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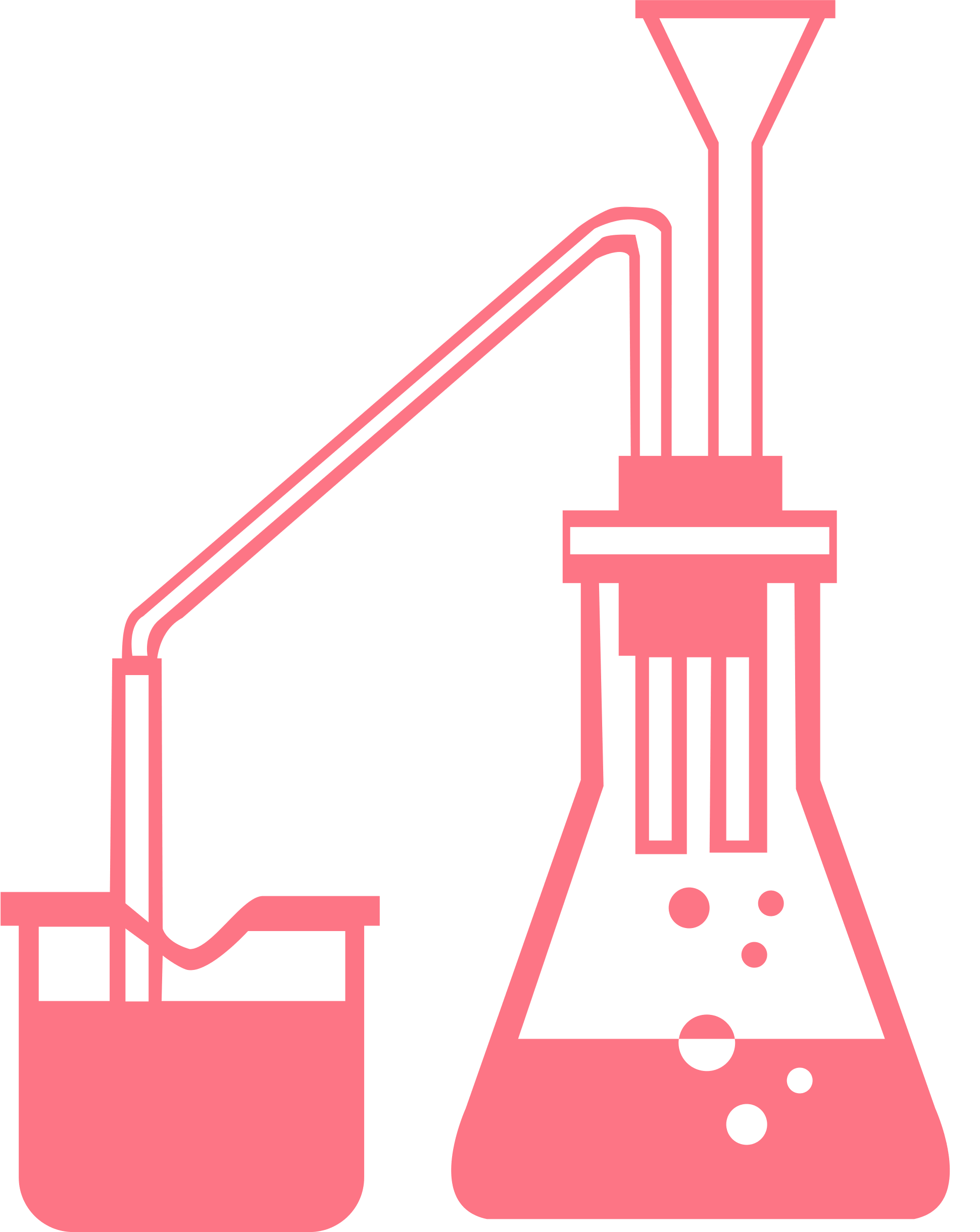
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**INTRODUCTION**

**METHODOLOGY**

Biodiesel is a renewable and sustainable alternative to fossil fuels, but the current methods for its production often involve expensive and toxic catalysts. The aim of this study was to develop a new catalyst for the synthesis of biodiesel from waste cooking oil, a low-cost and abundant feedstock.

A variety of catalysts were synthesized and evaluated for their ability to catalyze the transesterification of waste cooking oil to produce biodiesel. The catalysts were characterized using X-ray diffraction (XRD), scanning electron microscopy (SEM), and transmission electron microscopy (TEM). The reaction conditions were optimized in terms of catalyst concentration, reaction time, and temperature. The yield and quality of the biodiesel were determined using gas chromatography (GC) and Fourier transform infrared spectroscopy (FTIR).



**CONCLUSION**

CHEMISTRY RESEARCH POSTER

**Development of a New Catalyst for the Synthesis of Biodiesel from Waste Cooking Oil**

**AFFILIATIONS**

Researches are often under or on behalf of a university, an organization, or academic/research institutions. When available, include their logos with the names.

**AUTHORS**

Don't forget the names of the research authors and co-authors. Use full names and include any titles or honorifics the authors may have, as well as the university or research institution they are representing.

**RESULTS**

The results showed that a novel iron-based catalyst was highly effective for the synthesis of biodiesel from waste cooking oil. The XRD and SEM analysis revealed that the catalyst had a well-defined crystal structure and porous surface, which are favorable for catalysis. The TEM analysis showed that the catalyst particles were well-dispersed and had an average size of 20 nm. The optimal reaction conditions were found to be 1 wt% catalyst concentration, a reaction time of 3 hours, and a temperature of 60°C. Under these conditions, the yield of biodiesel was 95%, with a FAME content of 99.5%. The FTIR analysis confirmed the purity of the biodiesel and showed no evidence of residual catalyst.

**ANALYSIS**

The results of this study provide strong evidence for the effectiveness of the novel iron-based catalyst for the synthesis of biodiesel from waste cooking oil. The favorable properties of the catalyst, such as its well-defined crystal structure, porous surface, and well-dispersed particles, all contribute to its high performance. The high yield of pure biodiesel and the absence of residual catalyst demonstrate the potential of this catalyst to replace current methods for biodiesel production.

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The results of this study demonstrate that a novel iron-based catalyst is highly effective for the synthesis of biodiesel from waste cooking oil. The catalyst has favorable properties, such as a well-defined crystal structure, porous surface, and well-dispersed particles, which contribute to its high performance. The optimized reaction conditions yielded a high yield of pure biodiesel, with no residual catalyst. This study provides a new and sustainable approach for the production of biodiesel, which has the potential to replace fossil fuels in the future.

*Use graphs to show visualization of your data's analysis.*