CLAIMS

1. A method for synthesizing a derivative of FDCA comprising:
contacting DDG with an alcohol and an inorganic acid at a temperature in excess of 60 °C to form a derivative of FDCA.

2. The method of claim 1 wherein the alcohol is butanol or ethanol and the derivative of FDCA is a butyl or ethyl derivative of FDCA, respectively.

3. The method of claim 1 having a yield of at least 25% molar.

4. A method of synthesizing a derivative of DDG comprising:
contacting DDG with an alcohol, an inorganic acid, and optionally a co-solvent to produce a derivative of DDG.

5. The method of claim 4 wherein:
a) the alcohol is ethanol or butanol;
b) the inorganic acid is sulfuric acid; and
c) the co-solvent is selected from the group consisting of: THF, acetone, acetonitrile, an ether, ethyl acetate, butyl acetate, an dioxane, chloroform, methylene chloride, 1,2-dichloroethane, a hexane, a heptane, toluene, carbon tetrachloride, petroleum ether, and a xylene.

6. A method for synthesizing a derivative of FDCA comprising:
contacting a derivative of DDG with an inorganic acid to produce a derivative of FDCA.

7. The method of claim 6 having a yield of greater than 25% molar.

8. The method of claim 6 wherein the derivative of DDG is selected from the group consisting: methyl-DDG, ethyl-DDG, butyl-DDG, di-methyl DDG, diethyl-DDG, and di-butyl DDG; and
the derivative of FDCA is a methyl, ethyl, butyl, dimethyl, diethyl, or dibutyl derivative of FDCA, respectively.

9. The method of claim 8 further comprising that the derivative of FDCA is de-esterified to yield FDCA.

10. The method of claim 6 further comprising a step of polymerizing the derivative of FDCA.

11. A method for synthesizing FDCA comprising:
contacting DDG with an inorganic acid in a gas phase at a temperature greater than 70 °C to synthesize FDCA.

12. A method for synthesizing FDCA comprising:
contacting DDG with an inorganic acid in a gas phase at a temperature in excess of 120 °C to synthesize FDCA.

13. A method for synthesizing FDCA comprising:
contacting DDG with an inorganic acid under anhydrous reaction conditions to synthesize FDCA.

14. The method of claim 1 wherein:
the alcohol is selected from: butanol, ethanol, methanol, and propanol;
the acid is sulfuric acid;
the contacting occurs at a temperature of greater than 70 °C; and
thereby synthesizing a butyl, ethyl, methyl, or propyl derivative of FDCA, respectively.

15. The method of claim 14 wherein the contacting occurs in a gas phase at a temperature of greater than 150 °C.

16. The method of claim 5 further comprising a step of removing water from a solvent comprising the DDG prior to performing the method.

17. The method of claim 16 wherein greater than 90% of the water is removed from the solvent comprising the DDG prior to performing the method.

18. The method of claim 8 wherein the contacting occurs in the gas phase at a temperature of at least 90 °C.

19. The method of claim 11 wherein the inorganic acid is sulfuric acid.

20. The method of claim 12 wherein the inorganic acid is sulfuric acid.

21. The method of claim 13 wherein the contacting occurs at a temperature of greater than 80 °C.

22. The method of claim 13 wherein the DDG is comprised in a solvent that contains less than 10% water (w/w).

23. The method of claim 22 wherein the DDG is comprised in a solvent that contains less than 5% water (w/w).

24. The method of claim 8 further comprising a step of polymerizing the derivative of FDCA.