Poland and 8 neighbour countries; about 312,000 km$^2$, 38 mln citizens
Purpose of studies

• Huwa San TR 50 as growth stimulator
• Huwa San TR 50 as the plant regeneration product after hailstorm and heavy wind
• Huwa San TR 50 as seed dressing product
• Huwa San as the product for desinfection and water cleaning
• Huwa San as plant protection product
Influence of Huwa San TR 50, applied twice as plant spray, on yields of maize (*Zea mays*) seeds and fresh green mass.
Influence of Huwa-San TR-50, applied twice as plant spray, on the growth of tomato seedlings.
Influence of Huwa San on paprica (*Capsicum annuum*) fruit yield

![Graph showing the influence of Huwa San on paprica yield](image)

- **X-axis**: Concentration of Huwa San in %
- **Y-axis**: Yield of fruits (kg)
- **Legend**:
  - Yellow bars: Total yield
  - Blue bars: I class

- **Comparisons**:
  - Different letters indicate significant differences at 0.01, 0.05, and 0.1 levels.

- **Legend Values**:
  - 0: No Huwa San
  - 0.01
  - 0.05
  - 0.1
  - Watering with HS 0.1

- **Key Observations**:
  - Higher yield with increased concentrations of Huwa San.
  - Significant differences noted at various concentrations.
Influence of Huwa San on the increase of chlorophyll amount in paprica (Capsicum annuum) leaves

Spraying with Huwa San w %

- 0
- 0.01
- 0.05
- 0.1
- Watering with HS 0.1%

Legend:
- Solario
- Bernal
Huwa San as growth stimulator of ornamental plants
Influence of Huwa San TR 50, applied 3 times as plant spray, on the development of budded apple trees

![Graph showing the increase of shoot number and length for different concentrations of HS 0.1%, HS 0.2%, and Asahi 0.06%.](image_url)
Huwa San as seed dressing product
Effectiveness of Huwa San TR 50, applied as bean seed soaking, on healthiness of seedlings

% of diseased seedlings

Conc. HS TR-50

0,05% 0,10% 0,20%
Influence of Huwa San, applied to water contaminated with *Phytophthora plurivora*, on the decrease of the pathogen population density, number of spots/baiting leaves in relation to the product concentration.

![Graph showing the number of necrotic spots/leaf for different products at 2μg/ml, 10μg/ml, and 50μg/ml concentrations.](image-url)

- **Control**
- **Biosept Active**
- **Huwa-San TR-50**
- **Mildex 711.9 WG**
- **Previcur Energy 840 SL**
Huwa San as plant regenerating product

• Orozco-Cardines and Ryan (1999) concluded that, hydrogen peroxide is generated in response to wounding, and can be detected at wound sites within 1 hr after wounding

• The response is systemic and maximizes at about 4-6 hrs in wounded leaves, and then declines
Huwa San as the product for leak (Allium porrum) regeneration 3 weeks after hailstorm
Cabbage (*Brassica oleracea*) damaged by hailstorm and regenerated 1 month later
Regeneration of apple shoot demaged by hailstorm (left) within 2 weeks (right)
Huwa San TR 50 as soil disinfectant
Activity of Huwa San TR 50 in disinfection of peat infested by *Phytophthora cinnamomi*
Activity of Huwa San TR 50 in disinfection of peat infested by *F. oxysporum* f. sp. *dianthi*
Activity of Huwa San in disinfection of soil infested by *Cylindrocladium scoparium*
Huwa San TR 50 as plant protection product
Webber and Sandtner (2007)
The answer of authors for the anecdotal reports
Is the hydrogen peroxide plant stimulator or plant protection product?

In authors opinion
growth stimulus of hydrogen peroxide, applied as watering solutions, may be a result of the decreasing or elimination plant pathogens in the soil, rather than it serving as a direct stimulus to the plant (nasturtium)
Effectiveness of Huwa San TR 50, applied weekly 3 times as plant spray, in the control of heather (*Calluna vulgaris*) grey mould (*Botrytis cinerea*)

<table>
<thead>
<tr>
<th>Stężenie w %</th>
<th>No of shoots/plant</th>
<th>No of diseased shoots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control without folia</td>
<td>d</td>
<td>Shoot no</td>
</tr>
<tr>
<td>Control under folia</td>
<td>ab</td>
<td></td>
</tr>
<tr>
<td>0,05</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>0,1</td>
<td>c</td>
<td></td>
</tr>
<tr>
<td>Teldor 500SC - 0,1</td>
<td>bc</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Shoot no
- No of diseased shoots
Effectiveness of Huwa San TR 50, applied twice as plant spray, on rooting of cuttings in condition stimulation *Botrytis cinerea* development

No of rooting cuttings and with grey mold symptoms

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Sadzonki ukorzenione</th>
<th>Sadzonki z objawami szarej pleśni</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>cd</td>
<td>d</td>
</tr>
<tr>
<td>Control under</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>0.01</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>0.025</td>
<td>c</td>
<td></td>
</tr>
<tr>
<td>0.05</td>
<td>d</td>
<td></td>
</tr>
<tr>
<td>0.1</td>
<td>e</td>
<td></td>
</tr>
<tr>
<td>Teldor 500SC</td>
<td>a-c</td>
<td></td>
</tr>
</tbody>
</table>

Conc in %
Influence of Huwa San TR 50, applied as substratum drench of chrysanthemum cuttings on their rooting in peat infested by *Pythium ultimum*
Huwa San TR 50 controls also grey mould (Botrytis cinerea) of tomato
Huwa San TR 50 controls tomato powdery mildew (*Oidium lycopersici*); leaf area covered by the pathogen
HuaSan TR 50 in the control of *Sclerotium rolfsii* on peperomia (*P. obtusifolia*)

![Graph showing number of diseased cuttings after 2 and 3 weeks for different treatments.](image)

- **Control noninfested**
- **Control infested**
- **HS 0.25%**
- **HS 0.5%**
- **Topsin M500SC 0.1%**

**Legend:**
- □ after 2 weeks
- ■ after 3 weeks

**Graph Key:**
- a, a
- b, ab
- c, b
- d

**Number of diseased cuttings (n=50) after 2 weeks and 3 weeks**
Effectiveness of Huwa San TR 50, applied weekly 4 times as plant spray, in the control of *Xanthomonas campestris* pv. *campestris* on cabbage (*Brassica oleracea*)
Effectiveness of Huwa San TR 50, applied 6 times at weekly intervals as plant spray, in the control of *Pseudomonas lachrymans* on cucumber leaves.
Effectiveness of Huwa San TR 50, applied 6 times at weekly intervals, in the control of cucumber downy mildew (*Pseudoperonospora cubensis*)

![Graph showing effectiveness of treatments](image)

After 2 spraying:
- Control: a
- Huwa-San TR-50: b
- Środek standardowy: b

After 6 spraying:
- Control: a
- Huwa-San TR-50: b
- Środek standardowy: b
Effectiveness of Huwa San TR 50, applied 4 times at weekly intervals, in the control of Alternaria leaf spot of tomato (*Lycopersicon esculentum*)
Effectiveness of Huwa San TR 50, applied 3 times at weekly intervals, in the control of *Sclerotinia sclerotiorum* on bean.
Huwa San TR 50, applied as plant spray, effectively protects infected apple shoots.
Conclusions; Huwa San TR 50, may be used as growth stimulator, seed dressing product, water cleaning compound, and plant protection fungicide during all stages of plant development.