We claim:

1. A process for producing a hydrogenation product comprising: a) obtaining a fermentation broth at a pH of less than 5, containing at least one free organic acid, or a mixture of free organic acids; b) drying said fermentation broth into a powder; and c) reacting said organic acid in said powder with an alcohol solvent under a CO_2 atmosphere in substantial absence of any other extrinsic acid catalyst at a reaction temperature and pressure that corresponds to supercritical, critical or near critical conditions for at least the alcohol or CO_2 to synthesize an ester; and d) hydrogenating said ester to form a hydrogenation product.
2. The process according to claim 1, further comprising filtering said fermentation broth to remove cell mass and insoluble compounds either before drying or after ester synthesis, in particular filtering said fermentation broth to remove insoluble by-products resultant from ester synthesis, and concentrating said ester.
3. The process according to claim 1 or 2, wherein said hydrogenation product includes anyone of the following: 1,4-butanediol (BDO), tetrahydrofuran (THF), γ-butyrolactone (GBL), N-methyl-2-pyrrolidone (NMP), 2-pyrrolidone.
4. The process according to any one of the preceding claims, wherein said fermentation broth is either part of a continuous fermentation process, and further comprising recycling said insoluble compounds back into said fermentation broth; or part of a batch fermentation process, and further comprising recycling said insoluble compounds into a second fermentation reactor .
5. The process according to any one of the preceding claims, wherein said organic acid is selected from the group consisting of: formic acid, acetic acid, propionic acid , lactic acid, butyric acid, isobutyric acid, valeric acid, hexanoic acid, heptanoic acid, decanoic acid, lauric acid, myristic acid, and C_{15}-C_{18} fatty acids, fumaric acid, itaconic acid, malic acid, succinic acid, maleic acid, malonic acid, glutaric acid, glucaric acid, oxalic acid, adipic acid, pimelic acid, suberic acid, azelaic acid, sebacic acid, dodecanedioic acid, glutaconic acid, ortho-phthalic acid, isophthalic acid, terephthalic acid, citric acid, isocitric acid, aconitic acid, tricarballylic acid, and trimesic acid.
6. The process according to any one of the preceding claims, wherein said organic acid is a polycarboxylic acid, in particular said polycarboxylic acid is at least a dicarboxylic or a tricarboxylic acid.

7. The process according to any one of the preceding claims, wherein said reaction temperature and pressure is at a temperature between 150°C and 250°C, at a pressure in a range between 400 psi 3,000 psi.
8. The process according to any one of the preceding claims, wherein said process does not activate said free organic acid as an acyl halide.
9. The process according to any one of the preceding claims, wherein said fermentation broth has a pH in a range between about 1.5 and about 4.5.
10. The process according to any one of the preceding claims, wherein said organic acid is a diacid and said synthesis of the ester yields a minimum of 50% conversion to a diester of the organic acid.
11. The process according to claim 1, further comprising purifying said ester to at least about 90% purity.
12. The process according to claim 1, wherein said alcohol has an R-group of C_1-C_{20}, and is either a saturated, unsaturated, or aromatic species.
13. The process according to claim 1, wherein said dried fermentation broth powder is shipped to a location different from where said fermentation broth is sourced.
14. The process according to claim 1, wherein said ester synthesis is performed at a remote location different from where said fermentation broth is sourced.
15. The process according to claim 1, wherein said organic acid is at least a C_4 diacid, and said synthesized ester is at least a diester, and said hydrogenation product is a 1,4-butanediol.