CLAIMS:

1. A method for producing bio-oil using cellulosic or lignocellulosic biomass as an input, comprising the steps of:

a) using microwave hydrolysis of the cellulosic or lignocellulosic biomass as a pretreatment method to extract fermentable sugars; and

b) fermenting an oleaginous yeast using the extracted fermentable sugars to produce a bio-oil.

2. The method, as recited in claim 1, wherein the oleaginous yeast comprises *Lipomyces starkeyi*.

3. The method, as recited in claim 1, wherein using the microwave hydrolysis heats the cellulosic or lignocellulosic biomass to a temperature of at least 120° C for a time in a range of 1 to 20 minutes.

4. The method, as recited in any of claims 1-2, wherein fermenting the oleaginous yeast uses a fermentation substrate of cellulosic or lignocellulosic hydrolysate produced by the microwave hydrolysis.

5. The method, as recited in any of claims 1-2 and 4, further comprising extracting lipids from the oleaginous yeast.

6. The method, as recited in any of claims 1-2 and 4-5, further comprising milling the cellulosic or lignocellulosic biomass.

7. The method, as recited in any of claims 1-2 and 4-6, further comprising drying the cellulosic or lignocellulosic biomass.

8. A method, as recited in any of claims 1-2 and 4-7, wherein the bio-oil comprises long-chain fatty acids.

9. The method, as recited in any of claims 1-2 and 4-8, wherein the using the microwave hydrolysis is enzyme free and acidic additive free.

10. The method, as recited in any of claims 1-2 and 4-9, wherein using the microwave hydrolysis heats the cellulosic or lignocellulosic biomass to a temperature of at least 120° C for a time in a range of 1 to 20 minutes.

11. The method, as recited in any of claims 1-2 and 4-10, further comprising:

milling the cellulosic or lignocellulosic biomass to particles with a length of less than 2 mm; and

presoaking the particles in water at a loading rate between 1% and 20% by weight of solid mass to water prior to using the microwave hydrolysis.

12. The method, as recited in any of claims 1-2 and 4-11, wherein using the microwave hydrolysis of the cellulosic or lignocellulosic biomass as a pretreatment method to extract fermentable sugars creates biomass slurry, and further comprising centrifuging biomass slurry to separate the biomass slurry into a liquid phase and a solid phase, wherein the liquid phase is a hydrolysate used as a substrate for the oleaginous yeast fermentation.

13. The method, as recited in claim 12, wherein the hydrolysate comprises carbohydrates.

14. The method, as recited in any of claims 1-2 and 4-12, wherein lipids are extracted from oleaginous yeast via at least one of microwave and liquid-liquid extraction.