

## EMERGY SUSTAINABILITY INDEX OF A MILK PRODUCING UNIT

### ÍNDICE DE SUSTENTABILIDADE EMERGÉTICA DE UMA UNIDADE PRODUTORA DE LEITE

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Although small, the impacts caused by agriculture and livestock productive activities change the environment, which in turn reflects the stress conditions it is under. Some authors these environmental changes occur for countless reasons, many so-called natural while others are due to anthropogenic interventions. This study aims to assess milk production sustainability using the emergy analysis of indicators, considering the annual cycles of production to help decision making. A conceptual model of the milk production system using the Emergy flow chart was built at the Livestock and Agricultural Production Unit (UPA) of the Alto da Arauna Farm, located in Guzolândia, SP. After data processing, the emergy calculation table was elaborated. Several emergy sustainability indices were calculated and analyzed (indicators Renewability of Emergy Used Total, Index of Environmental Load Ratio of Investment Ratio Emergia beyond the calculations Transformidades among others) including the Emergy Sustainability Index (ESI). The results showed that the UPA has a high impact per unit of energy source used to produce milk for the general public. The agricultural production systems with ESI value less than one (1) can be considered unsustainable in the long term. The studied UPA has good working conditions and soil conservation, but has a highly disproportionate use of economy inputs in relation to natural resources, which results in low ESI value. The analysis of this ratio indicated low system efficiency. Several management practices and interventions were proposed aiming at improving sustainability indicators of the production system. Furthermore, strategies were formulated for more sustainable management of this UPA, thus reducing the impacts of the production system in use. The adoption of methods similar to organic production, agroecological systems, integration between farming and livestock, and/or adoption of silvopastoral system are recommended to improve the sustainability indicators.

**Table 1.** Emergy Index (ESI) of the annual cycles of dairy cattle of the APU Alto da Araúna, in 2005/2011

Emergy Index	Units	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	Mean
ESI	dimensionless	0.16	0.23	0.15	0.21	0.25	0.24	0.20

Keywords: emergy, environment impact, production system.