

Evaluation of antioxidant activity of natural avocado leaf extracts in biodiesel

Abstract

This study investigates the effectiveness of natural extracts from avocado leaves (*Persea americana*) as antioxidants in biodiesel. The oxidative stability of biodiesel supplemented with these extracts was evaluated in comparison to synthetic antioxidants such as BHA and BHT. The results demonstrated that the ethanolic extract of avocado leaves exhibited the longest induction time, suggesting its potential as a natural substitute for synthetic antioxidants.

Keywords: biodiesel, natural antioxidants, avocado, oxidative stability, rancimat

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Introduction

The increasing demand for renewable energy sources has driven research into biofuels, particularly biodiesel. However, the oxidation of biodiesel can compromise its quality and stability, leading to the formation of undesirable products. Antioxidants are often used to mitigate these effects. This study aims to evaluate the antioxidant activity of natural extracts from avocado leaves, comparing them with synthetic antioxidants.

Materials and methods

The extracts from avocado leaves were obtained through ethanolic extraction, as described by Souza et al.¹ The oxidative stability of biodiesel supplemented with 1000 ppm of the extracts was evaluated using the Rancimat test, according to the EN 14112 standard. The induction time was measured and compared with pure biodiesel and samples supplemented with BHA and BHT.

Results

The results showed that pure biodiesel had an induction time of 2.48 hours. In contrast, biodiesel supplemented with the ethanolic extract of avocado leaves (ABET) exhibited a significantly longer induction time of 18.02 hours. The synthetic antioxidants BHA and BHT had induction times of 6.20 and 6.79 hours, respectively. These data indicate that the ethanolic extract of avocado not only surpassed the synthetic antioxidants but also met the quality parameters established by ANP.

Discussion

The results obtained corroborate previous studies indicating the effectiveness of natural extracts in stabilizing biodiesel.² The superiority of the ethanolic extract of avocado may be attributed to the presence of phenolic compounds, which are known for their antioxidant properties. The use of natural antioxidants not only improves the stability of biodiesel but also offers a sustainable alternative to synthetic antioxidants, which may have adverse environmental impacts.

Conclusion

Natural extracts from avocado leaves demonstrated significant potential as antioxidants in biodiesel, surpassing the effectiveness of the tested synthetic antioxidants. This study suggests that the use of natural extracts could be a viable strategy to enhance the oxidative stability of biodiesel, contributing to sustainability in biofuel production.

Acknowledgments

None.

Conflicts of interest

The authors declared that there are no conflicts of interest.

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