# Mandatory IPM in the European Union: Experimental insights on consumers' reactions

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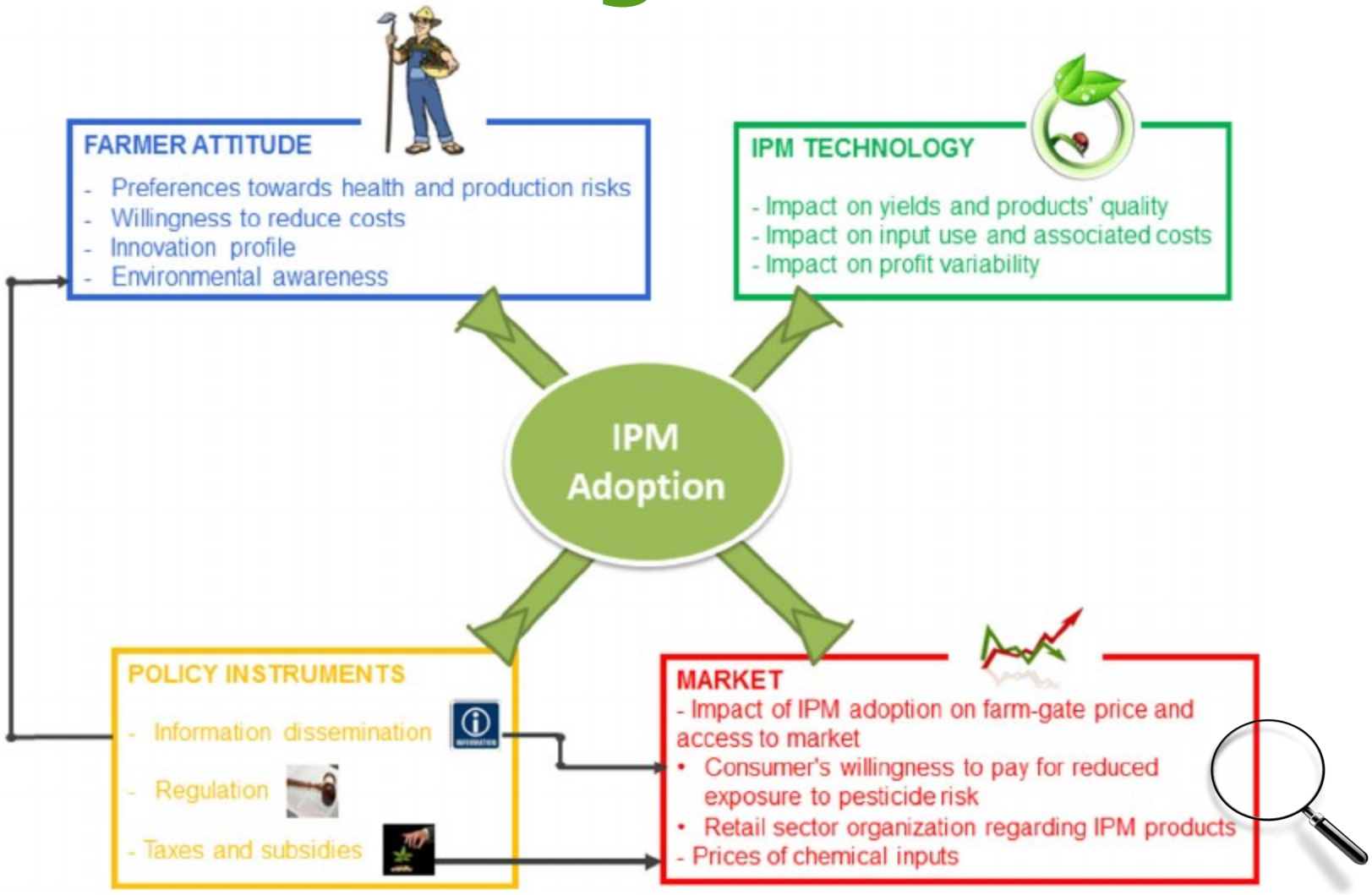
# Background




*Incentives and policies for integrated pest management in Europe: a review,*
M. Lefebvre, S. R. H. Langrell, S. Gomez-y-Paloma,
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# Objectives

“ Let's face it: IPM is new conventional! ” Jens Erik Jensen

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**How IPM tomatoes consumption would be influenced by a reduced availability of conventional products and an increase in the shelf space dedicated to IPM ?**

accounting for the impact of:

- Relative prices on consumers' preferences
- Information provided to consumers on IPM

➡ Contribution to effective marketing and pricing decisions of IPM products in the new legislative environment.

# Approach

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- Rely on experimental data, using incentive compatible methods

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Our approach:

- Rely on experimental data, using incentive compatible methods

- Focus on tomatoes

# Take home messages

- Strong substitution opportunities exist between IPM and organic tomatoes, while substitution with conventional tomatoes is more limited.
- Consumers are interested in information on IPM guidelines and residue levels in IPM tomatoes (more than on conventional and organic farming)
- While information on IPM guidelines increases IPM products purchases, providing extra information on residue levels in IPM tomatoes has no further impact on consumers' choices.
- IPM will win market share with the interdiction of conventional farming only if IPM prices remains sufficiently low compared to organic.

# Procedure


X 10 rounds

Please indicate the quantity of tomatoes you want to buy.
You can only choose one type of tomatoes

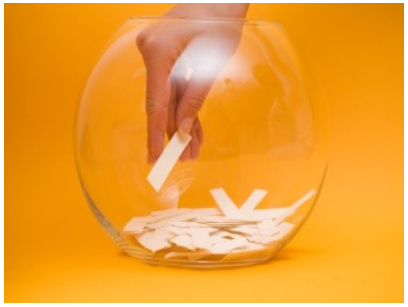
Find out more information on the production (click)

Conventional | IPM | Organic

| Conventional (round) | IPM | Conventional (Vine B) | Organic | Conventional (Vine A) |
|---|---|---|---|---|
| 1.5 €/Kg | 2.2 €/Kg | 2 €/Kg | 2.6 €/Kg | 1.9 €/Kg |
| | 0.5 kg | | | |

Total 1.1 €

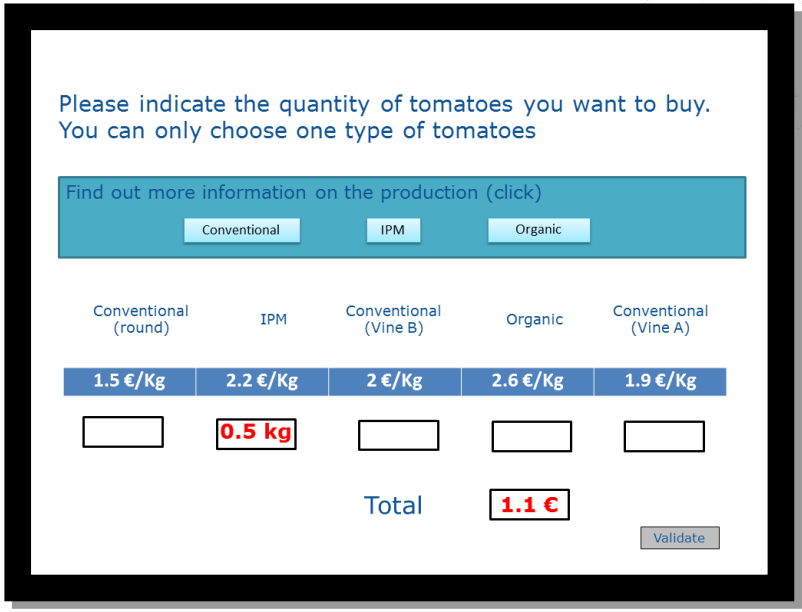
Validate



# Design

## Shelf space dedicated to IPM

- 1/5 (3 types of conventional)
- 1/3 (1 type of conventional)
- 1/2 (no conventional)




## Information

- Technical specifications of the production system

"*... the use of chemical pesticides is not prohibited but limited, thanks to a more efficient and targeted spraying and to the use of other methods ...*"

- Extra-information on the properties of the final product in terms of residuals

"*...Tomatoes produced according to IPM contain less pesticide residues than the maximal limit imposed by regulation, and, in average, 10 times less pesticides residues than what is observed in tomatoes from conventional agriculture...*"


## Relative prices

- Larger/Similar/Smaller price difference between organic and IPM than the prices observed in the supermarket

# Design

**Table 2: Experimental design – description of the 10 rounds**

Control

| Rounds | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Produces available | | | | | | | | | | |
| Conventional (Round) | YES | YES | YES | YES | YES | YES | YES | YES | NO | NO |
| Conventional (Large Tomatoes-On-Vine A) | YES | YES | YES | YES | YES | YES | NO | NO | NO | NO |
| Conventional (Large Tomatoes-On-Vine B) | YES | YES | YES | YES | YES | YES | NO | NO | NO | NO |
| Organic (Large Tomatoes-On-Vine) | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| IPM (Large Tomatoes-On-Vine) | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Available information (see Annex A) | | | | | | | | | | |
| Production system | NO | u.r | u.r | u.r | u.r | u.r | YES | YES | YES | YES |
| Characteristics of the final product | NO | NO | NO | NO | u.r | u.r | YES | YES | YES | YES |
| Prices (see Annex C) | | | | | | | | | | |
| Price list | Ref | Ref | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 |

Note: u.r. = upon-request

# Design

| | |
|---|---|
| **Information disclosed between rounds 6 and 7** | " The European Union has decided that from 2014, all farmers will have to use Integrated Pest Management to protect their crops against pests and diseases. Crop protection strategy as currently used in conventional agriculture will therefore be prohibited from 2014.<br><br>**Since farmers are anticipating this change, we can already observe that the share of conventional tomatoes in total production is diminishing**. There is now only one type of conventional tomatoes available, plus one type of integrated and one type of organic tomatoes. " |
| **Information disclosed between rounds 8 and 9** | " Crop protection strategies used in **conventional** agriculture will be **forbidden** starting from 2014. From now, **only integrated and organic tomatoes are available**. " |

# Sample

189 non-expert food shoppers from Dijon (France) contacted by emails and in markets + screened for eligibility

| | Mean | St Dev |
|---|---|---|
| Female | 68% | 0.47 |
| Age | 39.48 (22-75) | 14.85 |
| Weekly consumption of tomatoes in winter | 0.77 kg | 1.08 |
| Weekly consumption of tomatoes in summer | 2.20 kg | 1.71 |
| Price usually paid for a kg of tomatoes | 1.98 €/kg | 0.74 |
| Share of organic tomatoes in total consumption | 26% | 0.29 |
| Consumers never consuming organic tomatoes | 43% | 0.50 |
| Consumers only consuming organic tomatoes | 4% | 0.19 |

Experimental data …
but real food shoppers, real food products and monetary incentives

# Data analysis

- **Market level**: comparison of market shares of each type of tomato across rounds
  The market share of product *j* in round *t* is defined as the total quantities of product *j* purchased in round *t* by all participants divided by the total quantities of tomatoes bought in round *t* (all types of tomatoes).

- **Individual level:** Multivariate probit model explains individual choices in the different rounds by alternative-specific attributes and consumer-specific variables.

# Results

## Participants were overall interested in buying tomatoes in the lab

- Average consumption/round: 0.70kg (std=0.45)

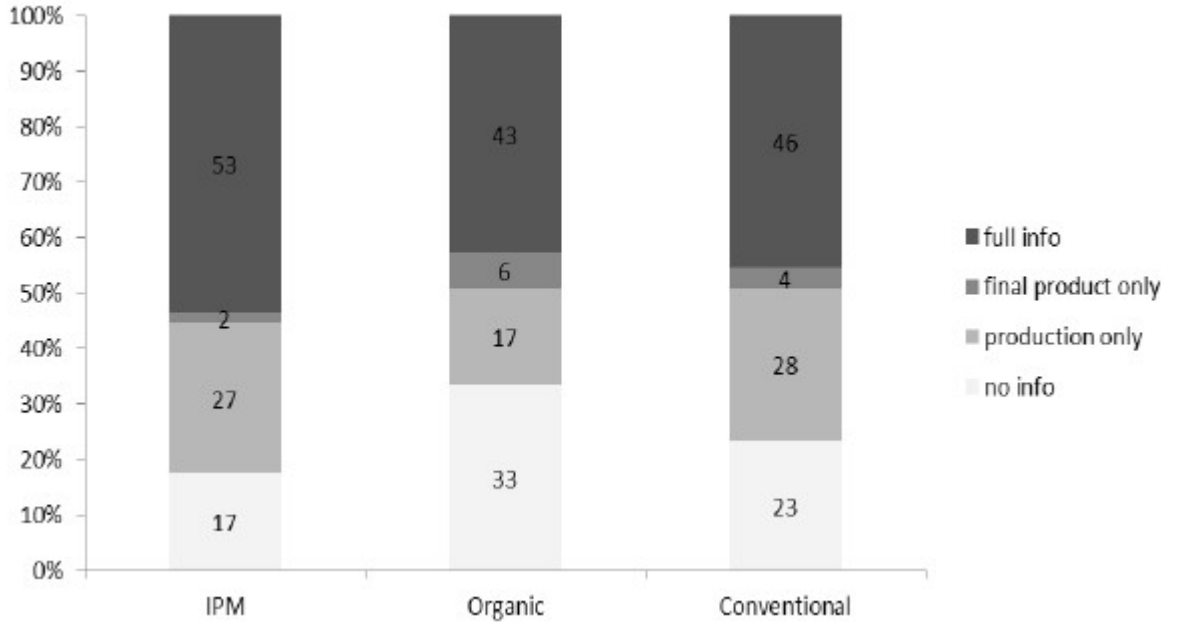
~average weekly consumption of tomatoes in autumn/winter

- Only between 10 and 13 participants per round choose the minimum quantity (0.1Kg).

## Consumption was impacted by design variables

- Quantity not significantly different across rounds. But participants have purchased different type of tomatoes in the different rounds.
- Only 13 participants (6.88%) have made the same choice during the ten rounds (mostly organic)

# Results



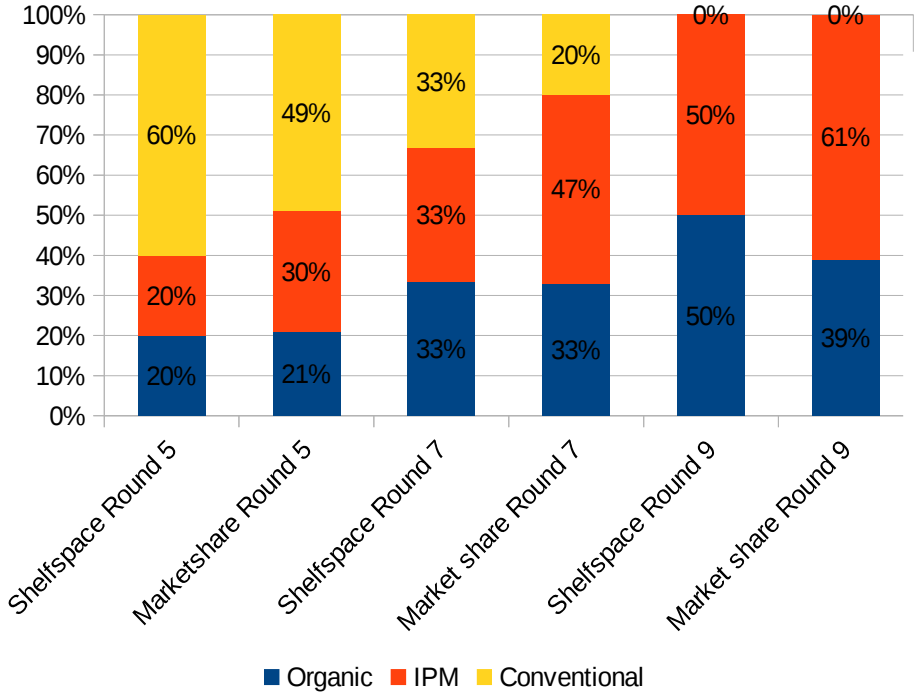

- Participants were clearly more interested in information on IPM than on organic farming.

- Among the participants looking for information, most of them have showed interest in both levels of information (on the production system and the characteristics of the final product in terms of residues).

# Results

IPM will win market share with the interdiction of conventional farming only if IPM prices remains sufficiently low compared to organic

Impact of shelfspace dedicated to IPM
- Large price difference between IPM and organic -

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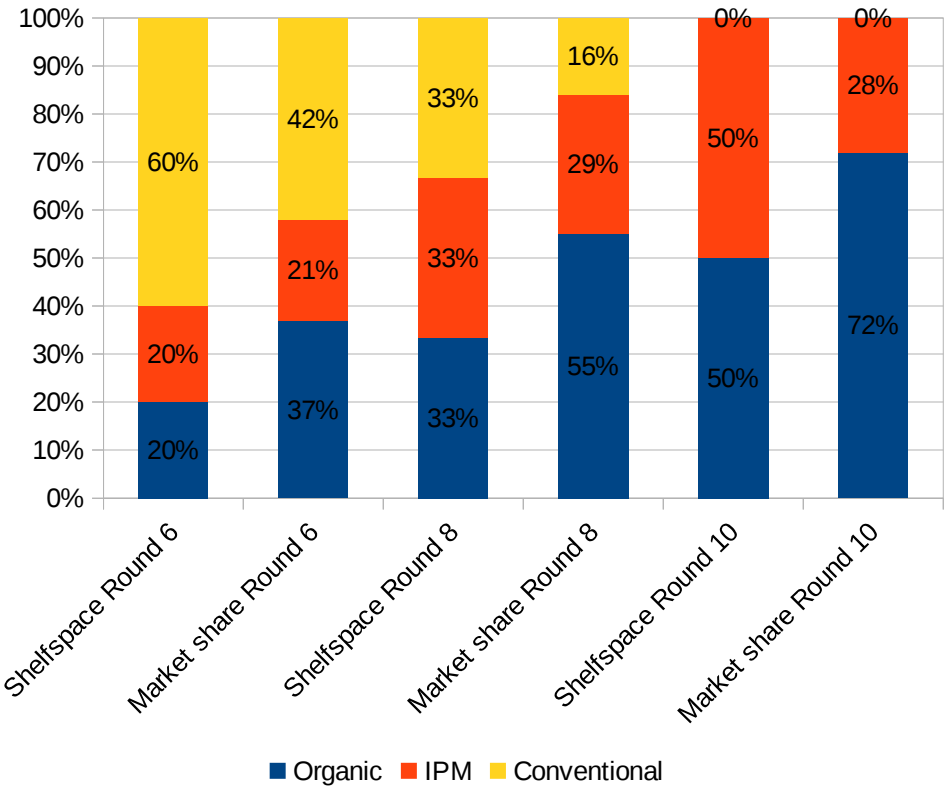

# 3 levers to increase IPM consumption (Results Multinomial Probit Model)

| | Reducing the price of IPM by 10 Euro cents | Increasing by 10 % the shelf space dedicated to IPM | Being informed on IPM guidelines |
|---|---|---|---|
| increases IPM consumption | + 5.2 % pts | + 17 % pts | + 17.5 % pts |
| mostly at the expense of organic consumption | - 4.2 % pts | - 14 % pts | - 14 % pts |
| while conventional tomatoes consumption is less reduced | - 1 % pts | - 3 % pts | - 3.5 % pts |

# Take home messages

- Strong substitution opportunities exist between IPM and organic tomatoes, while substitution with conventional tomatoes is more limited.
- Consumers are interested in information on IPM guidelines and residue levels in IPM tomatoes (more than on conventional and organic farming)
- While information on IPM guidelines increases IPM products purchases, providing extra information on residue levels in IPM tomatoes has no further impact on consumers' choices.
- IPM will win market share with the interdiction of conventional farming only if IPM prices remains sufficiently low compared to organic.

# Thank you for your attention

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- The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.

| | | |
|---|---|---|
| More information on the production system (available only from round 2) | Generic information on production system (displayed for Conventional, IPM and Organic) | Crop protection has a key role in agriculture since it protects crops from weeds, diseases and pest which are major causes of yield losses. Many crop protection methods exist (chemical pesticides, choice of crop varieties, soil management, use of beneficial insects…) and are used according to the crop protection strategy chosen by the farmer. |
| | Conventional | In conventional farming, chemical pesticides are used systematically and routinely for crop protection. It is the kind of crop protection which dominated the 20th century and which accounts for most farming today.<br><br>Tomatoes from conventional farming receive on average 30-35 spraying during the growing season (average for soil-less tomatoes, which represent most of tomatoes production in conventional agriculture) |
| | Organic | The specifications for organic farming totally prohibit the use of chemical pesticides. All organic tomatoes are soil- grown and with no chemical pesticides, contrarily to crop protection strategies used in conventional farming and integrated pest management. |

| | |
|---|---|
| IPM | Integrated Pest Management can be considered as a third-way between conventional and organic crop protection strategies: the use of chemical pesticides is not prohibited but limited, thanks to a more efficient and targeted spraying and to the use of other methods (physical protection, organic protection, cultural practices …).<br><br>Many tomatoes are produced nowadays with integrated pest management but the information is rarely disclosed in supermarkets.<br><br>Spraying of tomatoes is reduced to less than 5 per growing season with integrated pest management. This is less than in conventional farming but more than in organic (average for soil-less tomatoes, which represent a large majority of the tomatoes produced with integrated pest management). |

| | | |
|---|---|---|
| More information on the characteristics of the final product (available from round 5) | Generic information on pesticide residues<br>(displayed for Conventional, IPM and Organic) | Pesticides tend to stay in fruits and vegetables, even after washing or peeling them. In order to protect consumers' health and promote good practices in farming, maximum residue levels have been set legally. It aims at avoiding that consumers eat more than the acceptable daily intake of the active substance. Fruits and vegetables with residue levels beyond this limit cannot be sold. |
| | Conventional | All conventional tomatoes contain less pesticide residues than the maximal limit imposed by regulation. |
| | IPM | Tomatoes produced according to Integrated Pest Management contain less pesticide residues than the maximal limit imposed by regulation, and, in average, 10 times less pesticides residues than what is observed in tomatoes from conventional production system. |
| | Organic | Chemical pesticides not being authorized in organic farming, organic tomatoes can be considered as residue-free compare to conventional and IPM tomatoes.<br>However, some studies have revealed that residues can be found in organic tomatoes, since pesticides can have been used in neighbour fields or in the past in the same field. |