

عنوان مقاله:

Life cycle assessment and cumulative exergy demand analysis of greenhouse tomato production

محل انتشار:

چهارمین کنگره بین المللی توسعه کشاورزی، منابع طبیعی، محیط زیست و گردشگری ایران (سال: 1398)

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خلاصه مقاله:

Focus of this study is on the identifying the main environmental burdens and suggesting some environmental improvement potentials by applying Life Cycle Assessment (LCA) method and determining of energy forms by Cumulative Exergy Demand (CExD) for greenhouse tomato production in Alborz province of Iran. Initial data were collected from 30 greenhouses in the studied area. CML 2 baseline 2000 method of LCA applied in calculation environmental impacts. Moreover, 10000 kg greenhouse tomato production considered as Functional Unit (FU) in this research. The results of LCA revealed that AD, AC, EP, OLD, HT, FE, ME, TE and PO were 33.14 kg Sb eq., 17.79 kg SO₂ eq., 4.56 kg PO-3 4 eq., 3409.76 kg CO₂ eq., 0.00017 kg CFC11 eq., 2215.59 kg 1,4-DB eq., 827.44 kg 1,4-DB eq., 2330861.74 kg 1,4-DB eq., 14.69 kg 1,4-DB eq. and 0.88 kg C₂H₄ eq. for 10000 kg greenhouse tomato production, respectively. The highest share of emission in most environmental impacts belonged to diesel fuel and On-Farm emissions. CExD analysis used for determination of different energy form indices and its results indicated that Non-renewable, fossil with 39624.78 MJ was the highest energy consumer index; followed by renewable water 23140.21 MJ for 10000 kg of greenhouse tomato production. Finally, it is suggested that applying solar technologies for replacing renewable energy in heating of tomato greenhouses instead of diesel fuel consumption in production process.

کلمات کلیدی:

Cumulative exergy demand, Environmental impact, Life cycle assessment, Tomato

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