

Need for high and constant quality of pesticides for implementing Good Agriculture Practice

Prof. Dr. Árpád Ambrus

Lajos S. Benke

National Food-chain Safety Office, Hungary

Outline

- Close relationship among: food quality, safety and security - GAP- safe and efficient use of pesticides
- Related provisions of FAO/WHO Code of Conduct on Pesticide Management
- Major parameters affecting constant quality and efficacy of pesticides
- Need for testing quality of pesticides
- Examples for problematic situations: cross contamination, fake products, application problems
- Question: what can be done to improve the current situation?

Food safety and quality

- Both are essential for food security, public health and economic development.
- Improving food safety is necessary to increase food security, which exists when *all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food, which meets their dietary needs and cultural preferences to have an active and healthy life* (World Food Summit Declaration, 1996).

Food safety and quality capacity

- *the ability of individuals, organizations and systems along the farm-to-table continuum to perform appropriate functions effectively, efficiently and sustainably in order to ensure the safety and quality of food for domestic consumption and export.*

Good Agricultural Practice

- (GAP) in the use of pesticides includes the officially recommended or nationally authorized uses of pesticides under actual conditions necessary for effective and reliable pest control. It encompasses a range of levels of pesticide applications up to the highest authorized use, applied in a manner which leaves a residue which is the smallest amount practicable.
- **In an ideal world**, diligent implementation of the provisions of the *International Code of Conduct on Pesticide Management (2014)* would promote safe and efficient use of pesticides according to GAP, and would assure the quality and safety of food.

International Code of Conduct on Pesticide Management, 2014

- The entities which are addressed by this Code include governments, international organizations, pesticide industry, application equipment industry, traders of pesticides, pest control operators (PCOs), food industry and other industries that use or have an interest in pesticides, pesticide users, and public-interest groups such as environmental groups, consumer groups and trade unions.
- „I hope that through effective implementation of this new *International Code of Conduct on Pesticide Management* we can achieve significant reduction of risks to health and the environment from pesticides, while improving the productivity, sustainability and livelihoods of farmers everywhere” José Graziano da Silva FAO DG.

International Code of Conduct on Pesticide Management, 2014

- Article 1 Objectives of the Code
- Article 2 Terms and definitions
- Article 3 Pesticide management
- Article 4 Testing of pesticides
- Article 5 Reducing health and environmental risks
- Article 6 Regulatory and technical requirements
- Article 7 Availability and use
- Article 8 Distribution and trade
- Article 9 Information exchange
- Article 10 Labelling, packaging, storage and disposal
- Article 11 Advertising
- Article 12 Monitoring and Observance of the Code

The standards of conduct set forth in the Code

- assist countries which have not yet established regulatory controls on the quality and suitability of pesticide products needed in that country to promote the judicious and efficient use of such products and address the potential risks associated with their use;
- ensure that pesticides are used effectively and efficiently and in a manner that contributes to the sustainable improvement of agriculture, public and animal health and the environment;
- require that Governments of pesticide exporting countries should, to the extent possible, ensure that good trading practices are followed in the export of pesticides, especially with those countries that have not yet established adequate regulatory schemes;

Pesticide industry and traders should

- supply only pesticides of adequate quality, packaged and labelled as appropriate for each specific market;
- avoid pesticides whose handling and application require the use of personal protective equipment that is uncomfortable, expensive or not readily available especially in the case of small scale users and farm workers in hot climates;
- pay special attention to the choice of pesticide formulations and to presentation, packaging and labelling in order to minimize risks to users, the public and the environment;
- provide, with each package of pesticide, information and instructions in one or more of the official languages of the country and in a form adequate to ensure effective use, and minimize risks to users, the public and the environment;
- be capable of providing effective technical support, backed up by full product stewardship to end user level;

Major parameters affecting constant quality and efficacy of pesticides

- Active ingredient content
- Physical properties of formulation
 - Suspension, emulsion stability
 - Particle size distribution
 - Recrystallization
 - Particle size growth, formation of clusters
 - Volatility
 - Flammability
 - Corrosive action
- Impurities
 - Increased acute toxicity
 - Altered physical properties

Testing of pesticides

- Each country should possess or have access to facilities to verify and exercise control over the quality of pesticides offered for sale or export, to establish the quantity of the active ingredient or ingredients and *the suitability of their formulation*;
- Pesticide industry, including formulators, should:
 - ensure that each pesticide and pesticide product is adequately and effectively tested by recognized procedures and test methods;
 - provide, at the request of a country, methods for the analysis of any active ingredient, co-formulant or relevant impurity or formulation that they manufacture, and provide the necessary analytical standards;
 - provide advice and assistance in the training of technical staff involved in the relevant analytical work;

Real world: current situation

- Pesticides provided through aid programmes are sometimes inefficient due to inferior formulation or lack of active substance (locust control, broken brick as granulated pesticide)
- Uncontrollable illegal import of low quality pesticides;
- Repacking into small bottles;
- Inefficient application methods;
- Quality control of products, if available, is practically limited to testing active ingredient content;
- Inefficient advisory system, unqualified extension service personnel;

Formulated products with toxic impurities

- Occupational exposure (ETU in EBDCs, isomers in OP-s, sulfotep in diazinon and chlorpyrifos)
- Contamination of the environment (HCB in chlorothalonil)
- Disruption of food trade (DDT in dicofol,

Cross-contaminated formulated products

Carbaryl in copper oxychloride

Fipronil in captan: bee poisoning case

- fipronil was found
- in bee carcasses (0.07-0.18 mg/kg)
- in flowers of blossoming trees (0.005-0.36 mg/kg);
- farmers denied the use of fipronil containing PPP, they used mainly captan

Testing of pesticide products used by the farmers

PPP name	Sample	Fipronil impurity % m/m	Captan content % m/m
Póker Extra 80 WDG	160/14	0.003	81.70
	167/1 - 3/14	0.207	81.90
	168/14	0.043	81.90
	169/1-3/14	0.003	82.30

Counterfeit products

Counterfeit pesticides – illegal trade

It is hard to estimate the amount of these products, because the known cases are only the peak of the iceberg. The European Crop Protection Association estimated that 5-7 percent of the annual trade is affected by counterfeiting and illegal trade (360-510 million €/year) in Europe . Based on market evaluations, custom seizures and statistics in some regions 25 percent and even more of the pesticide products marketed is estimated to be counterfeit.

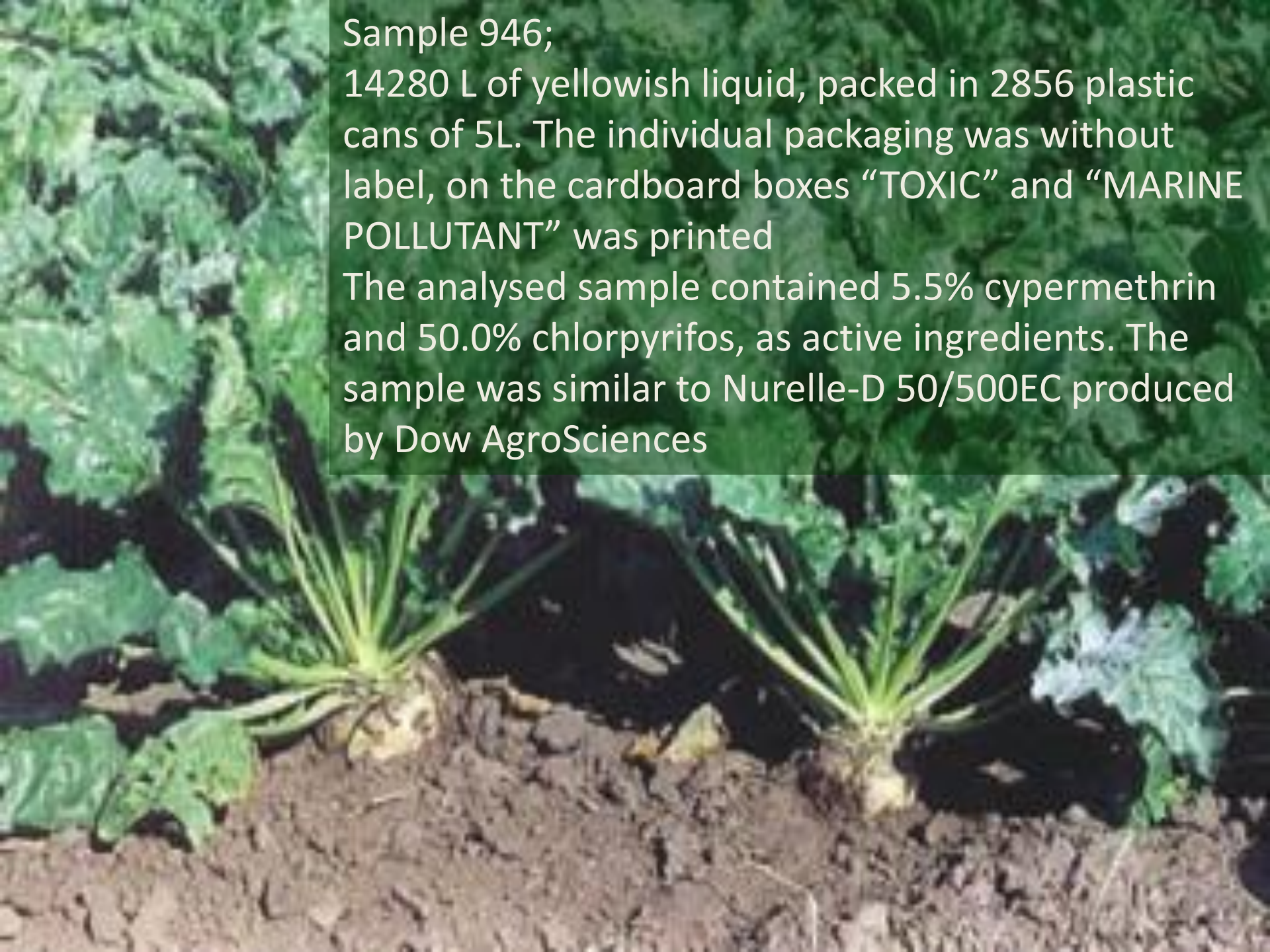
Some examples for the illegal trade: Hungarian experience;

Sample 933;
2000 kg of unknown powder, without label. The analysed sample contained 67.85 % imidacloprid. Such formulation is not registered in Hungary.






Sample 930;
18000 L of violet liquid, without any label, which after the
analysis proved to be 83.8 % acetochlor, similar to Acenit
A 880 EC, Agan

The background of the slide is a photograph of a field. In the foreground, there are two small, spiky green plants growing out of dark brown soil. Behind them, there are rows of larger, green leafy plants, possibly a vegetable field. The text is overlaid on the top right portion of the image.

Sample 946;
14280 L of yellowish liquid, packed in 2856 plastic
cans of 5L. The individual packaging was without
label, on the cardboard boxes “TOXIC” and “MARINE
POLLUTANT” was printed

The analysed sample contained 5.5% cypermethrin
and 50.0% chlorpyrifos, as active ingredients. The
sample was similar to Nurelle-D 50/500EC produced
by Dow AgroSciences



Sample 947;
5004 L of brownish liquid, having no label on individual packaging. On the cardboard box “Clethodim EC 24%” was printed. The laboratory analysis showed that the product contained 24.4% of clethodim and it was similar to the herbicide Select 240EC made by Arista LifeScience.



Sample 996;

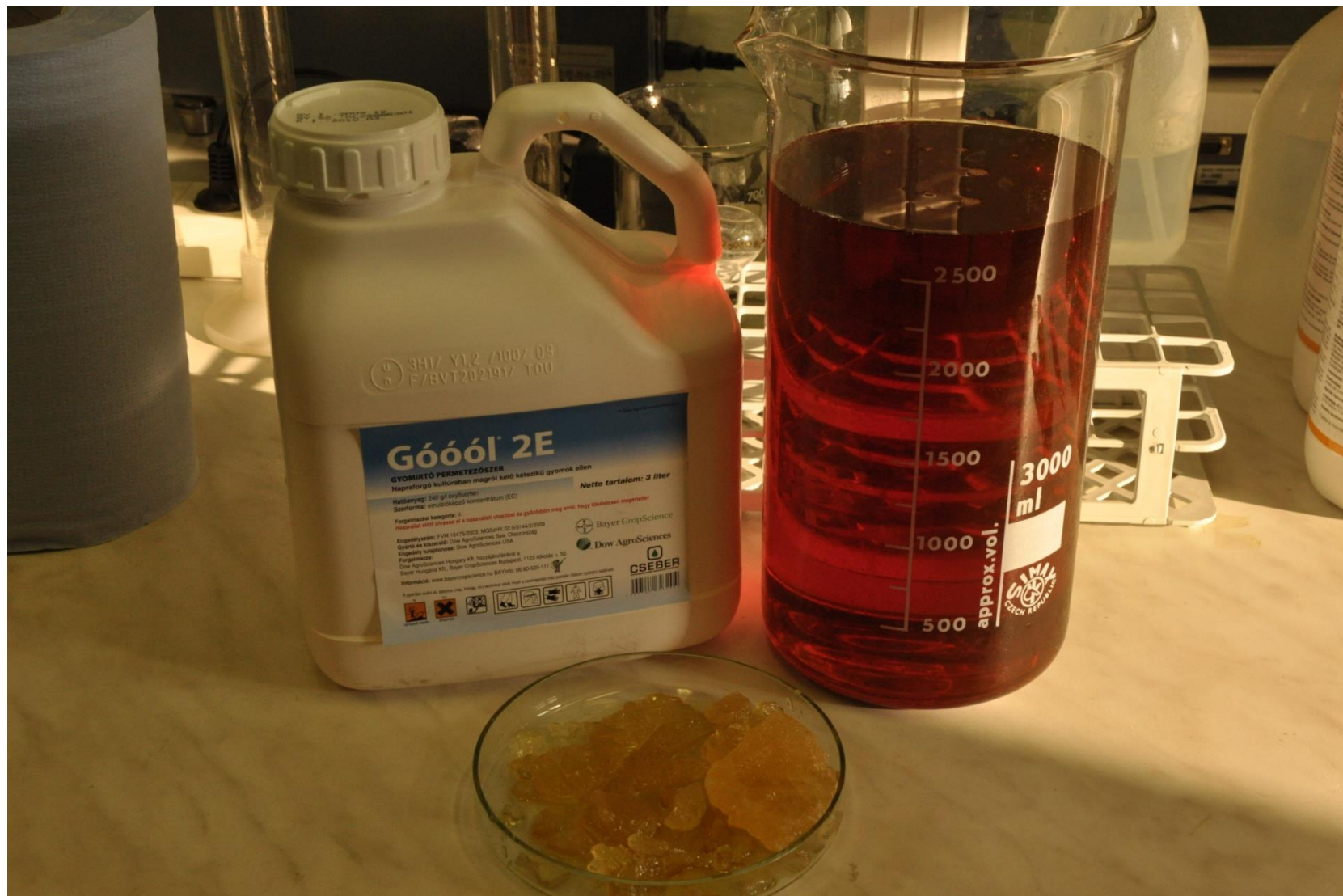
16000 L of unknown liquid, without label, on some cardboard boxes “Flutriafol SC” was printed. The formulation did not contain flutriafol (fungicide) but 51.5 % promethrin which is a herbicide. It was similar to the Gesagard 500 FW, produced by Syngenta.

Just imagine, you are treating your sugar beet against mildew with that fake flutriafol, and destroy all your sugar beet!.



Some other examples

Deltamethrin sample was not an EW formulation. The small package was the genuine product.



Oxyfluorfen sample was not a proper EC formulation: high degree of crystallization occurred, and the a.i. content was below specification.



A sample from a fake product which was claimed to be triasulfuron formulation, but instead of a PPP rape seeds were in the package.



Sample from a low quality Guardian Tetra (acetochlor) fake product: large amount of solid deposit was present, and the active ingredient content was less than the stated value.

Application of the „same“ pesticide from different sources. The farmer shows the point from where the new package did not kill the insects.



„Governments, pesticide industry and the application equipment industry should develop and promote the use of pesticide application methods and equipment that minimize the risks from pesticides to human and animal health and/or the environment and that optimize efficiency and cost effectiveness, and **should conduct periodic practical training in such activities.**”

Examples for inefficient application of pesticides

Incorrect, inefficient and or patchy applications



Major part of spray is lost



Major part of the spray is lost



Only a portion of target object is covered by spray



Good examples are also witnessed



The farm employee demonstrates "how to spray lettuce" to the participants of the workshop.

Good examples: the whole plant is uniformly covered



„Entities addressed by the Code should give high priority to relevant training and capacity building activities related to each Article of the Code.”

Urgent need for practice oriented training of personnel with advisory functions:

- Testing the quality of pesticide formulations including critical physico-chemical properties and impurities;
- Adjusting plant protection technology to requirements of export markets;
- Proper selection and timely application of pesticides;
- Potential consequences of applying cheap pesticides of uncertain origin;
- Maintenance and calibration of sprayers;

Target groups:

- Management and agronomists of private enterprises engaged in export and local supply of fresh fruits and vegetables;
- Leading farmers of local communities;
- Extension service personnel;

Ridiculously wrong training for delivering predefined dosage in supervised field trials.



The operator was instructed to move with continuous speed instead of directing the spray to the plants and fruits and then move to next tree.

The area dose could be correct, but the major part of the spray was lost.

The plants would not be protected and the residues measured would not reflect the level expected if the pesticide was applied correctly.

Closing remarks

- What can be done by industry and donor agencies as well as by local stakeholders to effectively improve the current situation?
- Can our practical experience be utilised to formulate some practically applicable advices?
- Any suggestion, comments?

Thank you for your attention and constructive comments!