

Thesis Project Portfolio

Leveraging Enzyme Excretion Systems for the
Cell-Free Synthesis of Lactic Acid
(Technical Report)

Publish or Perish: Pressures on Academia
in Technology Development
(Sociotechnical Research Paper)

An Undergraduate Thesis Portfolio
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In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Chemical Engineering

by

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University researchers introduce important innovations. How can access to such innovations be improved?

Some products of fermentation can now be produced through cell-free synthesis instead. In the production process, removing the enzymes from cells increases yield by using all raw materials solely for production. Cell-free enzyme technology can optimize large-scale manufacture of lactic acid. Lactic acid is typically produced by fermentation, but cell-free synthesis has been developed at lab scale. Scaling the process requires three main components: 1) producing enzymes for the cell-free reaction pathway; 2) conducting the cell-free reaction; and 3) purifying out the lactic acid product. By scaling up this process, researchers can optimize it and make it cost-effective.

University researchers face career pressure to publish research frequently, secure funding, and gain prestige in their fields. While such pressures can stimulate research productivity, they can also distort research priorities, compromise research quality, and even reward fraud. Academic researchers, publishers, professional societies, and companies are competing to protect or reform the status quo in research. Tenure standards and publication pressures, fueled by the status quo, can compromise research integrity.