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(54) Title: PLANT-DERIVED AEROGELS, HYDROGELS, AND FOAMS, AND METHODS AND USES THEREOF

(57) Abstract: Provided herein are aerogels and foams including: single structural cells and/or groups of structural cells derived from a plant or fungal tissue, the single structural cells having a decellularized 3D structure lacking cellular materials and nucleic acids of plant or fungal tissue; the single structural cells and/or groups of structural cells being distributed within a carrier derived from a dehydrated, lyophilized, or freeze-dried hydrogel. Also provided herein are methods for preparing aerogels or foams, including steps of: providing a decellularized plant or fungal tissue; obtaining single structural cells and/or groups of structural cells from the decellularized plant or fungal tissue by performing mercerization; mixing or distributing the single structural cells and/or groups of structural cells in a hydrogel, to provide a mixture; and dehydrating, lyophilizing, or freeze-drying the mixture to provide the aerogel or foam. Related methods and uses are also provided.