



University of Zabol

School of Agriculture

Gardening group

**Dissertation for obtaining a master's degree in the field of
greenhouse production**

Title:

**Analysis of greenhouse production systems of Roses and Alstroemeria in
Mashhad region using energy and economic analysis methods**

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Abstract

This study aimed to analyze rose and alstroemeria greenhouse systems in the Mashhad region using emergy and economic analysis methods. The emergy consumption of rose and alstroemeria production systems was $1.33E18$ and $1.01E18$ emjoules per hectare per year, respectively. The highest share of emergy inputs for rose was related to cuttings, fossil fuels, and labor, and for alstroemeria, it was rhizome, fossil fuels, and labor, respectively. The Solar transformity for both rose and alstroemeria production systems was $3.49E4$ and $2.37E4$ sej/j, respectively. The emergy renewability index (R%) for rose and alstroemeria production systems was 23.39% and 19.90%, respectively. The emergy yield ratio index (EYR) for both rose and alstroemeria was 1.01. The emergy investment ratio index (EIR) for rose was 88.49 and for alstroemeria was 95.23. The environmental loading ratio index (ELR) for rose and alstroemeria systems was 21959 and 16694, respectively, indicating that rose puts more pressure on the environment than alstroemeria. The benefit-cost ratio for rose was 4.24 and for alstroemeria was 4.16, with the highest benefit-cost ratio for rose. The productivity was 23.58 and 27.74 cuts per million rials for rose and alstroemeria, respectively, with the highest productivity for alstroemeria.

Keywords: Emergy analysis, Greenhouse, Sustainability, Net income