B., Sun, K., Ren, T.
(2005) *European Polymer Journal*, 41, p. 453.

- Percot, A., Viton, C., Domard, A.
(2003) *Biomacromolecules*, 4, p. 12.

- Topalovic, T., Nierstrasz, V.A., Bautista, L.
(2007) *Cellulose*, 14, p. 385.

- Yoo, S.I., Lee, H.Y., Markkandan, K.
(2019) *BMC Genomics*, 20.

- Yan, D., Liu, Y., Rong, C.
(2020) *Fungal Biology*, 124, p. 135.

- Belozerskaya, T.A., Gessler, N.N., Aver'yanov, A.A.
Melanin Pigments of Fungi
(2017) *Fungal Metabolites*, pp. 263-291.

- Plonka, P.M., Grabacka, M.
(2006) *Acta Biochimica Polonica*, 53, p. 429.

- Li, D., Zhu, Z., Sun, D.-W.
(2018) *Trends in Food Science & Technology*, 75, p. 46.

- Ragoonanan, V., Less, R., Aksan, A.
(2013) *Cryobiology*, 66, p. 96.

- Fernandes Diniz, J.M.B., Gil, M.H., Castro, J.A.A.M.
(2004) *Wood Science and Technology*, 37, p. 489.

- Yu, M., Zhang, H., Liu, Z.
(2019) *Fibers and Polymers*, 20, p. 1726.

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