

Production of Cellulosic Ethanol from Mixed Paper  
(Technical Report)

The Biofuel Lie: Why Americans Haven't Ditched the Pump for the Plug  
(STS Research Paper)

An Undergraduate Thesis Portfolio  
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Bachelor of Science in Chemical Engineering

by

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## Preface

How can fossil fuel usage for powering automobiles be reduced? Climate scientists are in agreement that the transport sector must be decarbonized to help curb climate change, but society has no settled answer on how to achieve this goal. Current leading methods include biofuels and electric vehicles, in which both technical and political factors influence the debate.

How can shredded paper be processed into an ethanol-based biofuel fit for use in automobile engines? A technically successful process was designed in which the shredded paper was broken down into glucose via acid hydrolysis and then fermented in a batch fermenter to ethanol. A single distillation column followed by a system of drying involving molecular sieves was utilized to separate ethanol from water to 99.5 percent purity. The process is energetically favorable with 85 percent of the heat of combustion of finished ethanol product needed to run the process equipment. However, the process is not economic without a very high government subsidy, concluding that shredded paper not be used as a feedstock for biofuel at this time.

The biofuel lie: why Americans haven't ditched the pump for the plug. Despite the clear advantages of electric vehicles over biofuels in reducing greenhouse gas emissions, the American public still views biofuels as viable alternatives. Biofuels are still viewed as viable despite scientific evidence to their inferiority because special interest groups, such as corn growers' associations, lobby politicians for favorable legislation. These groups also heavily promote biofuels to the public, using slogans like "American grown" and "energy independence" to invoke emotions to support corn ethanol. Some even go as far to publish their own research that is partial to ethanol. Due to the powerful biofuel lobby, before making decisions, the public, politicians, and automakers should consider the stake that the authors of biofuel research and advertising have in the adoption of biofuels as the answer to the climate crisis.

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