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SHORT COMMUNICATION



Evaluating the use of non-edible *Cephalaria syriaca* L. Seeds as a new and effective feedstock for biodiesel

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Description

Non-edible *Cephalaria syriaca* L. Seeds as a novel and effective biomass for biodiesel talks about how *Cephalaria syriaca* L.'s crude oil is evaluated. Seeds from pelemir as a biodiesel feedstock, free from competition with edible oils eaten for food. The main goal is to find out if the enhanced karahan genotype of pelemir grown in Turkey for biodiesel production. For this purpose, crude pelemir oil was first obtained using the solvent extraction method. The fatty acid profile and physicochemical properties of the crude oil were determined using analytical tests (Karabas, et al. 2026). The work emphasises that the low Free Fatty Acid (FFA) content of pelemir oil allows a one-step transesterification under basic catalysis using potassium hydroxide (Karabas, et al. 2013, Gokturk, et al. 2014). In this context, transesterification was used to create Pelemir Seed Oil Methyl Ester (PSOME). The principal process factors in the transesterification reaction were established thought about including oil-to-alcohol molar ratio, catalyst concentration, reaction temperature, and reaction time. Purification procedures were carried out following synthesis to determine the ester conversion yield (Singh, et al. 2023, Baskar, et al. 2016).

After these steps, gas chromatography was employed to find mono-, di-, and triglycerides in the produced fatty acid methyl ester mixture, thus offers compositional knowledge of the product made from biodiesel. One major advantage of the study is that the generated methyl ester is assessed not just in terms of conversion percentage, but also with regard to adherence to the world biodiesel criteria European Norm 14214 (EN) and American Society for Testing and Materials D 6751 (ASTM) (Jamil, et al. 2023, Pinzi, et al. 2013). PSOME's distinguishing traits were stated to be quite like ordinary diesel fuel. Especially important fuel-relevant factors for internal combustion engines. Such as density, kinematic viscosity, ester content, cold filter plugging point, and oxidation stability were underlined as falling within reasonable compatibility limits (Jamil, et al. 2023).

Moreover, PSOME derived from low-iodine-content pelemir oil helps to improve fuel stability, which helps with storage as well as consumption. The research also highlights the need for feedstock choice by looking at major elements impacting fuel quality. The quality of crude pelemir oil, including its fatty acid profile and physicochemical qualities. The findings point to pelemir's possible guidance toward local renewable biofuel generation and hence supporting ideas including resilience to extreme climatic conditions and agricultural diversification. Here, the study presents a broader perspective as well as a technical illustration of biodiesel manufacture an approach to renewable biomass use. Three main points will help one to grasp the contribution of this work.

First, it suggests a plan using an approach that lessens the food industry's risk of competition strategy for edible/non-edible

feedstock. Second, emphasising the low FFA level helps the research to show the viability of one-step transesterification. Third, it proves that the finished biodiesel meets ASTM D 6751 and EN 14214 criteria (Karabas, et al. 2026). Future studies should go on to evaluate engine performance, cost analysis, and emissions of pelemir biodiesel with several engine types. All told, the piece offers useful and fresh dataset supporting biodiesel synthesis using biomass sources, the quest for local biodiesel-related feedstock free from food rivalry.

Conclusion

In conclusion, the work provides a new and useful dataset supporting the role of biomass feedstocks in biodiesel production, the search for biodiesel-related local feedstocks that do not compete with food. Significantly, pelemir grows quite well in Turkey and other dry and semi-arid areas; it could also help to address assist surmounting feedstock supply limits, therefore supporting continuous operation of biodiesel manufacture resources available all year.

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