# Lactic acid production from biomass-derived sugars using acid or base catalysts

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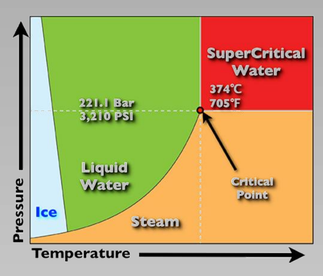
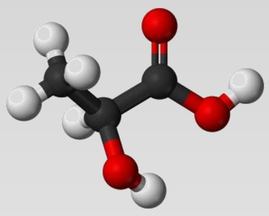
## INTRODUCTION

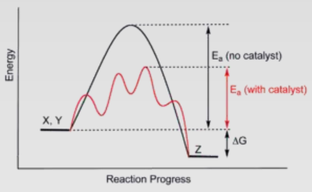
Subcritical water (subw) has been proposed as an alternative and promising solvent for fractionation of the biomass




Sugars derived from biomass, hexoses and pentoses, can be used as starting materials for further conversion to a range of value-added products

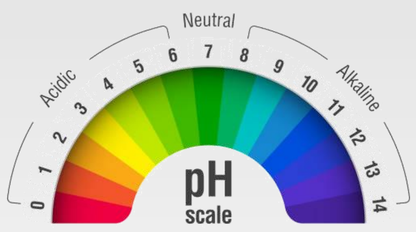
Second-generation lactic acid (2G-LA) is a promising sugars-derived building blocks






Different catalytic hydrothermal processes have been considered to selectively produce 2G-LA

These catalytic systems are divided into base and acids which have different catalytic reaction pathway

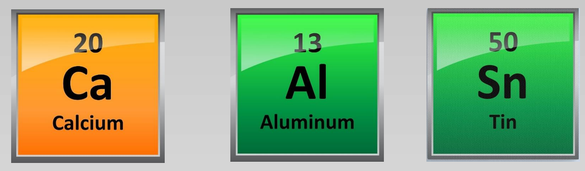


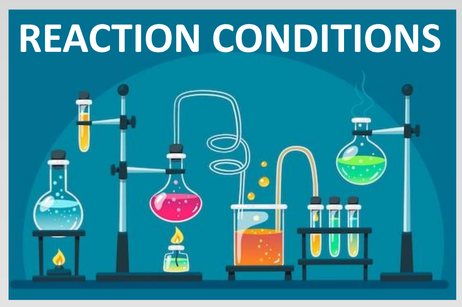

## EXPERIMENTAL

Discontinuous steel reactor (500 mL)
Possibility of taking aliquots over time

Agilent HPLC
Bio-Rad Aminex-HPX-87H column
VWD and RID detectors

Base catalyst: $Ca(OH)_2$
Acid catalyst: $Al_2O_3$ & $SnCl_2$

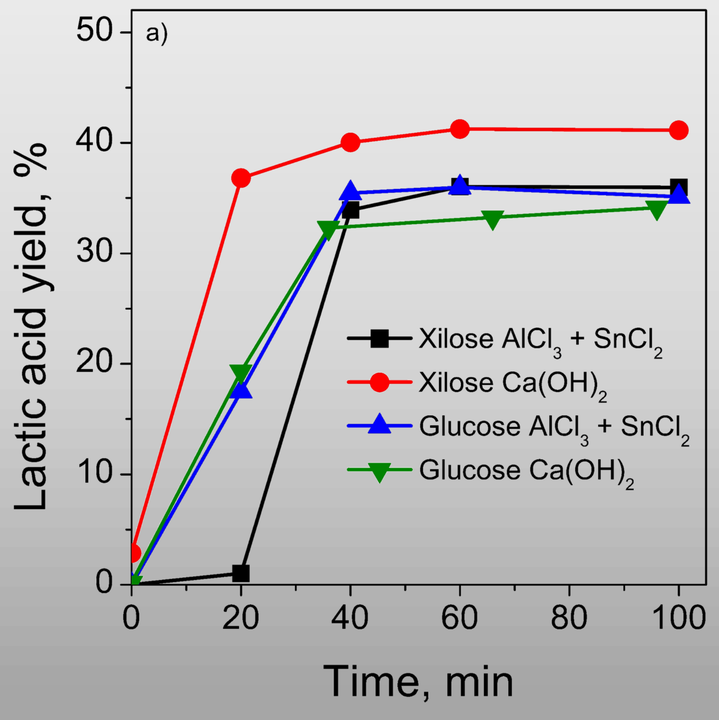


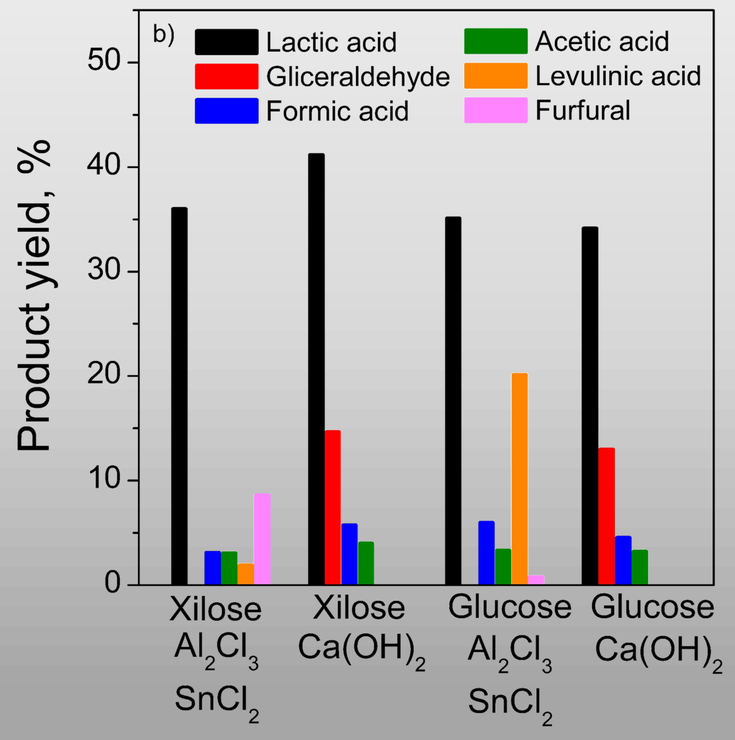




Volume: 200 mL
Sugar concentration: 0.05 M
Catalyst concentration: 0.10M
Temperature: 190 °C
Pressure: 55 bar

**Evaluate the feasibility of LA production from biomass-derived sugars**
**Analyze the possible kinetics of operation and the stability of the LA produced**

## RESULTS AND DISCUSSION




The presence of acid catalysts is more effective for glucose conversion; however, for xylose conversion base catalysts present a higher yield

The selected catalysts are highly active and selective for the production of lactic acid from biomass-derived sugars

The lactic acid produced presents stability over time. The experiment with glucose and $Ca(OH)_2$ is extended to 300 minutes and there is still no degradation of the lactic acid produced

**Lactic acid can be produced from biomass-derived sugars, both with basic and acid catalysts, and is a stable system, as no degradation of the produced lactic acid is observed over time**

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