CLAIMS

1. A glacial acrylic acid composition comprising at least 98 wt% acrylic acid, and wherein

   a portion of the remaining impurities in said glacial acrylic acid composition is propanoic acid;

   wherein said glacial acrylic acid composition has a bio-based content greater than 3%; and

   wherein the bio-based content is the amount of carbon from a renewable resource in a material as a percent of the weight (mass) of the total organic carbon in the material, as determined by ASTM D6866-10, Method B.

2. The glacial acrylic acid composition of Claim 1 wherein said glacial acrylic acid composition has a bio-based content greater than 30%.

3. The glacial acrylic acid composition of Claim 1 wherein said glacial acrylic acid composition has a bio-based content greater than 90%.

4. A process of producing a glacial acrylic acid composition comprising:

   a. Providing an aqueous solution of acrylic acid comprising: 1) acrylic acid; and 2) lactic acid, lactic acid derivatives, or mixtures thereof, and wherein said aqueous solution of acrylic acid is essentially free of maleic anhydride, furfural, and formic acid;

   b. Extracting said aqueous solution of acrylic acid, with a solvent to produce an extract;

   c. Drying said extract to produce a dried extract;

   d. Distilling said dried extract to produce distilled acrylic acid composition;

   e. Cooling said distilled acrylic acid composition to a temperature from -21 °C to 14°C to produce crystals of acrylic acid;

   f. Partially melting said crystals of acrylic acid to produce a liquid / solid mixture;

   g. Decanting said liquid / solid mixture to produce a purified acrylic acid solid composition;

h. Fully melting said purified acrylic acid solid composition to produce a purified acrylic acid liquid composition; and

i. Determining the acrylic acid purity of said purified acrylic acid liquid composition, and if the purity is less than 98 wt% acrylic acid, repeating said cooling, partially melting, decanting, and fully melting steps on the purified acrylic acid liquid composition until a purity of 98 wt% acrylic acid is achieved and said glacial acrylic acid composition is produced; wherein the produced glacial acrylic acid composition comprises at least 98 wt% acrylic acid, and wherein a portion of the remaining impurities in said glacial acrylic acid composition is propanoic acid;

wherein said glacial acrylic acid composition has a bio-based content greater than 3%; and

wherein the bio-based content is the amount of carbon from a renewable resource in a material as a percent of the weight (mass) of the total organic carbon in the material, as determined by ASTM D6866-10, Method B.

5. The process of claim 4, wherein the aqueous solution of acrylic acid comprises from 4 wt% to 80 wt% acrylic acid.

6. The process of claim 4 or 5, wherein the aqueous solution of acrylic acid comprises from 5 wt% to 25 wt% acrylic acid.

7. The process of any of claims 4 to 6, wherein the aqueous solution of acrylic acid comprises from 0.001 wt% to 50 wt% lactic acid, lactic acid derivatives, or mixtures thereof.

8. The process of any of claims 4 to 7, wherein the aqueous solution of acrylic acid comprises from 0.001 wt% to 20 wt% lactic acid, lactic acid derivatives, or mixtures thereof.

9. The process of any of claims 4 to 8, wherein said solvent is selected from the group consisting of ethyl acetate, isobutyl acetate, methyl acetate, toluene, dimethyl phthalate, hexane, pentane, diphenyl ether, ethyl hexanoic acid, N-methylpyrrolidone, C6 to C10 paraffin fractions, and mixtures thereof.

10. The process of any of claims 4 to 9, wherein said drying is performed by azeotropic distillation.

11. The process of any of claims 4 to 10, wherein said drying is performed by distillation.

12. The process of any of claims 4 to 11, wherein said drying is performed by sorption.

13. The process of any of claims 4 to 12, wherein said sorption is performed on a solid powder selected from the group consisting of magnesium sulfate, sodium sulfate, calcium sulfate, molecular sieves, metal hydrides, reactive metals, and mixtures thereof.