Race to Zero Residues

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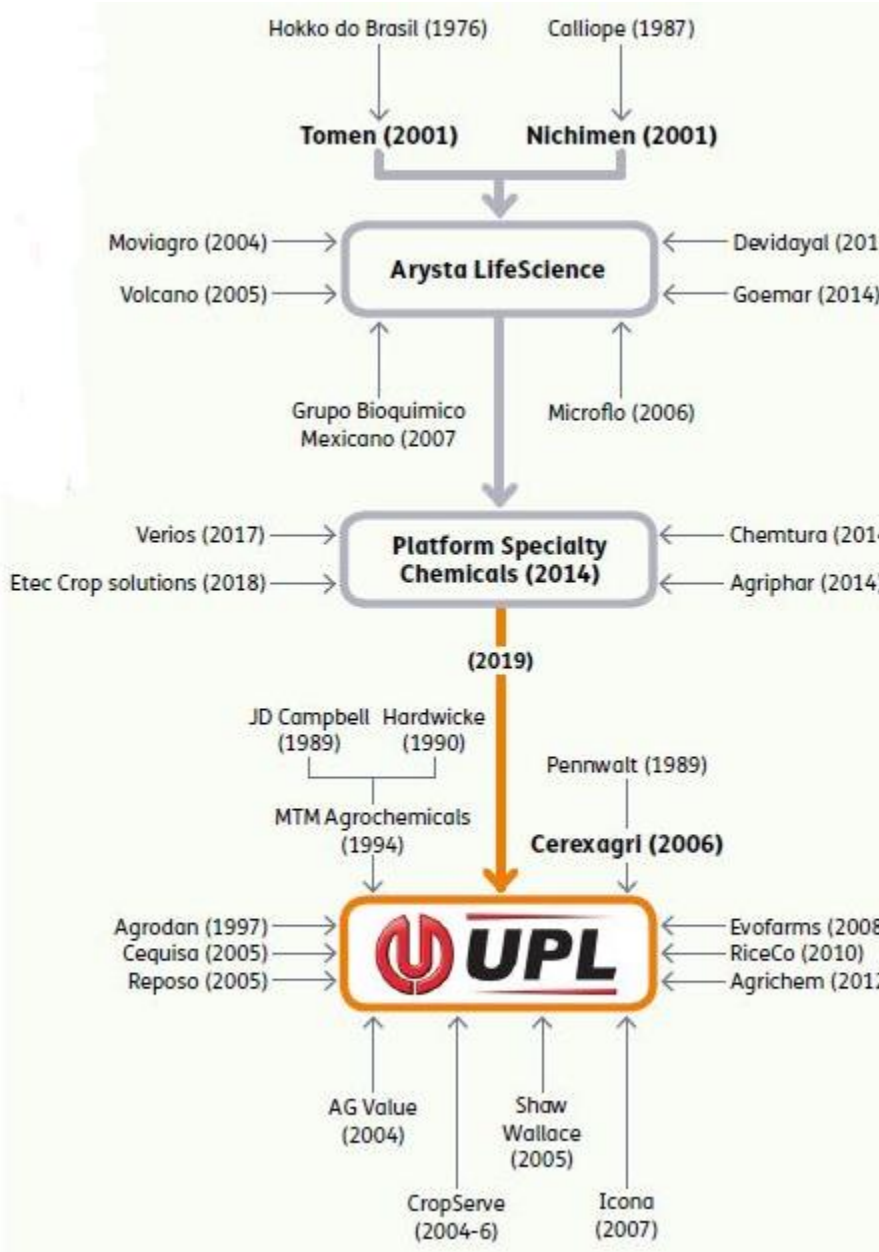
Global Regulatory Asset Manager/Food Trade Enabler
United Phosphorus Limited

Company Background

- In 2018, UPL, a global agrochemicals solutions provider, had announced that it had signed a definitive agreement with Platform Specialty Products Corporation to acquire Arysta LifeScience Inc. and its subsidiaries (collectively “Arysta”).
- The vision for New UPL is that it presents a huge opportunity to transform agriculture, enhance the lives of the farmers and grow the world's food supply sustainably.
- UPL is now 5th largest global company (~7Bn revenues) targeting 10% market share by 2022



- All food consists of chemicals. Chemical hazards are substances with the potential to cause adverse health effects that either occur naturally or are added during food production or handling. Examples include some additives, pesticides and certain metals. Chemical hazards can be present in all food, including organic food.

- When asked about a restricted number of issues in relation to food, citizens perceived the use of pesticides, antibiotics and additives in food production as the issue that worries them the most. A recent study commissioned by the EFSA found that 86 % of respondents were very or fairly worried about the use of such substances in food production.

CONSUMER TRENDS

- Desire to better understand/know maximum information about their food. Perfect traceability + more information from “the field” (Blockchain init. will answer that)

- Move toward organic consumptions (+ now 0 residues initiatives, etc …).

- Put pressure on retailers for better transparency and more responsibility, safety, quality standards, etc ..

THIS LEADS TO CONTINUOUS DVT OF PRIVATE LABELS/CERTIFICATES AND SECONDARY STANDARDS / QUALITY POLICIES OF AGRO- IND … (QUALITY STANDARDS / DIFFERENTIATE / TRANSPARENCY /CAPTURE MORE VALUE)

CAN IMPACT OUR FTO BUT ALSO SOURCE OF OPPORTUNITIES

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

MINISTÈRE
DE L'AGRICULTURE
DE L'AGROALIMENTAIRE
ET DE LA FORÊT

Week for pesticides alternatives

Together let's cultivate the future!

https://www.semaine-sans-pesticides.fr/

Market gardeners and arboriculturists from different regions of France announced the **creation of a new label**:

→Guaranteeing the consumer "**zero pesticide residue**" on their fruits and vegetables

Each product sold under this label "will guarantee to the consumer that it does not present more than **0,01 mg of pesticide per kilo**

7 founding companies

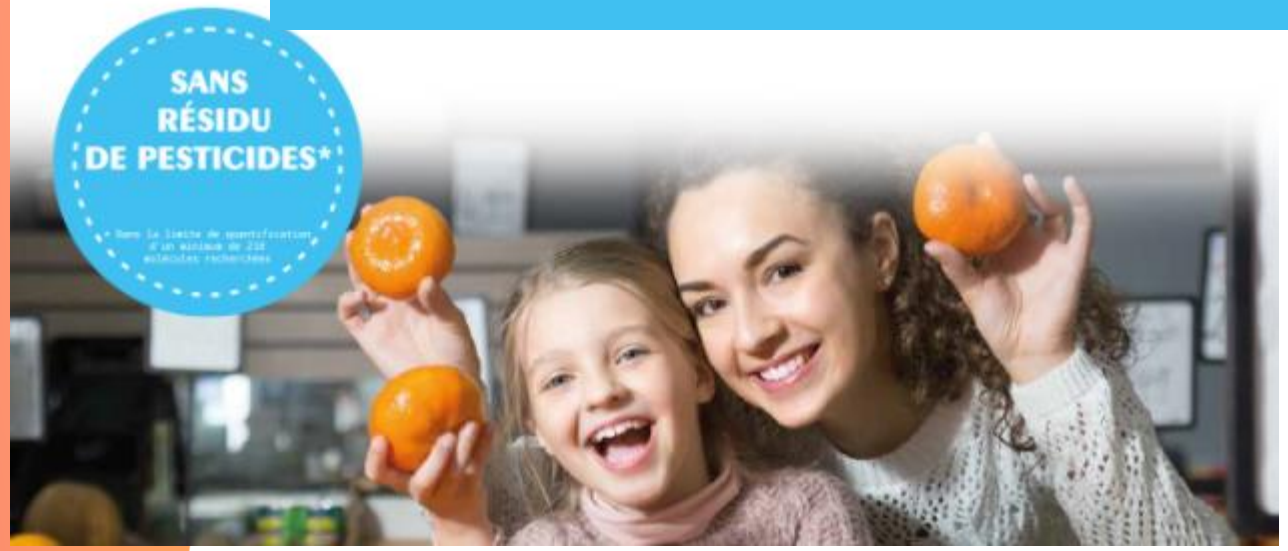
Paysans de Rougeline, Blue Whale, Oceane, Pomme Alliance, Larrère, Fruits et Compagnie et Lindor.

Auchan Retail France launches its range of fruits and vegetables without pesticide residues

LA VIE EN BLEU

Auchan

Find at Auchan fruits and vegetables guaranteed without residues of pesticide mark thanks to a sticker on each product



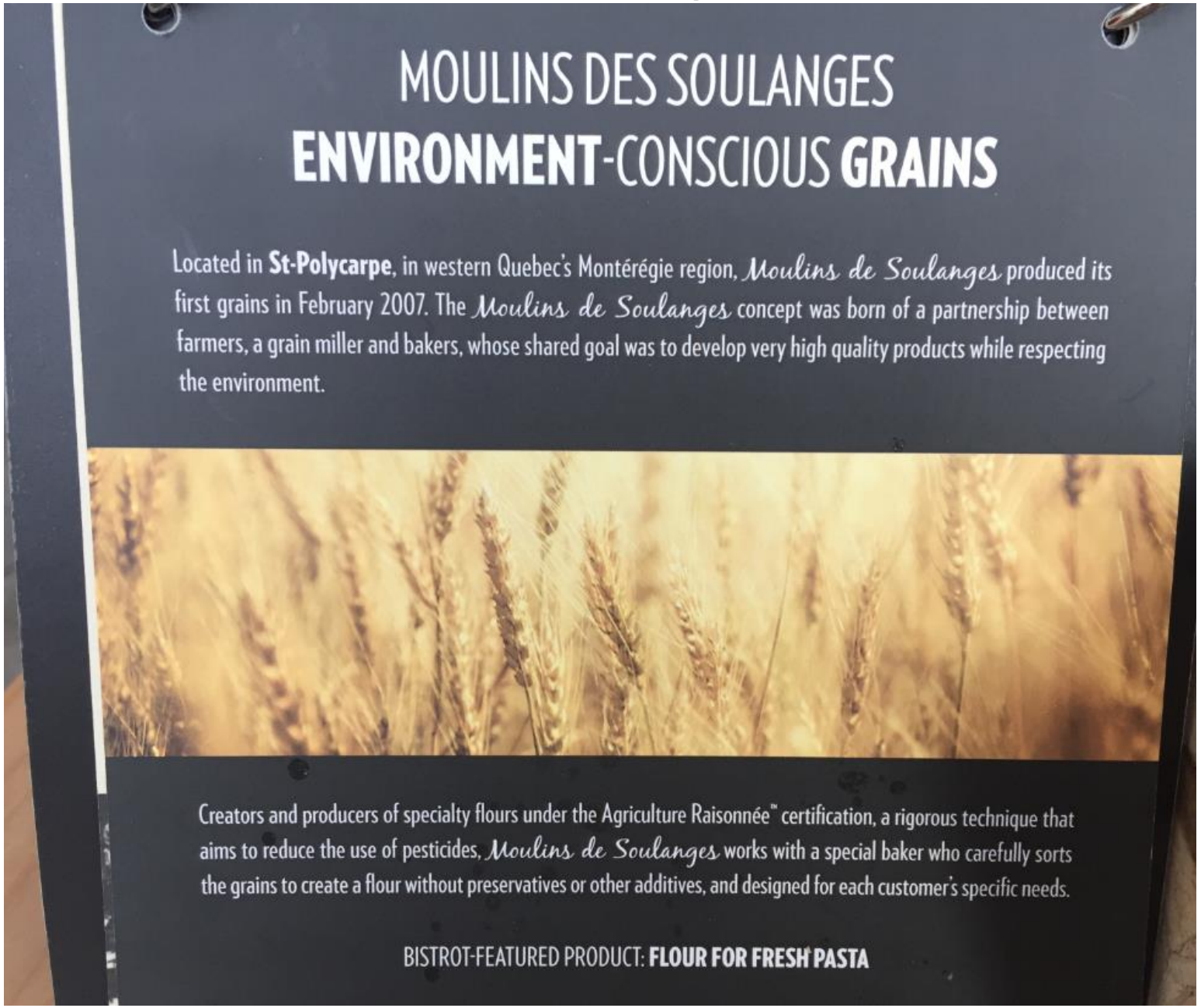
3 varieties of oranges and clementines are already available in store.

Carrefour's Wheat cultvated without insecticides

Carrefour's Crops wihout chemical residues !

Insecticide, Pesticide, Herbicide
Fed up of that « Cide» stuff !!

Canadian Restaurant Marketing



- In the course of the project a **Zero Residues (ZR) methodology** will be developed. This will demonstrate that this new approach to **produce, store, process and market** stone fruit **without residues**

- http://zeroresidues.eu/

Managing residues due to MRL changes within the EU

EFSA Reasoned Opinion may have no trials data or may not accept data.

Codex MRL may be recommended.
MRL may be deleted (default to Limit of Determination).
WTO informed.

Where the MRL is set to the Limit of Determination –

Any continued use will have to ensure no detectable residues.

EU Supermarkets Pesticide Residue Requirements

Supermarkets on mainland Europe specify a range of pesticide residues criteria for the supply of fresh produce.

The maximum percentage of the MRL for every pesticide residue detected.

The maximum sum of all percentages of the MRL for all pesticide residues detected.

The maximum percentage of the Acute Reference Dose (ARfD) for every pesticide.

The maximum number of permitted pesticide residue detections per sample.

Other specific requirements….. Square root of…..

Supermarket Pressure

- “Fruit and Vegetable Quality Management System”
  - Maximum concentration of one-third of applicable EU MRL is applied to each single residue
  - Percentage of each individual residue must not equal more than 80%

Active Substance	Findings (mg/kg)	EU MRL (mg/kg)	% EU MRL reached
Cyprodinil	1.3	15	8.7
Fludioxonil	0.52	40	1.3
Mandipropamid	1.7	25	6.8
Pyrimethanil	0.01	20	0.1
Acetamiprid	0.02	0.8	2.5
Sum of all identified substances			19.4

  - Total sum of active substances found must not exceed five

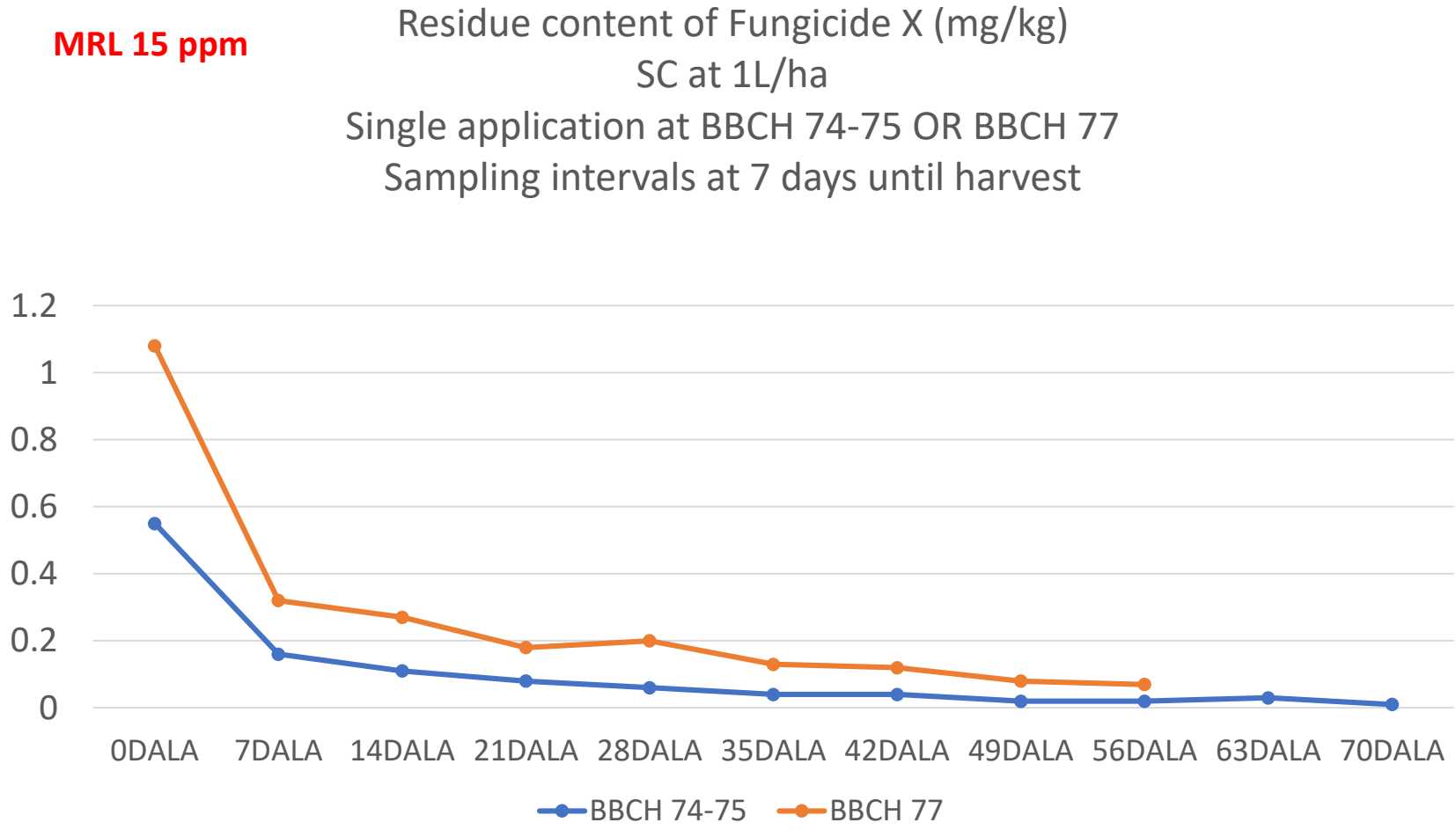
- Consequences: non-conformances- “full investigation”, reanalysis costs, jeopardize Global GAP certification, grower ban!

Isn’t zero residues just easier for all?

- But is it feasibile?

Can residue decline help?

MRL 15 ppm

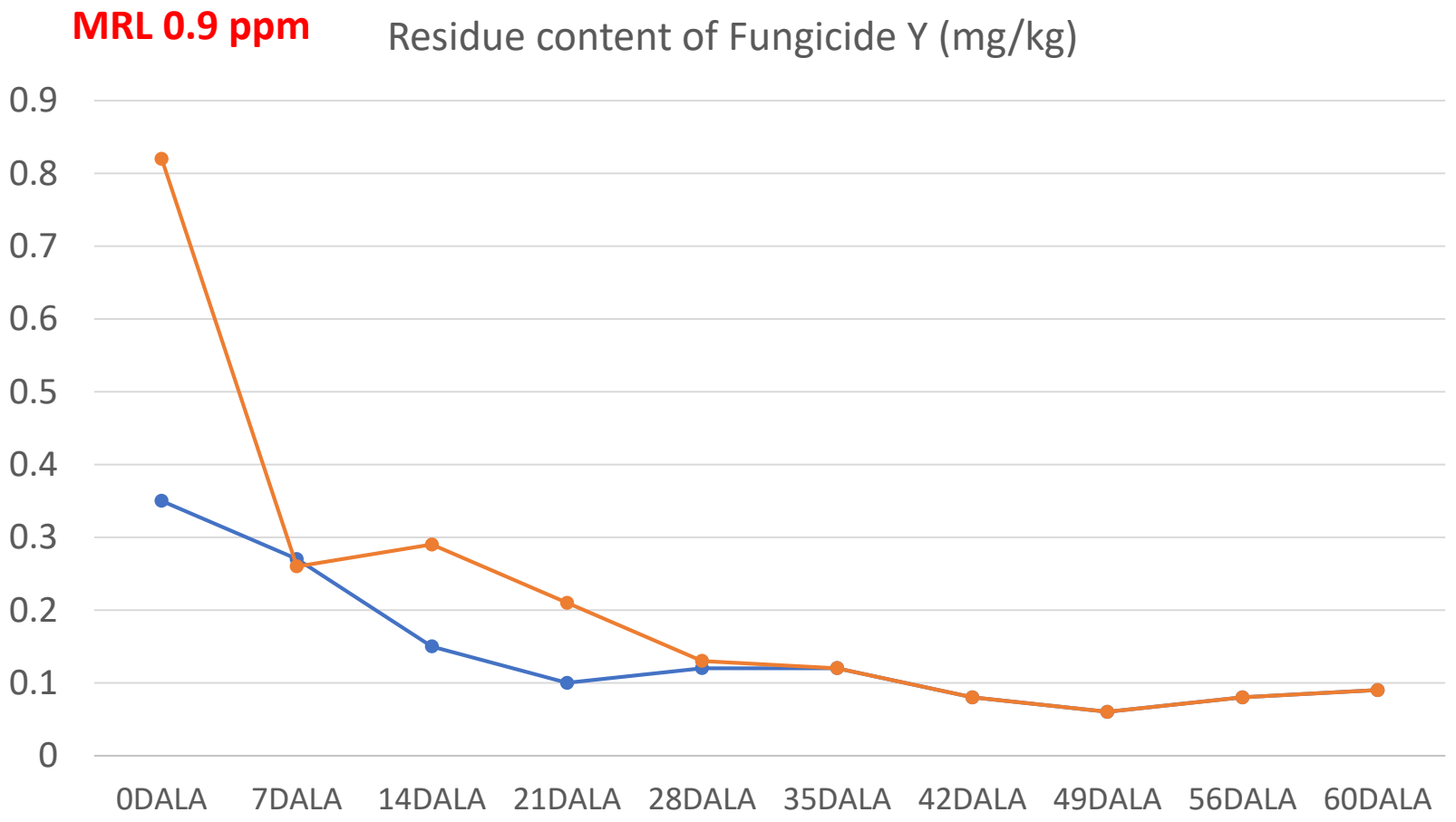


Fungicide X Summary **MRL 15 ppm**

Pesticide	PHI	Residue Value (mg/kg)	Percent of MRL
Fungicide X	0(T)	0.88	**5.87%**
Fungicide X	40	0.26	**1.73%**
Fungicide X	56	0.16	**1.07%**
Fungicide X	0(T)	0.72	**4.80%**
Fungicide X	40	0.14	**0.93%**
Fungicide X	56	0.2	**1.33%**
Fungicide X	0(T)	1.59	**10.60%**
Fungicide X	40	0.56	**3.73%**
Fungicide X	56	0.36	**2.40%**
Fungicide X	90	0.38	**2.53%**

It appears that achieving the secondary standard of 1/3 MRL is possible

Residue Decline across formulations



Low residue fresh produce

➢ **Our goals :**

- Lower the impact of conventional pesticides, especially by using BioSolutions close to harvest
- Maintain proper efficacy level
- Manage resistance
- Enhance yield and crop quality

➢ **Our program :**

pronutiva®
Crop Protection + BioSolutions

CUSTOMER MARKETING

pronutiva®
Crop Protection + BioSolutions

PRONUTIVA'S BOTTOM LINE:
20% ADDED REVENUE AND
25% LOWER RESIDUES

WHAT DOES THIS MEAN TO GROWERS?

ProNutiva customers will earn estimated revenues around 20 percent higher than growers not using ProNutiva. Even more important is that 25 percent lower residues means apple growers who use ProNutiva will be able to produce to the standards of the most demanding food chain companies in Europe.

"Our Apple Excellence Center gives us the opportunity to test our solutions and analyze the differences between different spray programs," said **Adam Slowinski**, the Polish team's Marketing and Development Director. *"With this information, we can build a unique offering for apple growers who want to sell their crop to the most demanding markets in the world. Our target was to guarantee high external and internal fruit quality together with the highest health standards."*

Reducing residues under authorized MRLs and achieving zero residues where possible, is now central to our agribusiness agenda. The results achieved through ProNutiva® integrated crop health solutions allow farmers to meet food chain and consumer expectations and achieve **Responsible Agroperformance®**.

Hasegawa Group, Brazil, the largest producer of vegetables in the country, has implemented the ProNutiva programme as it sought the Global Gap Certification - 'the ISO of agriculture' for physiological and nutritional management.

MORE TESTIMONIALS ON pronutiva® Crop Protection + BioSolutions WITH KEY STAKEHOLDERS IN APPLE

SZYMON MATYSIAK
Crop Manager Fruits & Vegetables Poland

In this program we aimed to replace traditional solutions with products mostly from the group of biological solutions, mainly insecticides, but also one biological fungicide. In six out of eight locations, we managed to reduce the percentage level of residues. In some, we also achieved reduction of the amount of active substances, all the while maintaining a similar or even better effectiveness compared to traditional chemical protection, which is extremely important for us.

HENRYK GRZYWACZ
Fruit grower, Pataki

After the first season of applying biological products, I am positively surprised with their effectiveness.

JANUSZ ROSIAK
Fruit grower, Stara Rossocha

The results from this first season are very encouraging. We can easily follow this program, which will be the standard for whole agriculture in the future for us.

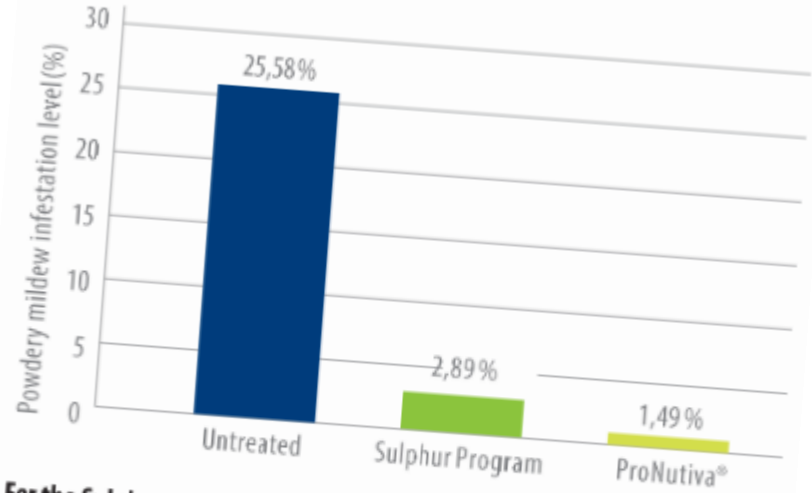
JANUSZ KUBIAK
President, IDEALSAD Group of Producers

The problem of the residues comes up more and more often in discussions.
Each time we replace a chemical product with one that does not leave any residues, it is worth highlighting. I think any company which recommends something like that can be proud of its job. The influence of biostimulants on the quality, size and coloration was really spectacular.

ADAM PAJEWSKI
Agronomist, Rajpol Fruit Producer Group

I think that the program is good. Honestly speaking, I even smiled to myself when I saw the research results and the products offered, because I already introduced exactly the same products to my plant protection program a few years ago.

INFESTATION LEVEL OF POWDERY MILDEW ON GRAPE BUNCHES* (%)



For the Sulphur program, grapes were sprayed (9-10 times) with 4 l/ha of Tiogel 80 WG (sulphur).

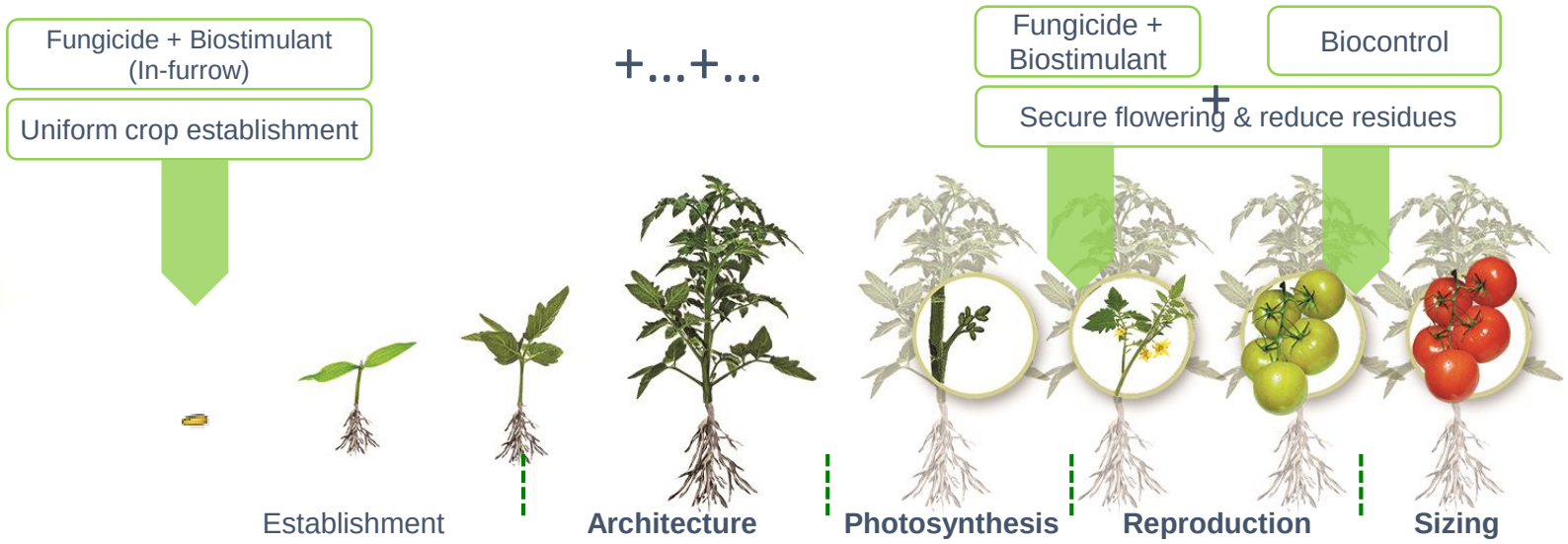
For the ProNutiva® program, grapes were sprayed (3 times) with 1.3 l/ha our Fungicide Spirox at the beginning of the cultural season (flowering stage) and then with 2 l/ha of Vacciplant (6-7 times) until the end of cultural season.

** variety Moscato bianco in Italian in vineyard (Piemonte) in 2016 and 2017.*

FOCUS ON **INTEGRATED CROP SOLUTIONS**

ProNutiva® is an exclusive program that integrates BioSolutions and conventional chemistry to deliver crop solutions that meet the evolving demands of the entire food chain.

Interactions between BioSolutions and conventional crop protection products are real and go beyond current benefits expected by most growers.



ProNutiva® program, always supported by a robust set of crop performance data, opens a new dimension to crop production with innovative solutions to:

- enhance overall crop protection
- target higher yields and better quality, resulting in enhanced farm economics
- manage resistance and residues

Thanks for your attention

Questions?