



European Network for the durable exploitation of crop protection strategies

IA3 Activity: Human resource exchange

ENDURE - Internal Mobility

Final activity report

(This form has to be completed and sent to the activity leader – the message should be sent to his p.a. elisa.scanzi@ibaf.cnr.it – within 15 days of the end of the visit)

LCA and pesticide impact calculation of tomato greenhouse production

1. Information about researcher and sending partner

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Sending partner: AGROS

Institute/Department/Research Unit: Research Department: *Biodiversity and Environmental Management*; Research Group: *Life Cycle Assessment*

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2. Information about hosting partner

Hosting partner: INRA Sophia-Antipolis

Institute/Department/Research Unit: URIH

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3. Information about the visit

Duration: 1 month

Start date: 16.06.08

End date: 11.07.08

4. Description of the activities and outcomes

Background and context:

The overall subject of the activity RA3 is the multicriterion assessment of crop protection methods and cropping systems. RA3.4 contributes to this goal with LCA calculations estimating the environmental impacts from the whole production stage. One of the activities of RA3.4 (in M19-M30) is the calculation of ecoefficiency (TR3.4c) for tomatoes (and other crops). But there are only few data available for tomato production in greenhouses which could be used in LCA; this complicates the calculation of environmental impacts. Therefore cooperation is needed between a group assessing the inventories of glasshouses UHRI (Unité de Recherches Intégrées en Horticulture at INRA Sophia-Antipolis) and a group with experience in LCA.

Objectives:

1. To calculate the LCA for three different tomato production systems with a focus on pesticide use.
2. To conduct a literature review on pesticide emissions from greenhouses and pesticide concentrations in the working environment of greenhouses.
3. To calculate the ecotoxicity for the production systems due to pesticide use with the methods EDIP, CML, USES if possible.

Activities carried out:

1. The calculation of the LCA for the different tomato production systems was nearly finished during the visit, in cooperation with Caroline Raeppl a master student from ULP Strasbourg. A meeting between both partners will take place in September to present the final results and to plan further cooperation and publishing.
2. To literature review results in using the HAIR indicators for pesticide risk (developed within the EU 6th Framework Programme) to estimate the impact on greenhouse workers. Pesticide emissions from the greenhouse have been calculated using a model developed by Hauschild and adapted to greenhouses by Antón et al. (2004).
3. Finally the ecotoxicity due to pesticide use were calculated using the Methods EDIP, CML and IMPACT and the emissions estimated with the model from Antón et al. (2004).

Anton, A., Castells, F., Montero, J.J., Huijbregts, M. (2004): Comparison of toxicological impacts of the integrated and chemical pest management in Mediterranean greenhouses. Chemosphere, Vol. 54, 1225-1235.

Garreyn, F., Vagenende, B., Steurbaut, W. (2001): HARmonised environmental Indicators for pesticide Risk "Occupational" indicators: Operator, worker and bystander, Report financed by the EU sixth Framework Programme, Contract number SSPE-CT-2003-501997

5. Links between visit activity and ENDURE

For the reasons described above the cooperation with the UHRI was started. On the one hand they have the knowledge about the production in greenhouses and they collected data for the structure of greenhouses and the production of tomatoes. But on the other hand they have to calculate a LCA and are not experienced in this analysis. Therefore the cooperation was advantageous for both sides. The RA3.4 could benefit from the knowledge in greenhouse tomato production of the UHRI group which in turn could profit from the LCA experience of the RA3.4. Finally this exchange provides the RA3.4 with data to calculate the ecoefficiency of different tomato production systems and fulfil the activity TR3.4c.

6. Impact

Added value for the researcher:

- the intensification of the contact to UHRI at INRA Sophia-Antipolis
- the use of a new model to calculate the risk for greenhouse workers and the calculation of pesticide emissions from closed systems and the resulting knowledge about data needed and sources for these data.
- the chance to learn something about workaday life in France
- the possibly resulting publication and finally

Added value for sending partner and hosting partner:

See Chapter 5

Date of submission

31.07.2008



Dr. Maurizio Sattin
IA3 activity leader

Approved