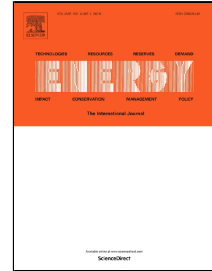


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Assessment of tomato production process by cumulative exergy consumption approach in greenhouse and open field conditions: Case study of Turkey

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1 **Assessment of tomato production process by cumulative exergy consumption approach in**  
2 **greenhouse and open field conditions: Case study of Turkey**

3  
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9 **Abstract**

10 Cumulative exergy consumption is an innovative method that can help to evaluate different  
11 energy use problems in crop production process. In this study, cumulative exergy approach was  
12 applied for evaluate the tomato production process. In this context, open field productions in  
13 South Marmara and Tokat, and also greenhouse structures in Antalya were assessed by  
14 cumulative exergy consumption for tomato production in Turkey. The results showed that, Tokat  
15 is the best region for tomato production in open field. Cumulative degree of perfection and  
16 renewability indicator for tomato production in this region were 1.62 and 0.38, respectively. In  
17 this study, cumulative exergy consumption showed that water consumption in open field and also  
18 electricity consumption in greenhouse conditions are high. Fossil fuel is the main sources in  
19 these regions for pumping water and also electricity generation. As a new case, hydroelectricity  
20 energy supply is provided instead of fossil energy source for irrigation system and electricity  
21 generation. The results showed that when the hydroelectricity source was applied for irrigation  
22 system and electricity generation, the best region based on renewability indicator is Antalya  
23 (greenhouse condition). As a result, the cumulative exergy consumption approach is an effective  
24 method for increasing the renewability of crop production processes.  
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26 **Keywords**

27 Tomato production, Cumulative exergy consumption, Renewability indicator, Turkey  
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