

عنوان مقاله:

Optimization of Biodiesel Production from Prunus Scoparia using Artificial Bee Colony Algorithm

محل انتشار:

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خلاصه مقاله:

Renewable energy sources are developed worldwide, owing to high oil prices and in order to limit greenhouse gas emissions. The objective of this research was to study the feasibility of biodiesel production from mountain almond (Prunus Scoparia) oil using ultrasonic system and optimization of the process using Artificial Bees Colony (ABC) Algorithm. The results showed that by increasing the molar ratio, the conversion percentage increased and after reaching a certain ratio, further increase in the molar ratio caused decrease in the conversion percentage. Increasing in the ultrasound amplitude resulted in an increase in the conversion percentage which tends to ascend; Furthermore, results of optimization showed that the amount of molar ratio, amplitude, pulse and reaction time were ۵.۶، ۰.۹۰، ۰.۳۳ and ۵ min, respectively. For independent variables, the values of yield and energy consumption were obtained which were equal to ۹۶.۱% and ۹۹۱۲ J, respectively. This finding proves that ABC algorithm can estimate the optimum point in biodiesel production with high accuracy. Renewable energy sources are developed worldwide, owing to high oil prices and in order to limit greenhouse gas emissions. The objective of this research was to study the feasibility of biodiesel production from Mountain almond (Prunus scoparia) oil using ultrasonic system and optimization of the process using Artificial Bees Colony Algorithm. The results showed that with increasing the molar ratio, the conversion percentage increased and after reaching a certain ratio, further increase in the molar ratio caused decrease in the conversion percentage. The increase in the ultrasound amplitude resulted in an increase in the conversion percentage which tends to ascend. Furthermore, results of optimization showed that the amount of molar ratio, amplitude, pulse and reaction time were ۵.۶، ۰.۹۰، ۰.۳۳ and ۵ min, respectively. For independent variables, the values of yield and energy consumption were obtained which were equal to ۹۶.۱% and ۹۹۱۲ J, respectively. This finding proves that ABC algorithm .can estimate the optimum point in biodiesel production with high accuracy

کلمات کلیدی:

Mountain Almond, Biodiesel, Artificial Bees Colony, RSM, ultrasonic

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