CLAIMS

1. A film-forming composition which complies with halal, kosher and vegan dietary requirements, the film-forming composition comprising:

a hydrogel comprised of a polysaccharide;

a plasticizer; and

a water-soluble additive comprising a phenolic phytochemical and an anti-fungal agent, wherein the hydrogel is formed as a matrix incorporated with the water-soluble additive, and

wherein the phenolic phytochemical comprises tannic acid and gallic acid, wherein the anti-fungal agent comprises potassium sorbate and sodium benzoate, wherein the polysaccharide, the plasticizer, the potassium sorbate, the sodium benzoate, the tannic acid, the gallic acid, and water, are present in a weight ratio of 0.5 to 1.5 : 0.5 to 1.5 : 0.1 to 1 : 0.1 to 1 : 0.1 to 2 : 0.1 to 2 : 25 to 75.

2. The film-forming composition of claim 1, wherein the phenolic phytochemical and the anti-fungal agent are free of covalent bonding and ionic bonding to the polysaccharide.

3. The film-forming composition of claim 1 or 2, wherein the phenolic phytochemical further comprises a plant-based polyphenol, ferulic acid, or a combination thereof.

4. The film-forming composition of any one of claims 1 to 3, wherein the anti-fungal agent further comprises benzoic acid, methyl paraben, sorbic acid, or a combination thereof.

5. The film-forming composition of any one of claims 1 to 4, wherein the polysaccharide comprises agar, carboxymethyl cellulose, hydroxypropyl methylcellulose, pullulan, pectin, iota-carrageenan, κ-carrageenan, sodium alginate, or starch.

6. The film forming composition of any one of claims 1 to 5, wherein the plasticizer comprises glycerol, sorbitol, polyethylene glycol, glucose, or saccharose.

7. A method of producing a film-forming composition, wherein the film-forming composition complies with halal, kosher and vegan dietary requirements, wherein the film-forming composition comprises

a hydrogel comprised of a polysaccharide;

a plasticizer; and

a water-soluble additive comprising a phenolic phytochemical and an anti-fungal agent, wherein the hydrogel is formed as a matrix incorporated with the water-soluble additive, and wherein the phenolic phytochemical comprises tannic acid and gallic acid, wherein the anti-fungal agent comprises potassium sorbate and sodium benzoate, wherein the polysaccharide, the plasticizer, the potassium sorbate, the sodium benzoate, the tannic acid, the gallic acid, and water, are present in a weight ratio of 0.5 to 1.5 : 0.5 to 1.5 : 0.1 to 1 : 0.1 to 1 : 0.1 to 2 : 0.1 to 2 : 25 to 75, the method comprising:

providing an aqueous solution comprising the phenolic phytochemical, the anti-fungal agent, and the plasticizer; and

mixing the aqueous solution with the polysaccharide to form the film-forming composition,

wherein mixing the aqueous solution with the polysaccharide comprises mixing the polysaccharide, the phenolic phytochemical, the anti-fungal agent, and the plasticizer, in water, and

wherein the polysaccharide, the plasticizer, the potassium sorbate, the sodium benzoate, the tannic acid, the gallic acid, and the water, are mixed in the weight ratio of 0.5 to 1.5 : 0.5 to 1.5 : 0.1 to 1 : 0.1 to 1 : 0.1 to 2 : 0.1 to 2 : 25 to 75.

8. The method of claim 7, wherein providing the aqueous solution comprises dissolving the phenolic phytochemical and the anti-fungal agent in water.

9. The method of claim 7 or 8, wherein providing the aqueous solution further comprises dissolving the phenolic phytochemical and the anti-fungal agent in water

containing the plasticizer, wherein the plasticizer comprises glycerol, sorbitol, polyethylene glycol, glucose, or saccharose.

10. The method of any one of claims 7 to 9, wherein mixing the aqueous solution with the polysaccharide is free of forming any covalent bond and any ionic bond between (i) the phenolic phytochemical and the polysaccharide and (ii) the anti-fungal agent and the polysaccharide.

11. The method of any one of claims 7 to 10, further comprises heating the aqueous solution at a temperature ranging from 60°C to 100°C after mixing the aqueous solution with the polysaccharide.

12. The method of claim 11, wherein heating the aqueous solution comprises heating the aqueous solution for a duration ranging from 10 minutes to 20 minutes.

13. The method of any one of claims 7 to 12, wherein the phenolic phytochemical further comprises a plant-based polyphenol, ferulic acid, or a combination thereof.

14. The method of any one of claims 7 to 13, wherein the anti-fungal agent further comprises benzoic acid, methyl paraben, sorbic acid, or a combination thereof.

15. The method of any one of claims 7 to 14, wherein the polysaccharide comprises agar, carboxymethyl cellulose, hydroxypropyl methylcellulose, pullulan, pectin, iota-carrageenan, κ-carrageenan, sodium alginate, or starch.