**Graphical abstract**

Wastewater sludge

Acidic

Alkali

Microwave

Ultrasonication

**Pretreatment**

**Fermentation**

(Lipid production)

Lipid

Residue

**Sludge reduction: 63%**

**Lipid yield: 0.21 g lipid/g MLSS**

(Lipid production)



**Biodiesel**