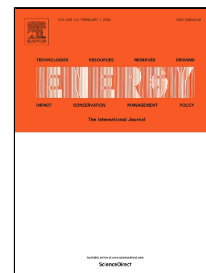


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## Resource Use Efficiency of Rice Production upon Single Cropping and Ratooning Agro-systems in Terms of Bioethanol Feedstock Production

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### Abstract

Bioethanol is one of the most widely used biofuels worldwide and rice (*Oryza sativa* L.) is a feedstock for bioethanol production. This study aimed at evaluating the energy use efficiency of rice single cropping and ratooning agro-systems in terms of brown rice production as a feedstock for bioethanol production. Moreover, the possibility of bioethanol production from Iranian rice was studied and a potential atlas, regarding the possibility of bioethanol production across the country, was also presented. The results demonstrated that the total energy consumption for producing 2.4 kg of brown rice as the feedstock unit for one liter bioethanol production in rice single and ratooning agro-systems were 54.24 and 29.98 MJ, respectively. The results clearly highlighted that the bioethanol feedstock production in ratooning agro-system was more energy-efficient than the single cropping system. Substitution of low-yielding paddy variety of Hashemi with high-yielding cultivars and compensating some of the crop's nitrogen requirement using biological alternatives are proposed to enhance energy productivity in both agro-systems. The annual potential of bioethanol production from rice in Iran was estimated to be 648 million liters. Overall, developing a macro-plan is recommended to produce rice to be used as food and bioethanol feedstock based on the ratooning agro-system in Northern Iran.

**Keywords:** Biofuel, Energy efficiency, Feedstock for bioethanol, Rice agro-systems

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