Mechanical and physical properties of mycelial-based leather from Fomitella fraxinea (Bull.)

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Sustainable leather substitutes are made from mushroom-based material, an environmentally friendly alternative to bovine leather. Here, mycelium-based leather is derived from F. fraxinea was produced from SSF. We plasticized the mycelial mat with various reagents that might impact the leather properties and affect mycelial architecture. As a result, the mycelial mat visually resembles leather and exhibits comparable material and tactile properties. The mycelial mat was treated with 20% PEG and 15% ethylene glycol (EG). As a result, Young's modulus of 7.03 ± 0.03, 6.10 ± 0.01 MPa, an ultimate tensile strength of 7.56 ± 2.39, 7.59 ± 2.41 MPa and a strain was 1.08, 1.24 %, respectively. The most considerable effect is observed after treatment with 30% glycerol (GLY) and EG, tannic acid (TA) crosslinking and corn zein (CZ) coating, decreasing Young's modulus and the ultimate tensile strength to 0.517 to 2.64 MPa, respectively. Moreover, plasticized techniques make the surface of mycelium hydrophobic and prevent surface leaching. Therefore, tuning the mycelial growth and leather processing might be possible to alter the tensile strength.