Responsible Application of Plant Protection

Contract Farming of Spinach
Contract Growing of Spinach
- Geographic Position -
Contaminants Control
Cultivation Principles

- vegetables are from contract farming
- prescribes fields, sequence of crops
- provides
  - analyses of the soil status (nutrients)
    - advice for necessary supplements
  - seed materials
  - field inspection
    - advice for necessary treatments
    - suitable measures in case of need
Crop Growing and Requirements

Treatments

- manual weed control
Contaminants Control Treatment Principles

- **PRO**
  - sensory quality
  - reliability of supply
  - control of foreign bodies (insects, weeds)
  - sustainability (following widely agreed principles, see chart 13))

- **CONTRA**
  - image
  - chemical residues
  - sustainability (emotionally)
Contaminants Control
Treatment Principles

- in case of need
  - prescribes chemicals to be applied
    - preferentially **one** active principle per issue
    - quantum satis (often lower than recommendation of supplier)
    - method of use (distance from field ridge, brooks, disposal of residues, ...) concentrations, certification of spraying equipment (drift, uniformity of spray, ...)
  - controls residues
    - by own assessment of the degradation
    - by fixing a waiting period before approval
    - before harvesting for each field
Quality Assurance

- growing → bef. harvest.

Residues control

result not o.k.

Overall Check

result o.k.

- harvest
Contaminants Control
Experience with actual System

■ internally
  • control of pests
    ‣ satisfactory control of pests which are detrimental to the growth/quality
    ‣ not all pests can be controlled
      – occasional problems with insects which may present a foreign body problem (which many consumer don’t accept, claims for reparation, lawyers etc>)
Contaminants Control
Experience with actual System

- internally
  - control of residues
    - in all cases fully compliant with the legal requirements
    - in many cases below detection limit at the time of harvest
  - quality of vegetables
    - in most cases the specified quality is met
    - in few cases the raw vegetables must be destroyed
Contaminants Control
Experience with actual System

- external relations - inquiries, complaints
  - authorities
    - no complaints for elevated residues ever
  - our system provides efficient customer response for
    - status requests in case of public issues
  - our system provides efficient consumer response for
    - occasional inquiries for residue status
    - complaints about insects as foreign bodies (treatment limited to plant protection, not to avoid foreign bodies, this is not accepted by several complainants)
## Spinach - analytical results 2004

<table>
<thead>
<tr>
<th>Compounds</th>
<th>Phenmedipham</th>
<th>Dimethomorph</th>
<th>Pendimethalin</th>
<th>Metalaxyl</th>
<th>Cyhalothrin</th>
<th>Cypermethrin</th>
</tr>
</thead>
<tbody>
<tr>
<td>legal limit mg/kg</td>
<td>0,05</td>
<td>0,1</td>
<td>0,1</td>
<td>0,05</td>
<td>0,5</td>
<td>0,5</td>
</tr>
<tr>
<td>&gt; legal limit</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>not detectable</td>
<td>80%</td>
<td>98%</td>
<td>98%</td>
<td>99%</td>
<td>67%</td>
<td>89%</td>
</tr>
</tbody>
</table>

**multi residues** 7 x 2 compounds 1x 3 compounds

### Pesticides in Spinach finished products

![Phenmedipham](image)

mg/kg

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*Unilever*
Contaminants Control sustainability - first steps

- Unilever sustainability initiative for agriculture (fish-MSC, water)
- guidelines for key crops 1998
- pilot projects since 2000
- first results regarding contaminants control for spinach 2003
Sustainable Agriculture

Sustainable Agriculture Indicators

- Soil loss
- Nutrients
- Pest management
- Biodiversity
- Product value
- Energy
- Water
- Social and human capital
- Local economy
- Soil fertility health
Sustainability Activities in 2002

- GPS mapping of all fields completed
- allows harvesters to find field/check field
- allows for ArcView/GIS use for other purposes (e.g. soil maps, risk assessment, optimised application of agro chemicals)
Sustainable Agriculture

Pest Management

- Pest Monitoring + Strategy
Frequent Finding: Beetle (Ladybeetles), Moth, Larva

7% Others which are not associated with spinach like ladybeetles cannot be combat by pesticides

Agricultural treatments to those are limited

to avoid foreign bodies effective washing is necessary
Pest Management
GIS-Analysis of landscape structure

- 2003 data show significant correlation of caterpillar abundance with percentage area cropped to potatoes
- No effects for other land uses
Alternative Pest Management
summary of results

- Use of Bio-Insecticides
  - Neem not effective
  - Bacillus thuringensis promising
    - dependant on climatic conditions
    - combination of Bt and pheromone trap
      - trap as forecasting tool
        (number of trapped moths -> treatment)
      - Bt treatment is effective only at an early
development stage of caterpillars