Phosphonic Acid

A CASE ON IT's SELF

OPTA Organic Processing and Trade Association Europe

FiBL Switzerland

AntiFraud Initiative

PROGRAM

- 9.00-9.01 **Welcome and introduction**

  - Bavo van den Idsert - OPTA

- 9.01-9.11 **Phosphonic Acid; what are we talking about?**

  - Norbert Fuchsbauer – HiPP

- 9.11-9.21 **PA findings in the organic industry**

  -Bernhard Speiser - FiBL

- 9.21-9.28 **OPTA strategies to solve PA challenge in organic**

  - Bavo van den Idsert - OPTA

- 9.28-9.35 **On the way to a common PA approach?**

  - Jochen Neuendorff – Anti-Fraud-Initiative

- 9.35-9.44 **Discussion with the audience**
- 9.44-9.45 **Closing**

Phosphonic Acid; what are we talking about?

Norbert Fuchsbauer

OPTA Organic Processing and Trade Association Europe

FiBL Switzerland

AntiFraud Initiative

HiPP

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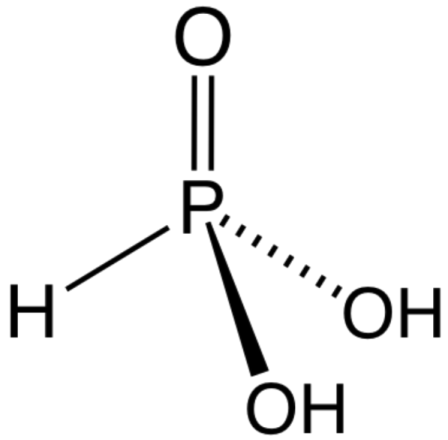
Phosphonic acid, chemically seen

- H_3PO_3
- Inorganic phosphonic acid
- Outdated: phosphorous acid
- Salts: phosphonates



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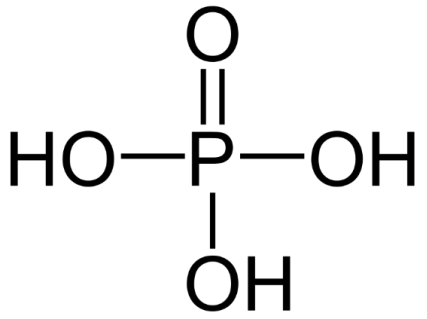
Phosphonic Acid, close relatives, but not relevant in this discussion

- H_3PO_4; phosphoric acid, phosphates



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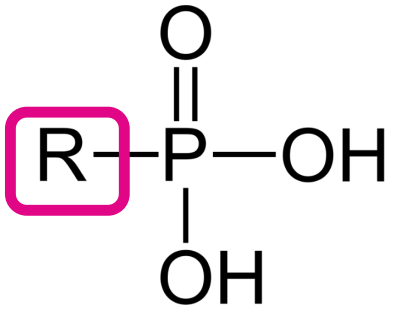
- Organic phosphonic acid (salts are also called phosphonates!)



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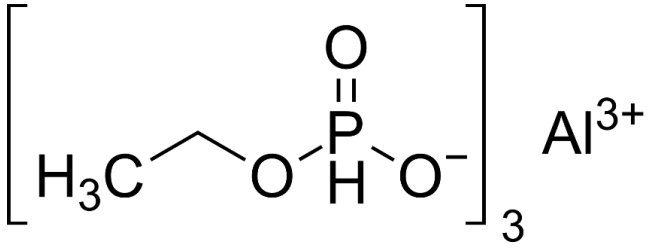
Phosphonic acid, an approved chemical pesticide, and a metabolite of fosetyl-Al at the same time

- Fosetyl-AL



Sourece: Emeldir (talk) - Eigenes Werk, Gemeinfrei, https://commons.wikimedia.org/w/index.php?curid=32042029

- … a commonly used fungizide in non-organic farming
- … that rapidly degrades to phosphonic acid

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From a legal perspective…

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- Neither fosetyl-Al nor phosphonic acid may be used in organic farming
- Phosphonic acid was allowed in certain plant strengthening products in organic farming up to 2013
- Although phosphonic acid is now an authorized pesticide on its own, its legal definition is still in sum with fosetyl-Al
- Therefore, laboratories have to report findings of phosphonic acid as fosetyl-AL, which is leading to misunderstandings

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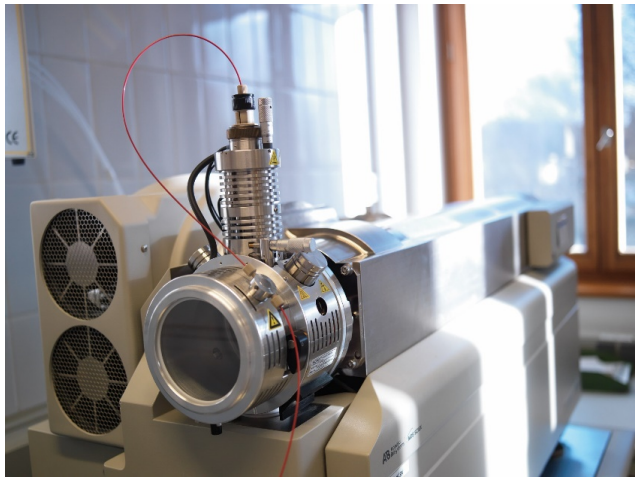
Analytically seen…



- Phosphonic acid and fosetyl can be easily analysed by LC-MS/MS with QuPPe based methods
- Mistakes concerning organic phosphonates or phosphorous acid are unlikely, due to the high specificity of LC-MS/MS methods
- But because fosetyl degrades rapidly, mostly only phosphonic acid is found
- Only, if both substances are found in parallel in the same sample, it is a clear evidence for the use of or contaminaton with fosetyl-Al
- Labs should report findings of fosetyl and phosphonic acid seperately

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Possible sources of phosphonic acid in organic products

- Of course, possible fraudulent use of fosetyl-Al or phosphonic acid cannot be absolutely excluded
- But it is well known that phosphonic acid accumulates in perennial plants (due to former use) and will be detectable even years after the last application
- Furthermore, phosphonic acid can still be found in certain products, marketed as (foliar) fertilizers for organic farming; application of these products will inevitable lead to residues of phosphonic acid
- Concerning other sources like forming by microbes or uptake from soil more research is needed
- With respect to the history of phosphonic acid, the experience of investigations by control bodies and the information available from producers, it seems likely that the overwhelming majority of findings is not due to fraud

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PA findings in the organic industry

Bernhard Speiser

OPTA Organic Processing and Trade Association Europe

FiBL Switzerland

AntiFraud Initiative

Where do the data come from?

- OPTA call to provide data within the phosphonic acid working group
- Data only from few companies, but these provided large data sets (other companies might have different experiences…). Data structure not identical; not all data usable for all analyses.
- Data reflect the companies‘ sampling strategy (e.g. pre-shipment samples, suspicion samples, etc.). In some cases, there may be more than one analysis for the same batch.

- Results demonstrate the burden for the organic sector, but not necessarily the occurrence in organic foods.
- **Total of almost 4000 residue analyses.**

Which crops are affected I

A) Perennial crops

- Pome fruit: apple, pear, quince
- Stone fruit: apricot, peach, plum, cherry, sour cherry
- Various fruit: figs, kiwi, pomegranate, table grapes
- Citrus fruit: orange, mandarin, lemon, lime, grape fruit
- Tropical fruit: banana, mango, papaya, passion fruit, pineapple, dragon fruit
- Berries: strawberries, raspberries, Blackberries, Red currants, blueberries
- Nuts: almond, cashew
- Spices: ginger, curcuma

Which crops are affected II

B) Annual crops

- Grains: maize, rice, buckwheat, amaranth
- Pulses: lentil, chickpea
- Oilseeds: sunflower
- Vegetables: carrot, celery, onion, pepper, pumpkin, potato, tomato

Note: These commodities were present in the data set. Most likely, other commodities are also affected.

How frequent are residues of phosphonic acid I

On average (all crops, N= ~4000)

- Around 50 % of all organic products tested contain phosphonic acid.
- However, there is great variability between companies, ranging from 20 % to 90 %.

How frequent are residues of phosphonic acid II

Perennial crops (N= ~2800)

- Around 67 % of all organic products tested contain phosphonic acid.
- Variability between companies: from 45 % to 90 %.

Annual crops (N= ~1000)

- Around 11 % of all organic products tested contain phosphonic acid.
- Variability between companies: from 5 % to 75 %.

How frequent are residues of phosphonic acid III

Example: apple (N= ~460)

- Around 65 % of all organic products tested contain phosphonic acid.

Example: citrus (N= ~850)

- Around 90 % of all organic products tested contain phosphonic acid.

Levels of phosphonic acid residues

No residues	50 % of the samples
Residues 0 – 0.01 mg/kg	2.5 %
Residues 0.01 – 0.1 mg/kg	28 %
Residues 0.1 – 1 mg/kg	17 %
Residues 1 – 10 mg/kg	2.5 %

Median levels of phosphonic acid in different crops

All crops (N=1250):	Median value = 0.05 mg/kg.
Perennial crops (N=1150):	Median value = 0.05 mg/kg *.
Annual crops (N=110):	Median value = 0.06 mg/kg.
Example: apple (N=240):	Median value = 0.02 mg/kg.
Example: citrus (N=170):	Median value = 0.14 mg/kg.

* Some companies mentioned higher values, but the data were not (yet) provided to FiBL for analysis.

Compliance investigations

	Compliant	non-compliant
All crops	865	1

Comments

The data set contains not a single case where the presence of phosphonic acid alone is connected with a documented non-compliance.

In one case, not only phosphonic acid but also fosetyl was detected. This batch was considered as non-compliant, mainly due to the presence of fosetyl.

There are cases where clients decide not to buy a batch with high levels of phosphonic acid. This is no proof of non-compliance, but may be motivated by doubts about compliance.

Conclusions

- Residues of phosphonic acid occur in a wide range of crops, particularly in perennial crops.
- A high proportion of food samples are affected; on average 50 %.
- On average, residue levels range around 0.05 mg/kg.
- Residues of phosphonic acid are not correlated with documented non-compliances.

OPTA strategies to solve PA challenge in organic

Bavo van den Idsert

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OPTA Aim

EU harmonized approach for Phosphonic Acid (PA) as a single detected substance (without Aluminum Fosetyl) that can be handled in practice and stops the confusion / narrow minded approaches between operators, CB's / CA's and the Commission.

Problem setting

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- Limited dataset of 4.000 analyses on both perennials and annual crops show 50% PA residue findings
- More than 20% OFIS cases are related to PA
- Discussion on the right execution of regulation in case of PA finding
- Certifiers wants risk-based approach to focus their limited resources
- Operators wants a practical and harmonized approach for single PA findings

In the background for alle substances and residue findings:

- Tendency towards an end product approach with a decertification limit
- Operators want to stick to the process-based approach in combination with smart risk based evaluation in case of findings

OPTA

- Our position paper on organic quality and residues defends the process-based and risk-based approach with the rationale that we live in a polluted world and as organic are affected, carry the burden that is caused by chemical farming without the polluter-pays-principles and have to function as safe haven for consumers.

OPTA Strategies

I. The long-term strategy: a road map approach

> The final aim: road map to eliminate or reduce of PA residues in organic production

> Broad coalition to establish the road map

> What can OPTA do to establish this roadmap?

> Who could be allies in this coalition?

> How could it be done and when can it become in practice?

II. Intermediate solution

> A practical approach for coming years as bridging stone to the road map approach

Road map approach

I.a. Clear objectives, milestones and instruments:

1. Reduce and eliminate PA residues in organic production, f.i. 10% reduction annually
2. Distinction between perennial and annual crops
3. Further crop-distinction if necessary based on data
4. Fact based = data based
5. Monitoring system to evaluate the objectives annually
6. Best practice instruments to reduce PA findings in differentiated crops, f.i. list of allowed substances (without PA as ingredient)
7. Guideline for sampling method (differentiated to crops)
8. Scientific research-data of PA-level in different crops in different situations (active use – conversion – organic)
9. Special attention for conversion from conventional to organic

Road map approach

I.b. Broad coalition

The road map approach can only be successful when a broad coalition is willing to cooperate.

For instance:

1. Food & Drink Europe
2. Freshfel
3. Specialized Nutrition Europe (SNE)
4. European Fruit Juice Association (AIJN)
5. Other specialized associations that can provide blue prints on the level of products (nuts, tea, etc)
6. EOCC
7. IFOAM EO
8. Research institutes (also for blue prints on products)

Road map approach

I.c. How to establish?

1. Involve the Commission Organic Unit in 2021
2. Create the coalition in 2021
3. Elaborate the Road map in 2022-2023
4. Present to Commission DG Sante in 2023
5. Start 2024

Intermediate solution

II Proposal for harmonized intermediate practice

1. Operator is responsible to create an internal SOP for single PA findings.
2. Operators take - for their internal SOP- into account existing documents like EOCC, AFI, BNN, Italian authorities, etc.
3. Operator discuss the internal SOP with CB for approval, most preferable on national level.
4. In case of each single PA finding operator applies the internal SOP and clearly document each case.
5. In case of substantiation operator informs CB.
6. CB investigates the substantiated cases and controls (risk-based) operators annually on the application of the internal SOP
7. After implementation of this approach, further steps for international harmonization can be taken.

OPTA conclusions

1. Coexistence chemical and organic agriculture is under pressure.
2. Lowered detection limits in past 20 years increases the pressure.
3. Latest EFSA report shows: still 85% of analysis on organic show no detectable residues.
4. Expectation towards organic are high, and we show good figures, but can't achieve total absence of chemical residues, like PA.
5. Responsibility organic sector together with conventional sector = road map approach.
6. Intermediate bridging stone for PA is needed and requires good cooperation and common understanding from operator, CB/CA's, national member-states and the EU Commission.

On the way to a common PA approach?

Jochen Neuendorff

OPTA Organic Processing and Trade Association Europe

FiBL Switzerland

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Different actors – different perspectives

- PA contaminations are a complex issue
- Different actors in organic production work on it from a different perspective:
  - BioSuisse (12/20) Farmer's association perspective
  - EOCC (9/20) : From an inspection perspective
  - OPTA (draft): From the organic industry perspective
  - AFI (10/20): Focus on fraud

Approaches could be complementary – strong need for information exchange

One approach: The Rescue Network

Different actors – different perspectives

No contradicting elements in the way forward

Comparison of Position (Paper)s on phosphonic acid (PA) in organic products

Reference to … / by versions	EOCC September 2020	BioSuisse December 2020	AFI 15 October 2020	OPTA DRAFT
Issues related to the source of PA: Different levels of details, no contradicting elements between EOCC and BioSuisse				
The three active substances (fosetyl-Al, K-H_2PO_3 and Na_2-HPO_3)		K_2HPO_3 Fosetyl-Al	YES?	YES
Storage of PA in perennial crops due to use in the past		YES	YES	YES
Vegetative plant reproductive material		YES	YES	YES
Fertilizer containing PA (non declared)	YES	YES	YES	YES
PPP containing PA (non declared)	YES	YES	YES	YES
Spray drift	YES	YES		YES
Substances which should not be considered as sources of PA: Contradicting elements between EOCC and BioSuisse & AFI.				
Manure or other livestock excrements	NO (is considered potential source of PA)	YES (specifically referring to poultry droppings)	YES	YES
Compost	NO (is considered potential source of PA)	YES	YES	NO
Irrigation water	NO (is considered potential source of PA)	YES (but is not 100% because further there is guidance on what to do in case of PA due to irrigation water)	YES	?
Phosphonates type O-C-P		NO	YES (referring to cleaning products, chelates, glyphosate, naturally occurring substances)	YES
PO_4		YES	YES	YES

What does „RESCUE“ stand for?

- Platform for information exchange about R&D projects on Residues and Contaminants in organic production
- RESCUE = “**RES**idues and **C**ontaminants: **U**nderstanding and **E**nabling appropriate action”
- Participants: AFI, AOEL, EOCC, FIBL, IFOAM-OE, OPTA, SYNABIO – open for further participation

What is the current knowledge about origins and possible actions?

- PA contaminations must be judged in the context of legal requirements of the "old" and the "new" EU Organic Regulation (perspective: irregularities & fraud)
- Mostly, PA contaminations seem to relate to allowed practices in organic production (heritage despite conversion of 3 years, authorised use of conventional vegetative propagation material)
- Testing of "organic" inputs shows presence of salts of PA without indicatiosn on the labelling. This is a violation of labelling rules for PPP but not for fertilisers. Farmers cannot deduct presence of PA from the fertilisers label.
- A NEW proactive approach by operators and CA/CB is required: Increased sampling frequency of inputs used on farm level + testing for PA
- Compared to perennial crops, the origin of PA in annual crops is less understood