



Use of L-ascorbic acid as a mean to prevent in-vial degradation of LC-amenable pesticides

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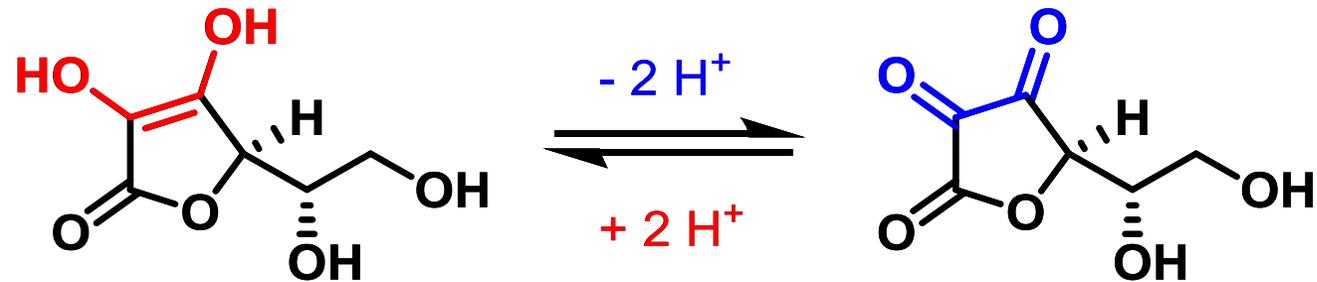
European Union Reference Laboratory for Pesticide Residues
Fruits and Vegetables

www.eurl-pesticides.eu

**Use of L-ascorbic acid as a mean to prevent
in-vial degradation of LC-amenable
pesticides**

Properties

- Readily undergoes oxidation → antioxidant properties



- Solubility up to 30 % (w/V) in water
- Can be employed as analyte protectant for LC analyses



No L-ascorbic acid: 0.2 mL of the 0.050 ppm pesticide mixture, and 0.8 mL of water



12 ppm L-ascorbic acid: 0.2 mL of the 0.050 ppm pesticide mixture, 0.796 mL of water, and 0.004 mL of the 3 % (w/V) L-ascorbic acid solution



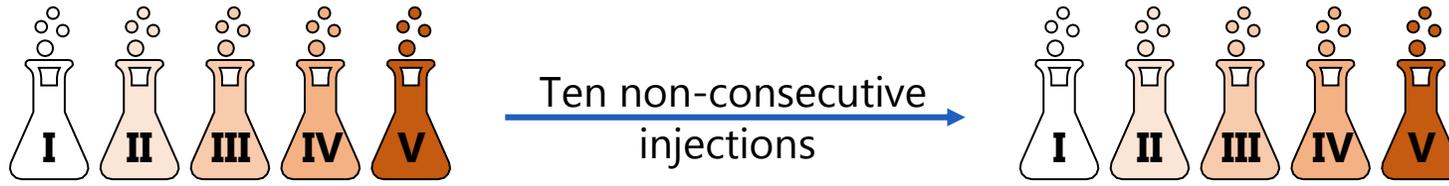
60 ppm L-ascorbic acid: 0.2 mL of the 0.050 ppm pesticide mixture, 0.78 mL of water, and 0.02 mL of the 3 % (w/V) L-ascorbic acid solution



300 ppm L-ascorbic acid: 0.2 mL of the 0.050 ppm pesticide mixture, 0.7 mL of water, and 0.1 mL of the 3 % (w/V) L-ascorbic acid solution

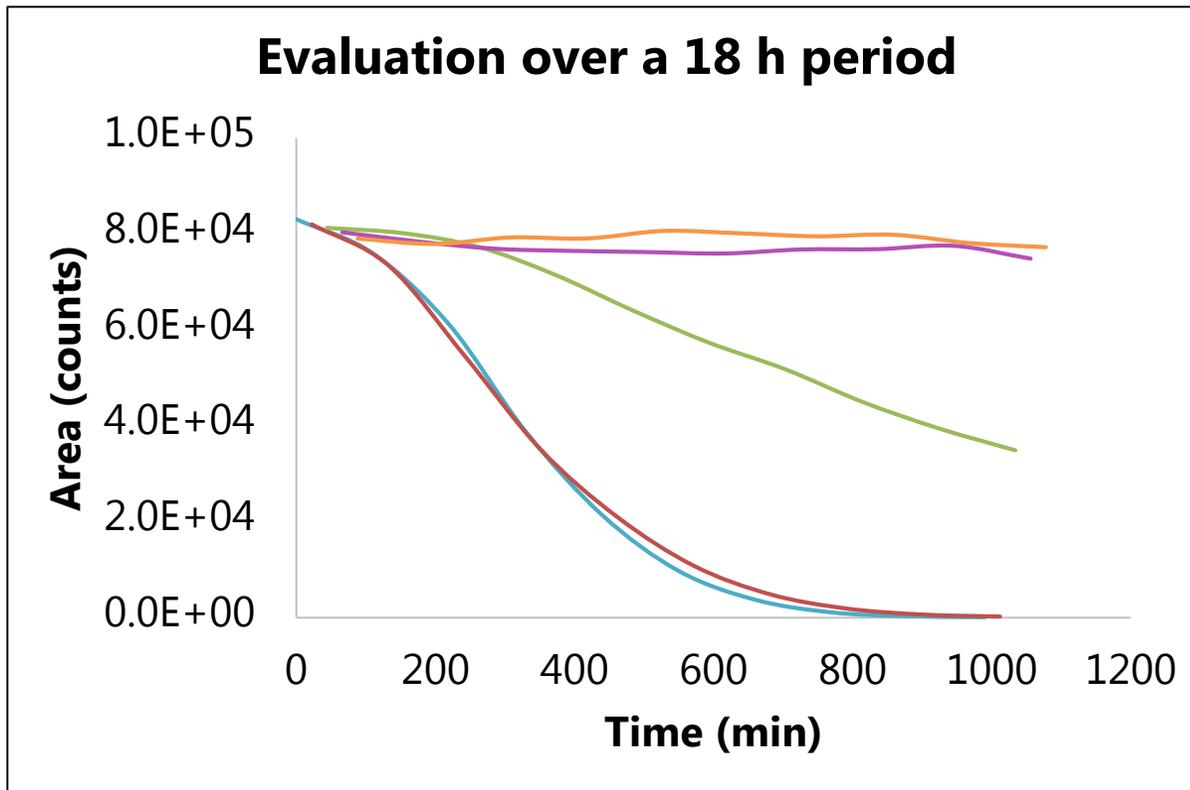


600 ppm L-ascorbic acid: 0.2 mL of the 0.050 ppm pesticide mixture, 0.6 mL of water, and 0.2 mL of the 3 % (w/V) L-ascorbic acid solution



VIAL COMPOSITION

Acetonitrile:Water (20:80, V/V)



L-ascorbic acid in-vial concentration

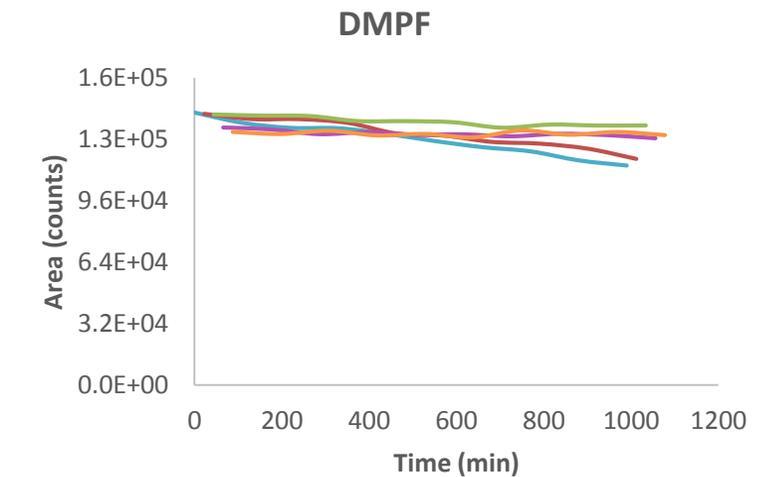
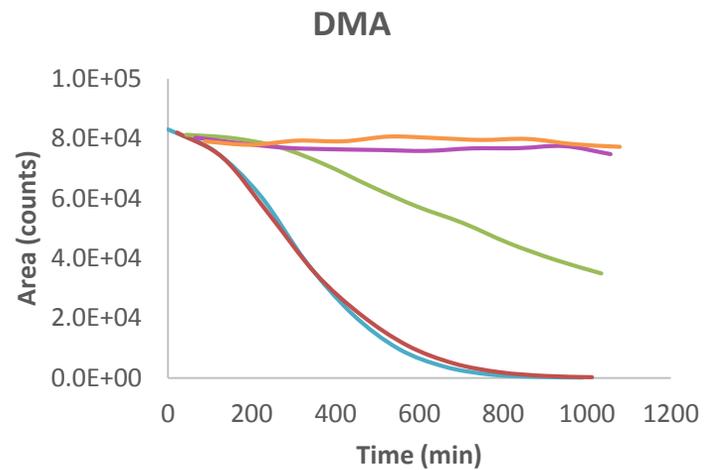
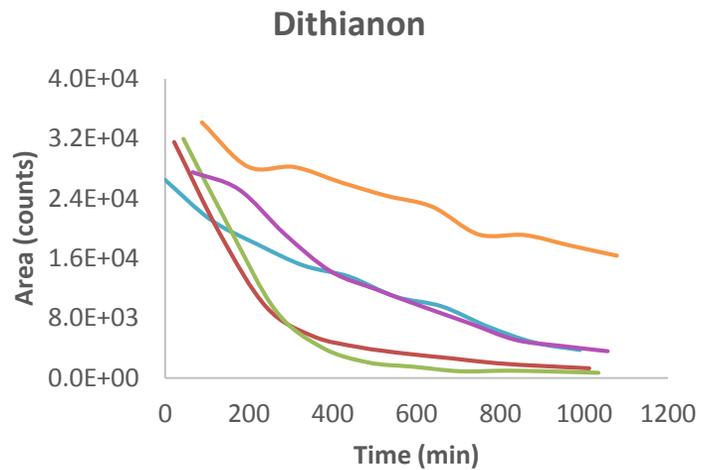
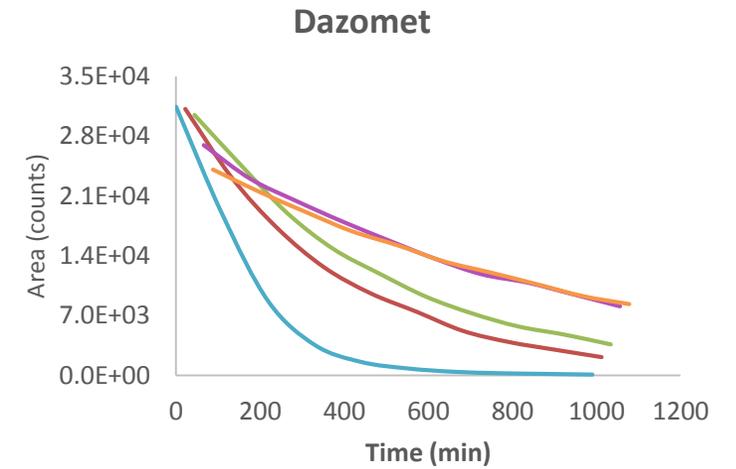
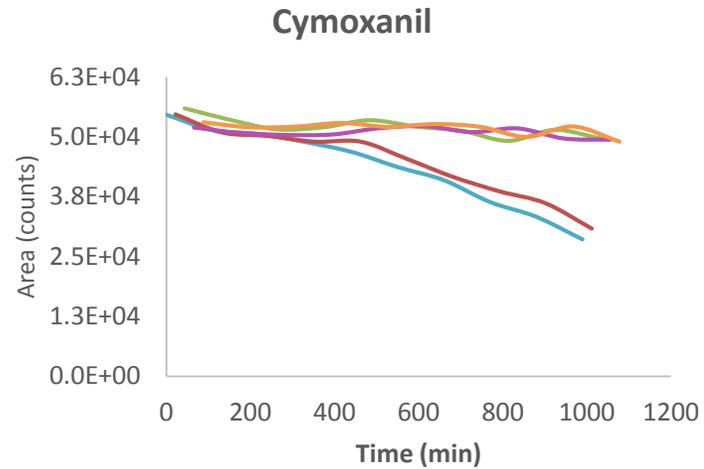
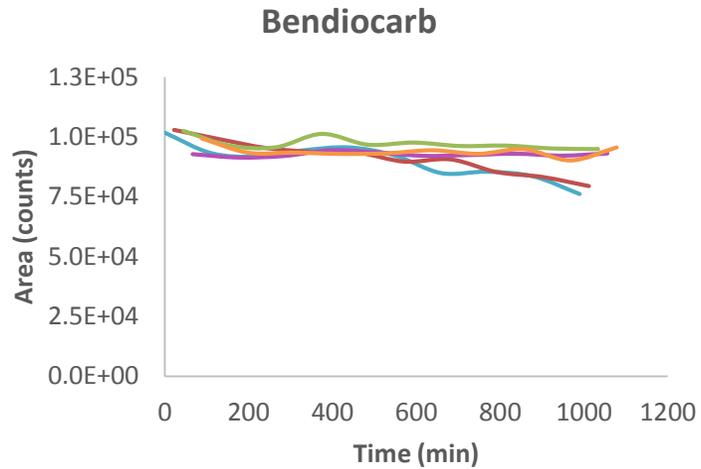
- 0 ppm
- 12 ppm
- 60 ppm
- 300 ppm
- 600 ppm

**278 LC-amenable
compounds
evaluated**

**Non-thermostatted
autosampler**

(20 °C ≤ T ≤ 30 °C)

COMPOUNDS POSITIVELY AFFECTED (PRESERVATION)



0 ppm

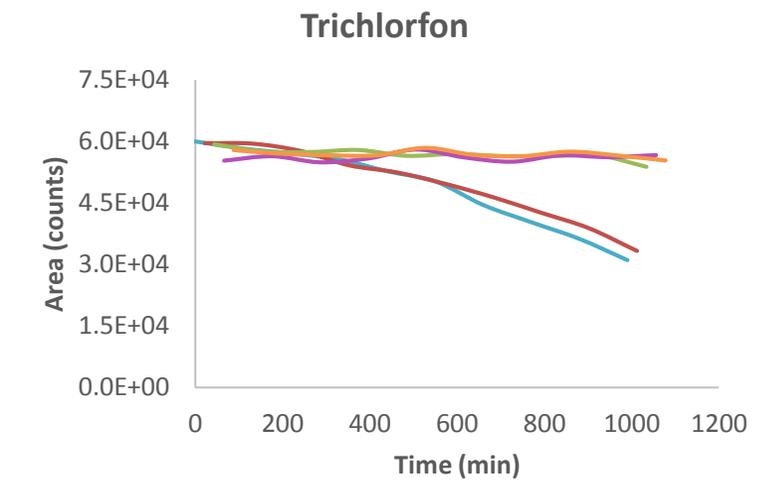
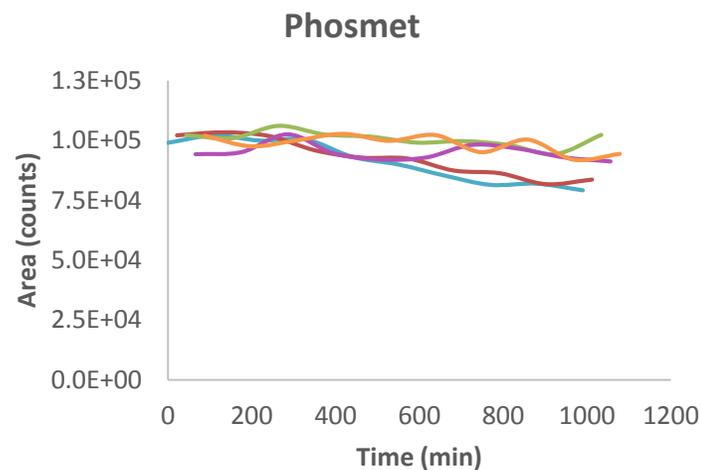
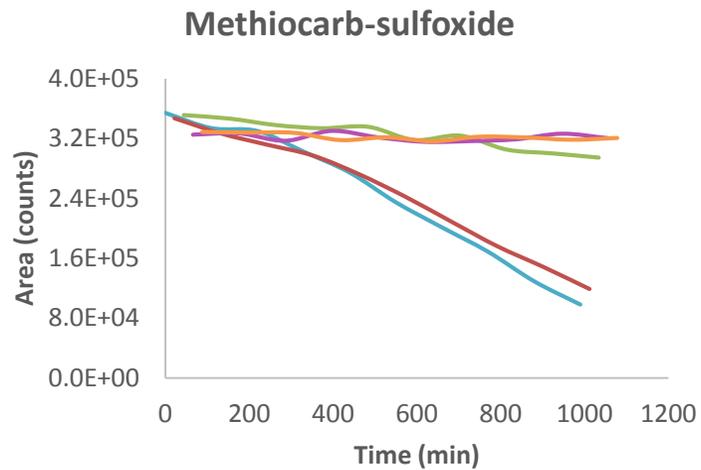
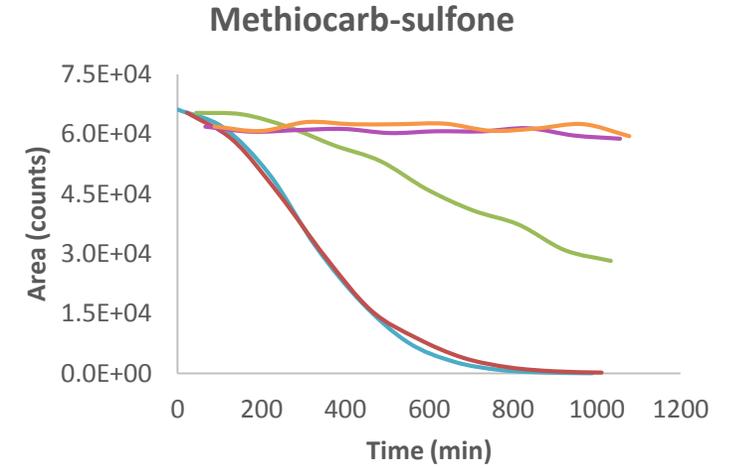
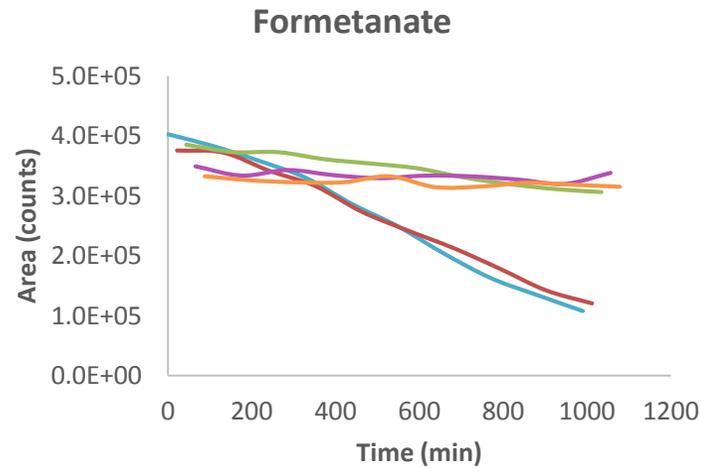
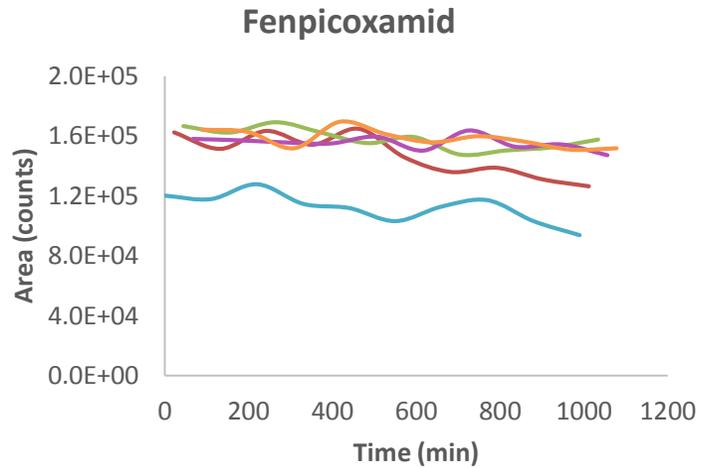
12 ppm

60 ppm

300 ppm

600 ppm

COMPOUNDS POSITIVELY AFFECTED (PRESERVATION)



0 ppm

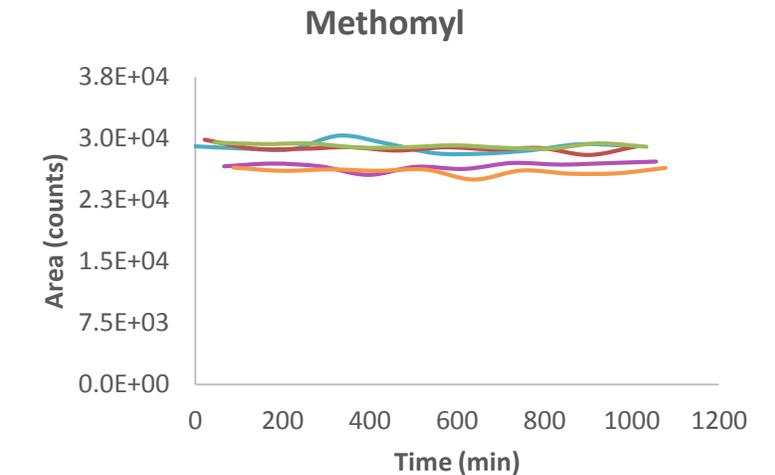
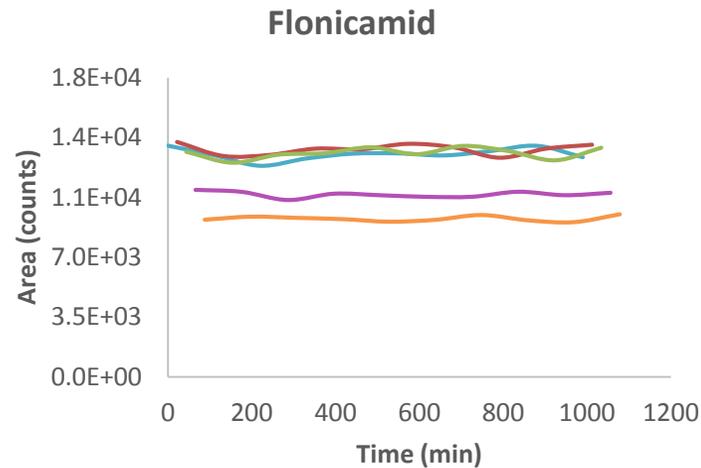
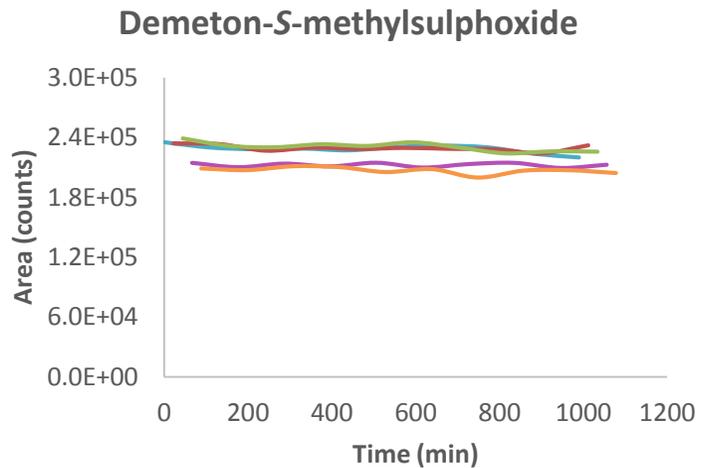
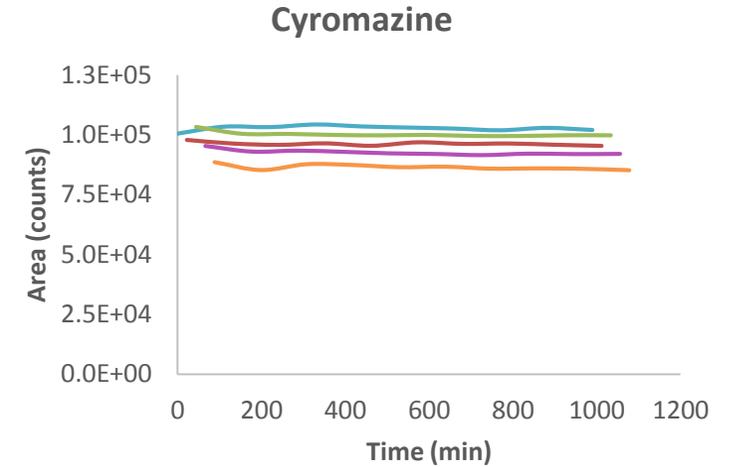
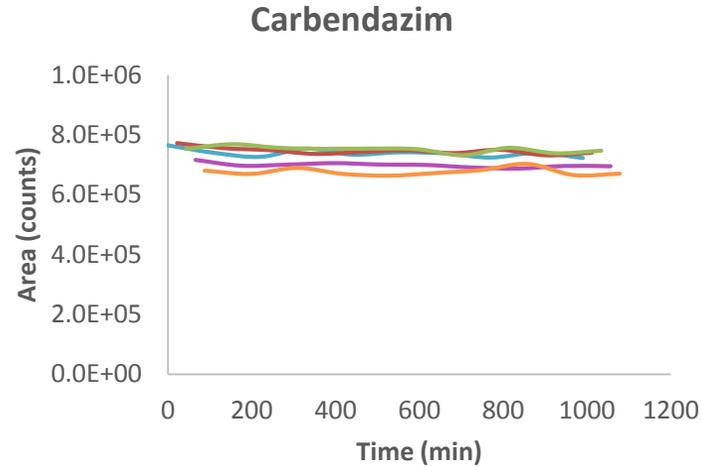
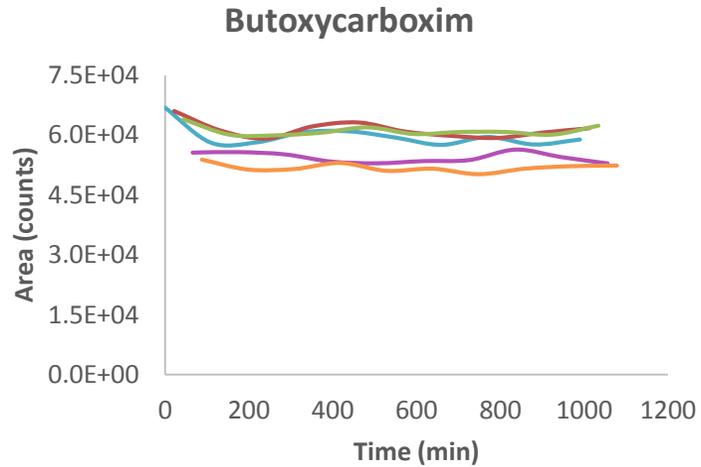
12 ppm

60 ppm

300 ppm

600 ppm

COMPOUNDS NEGATIVELY AFFECTED (SUPPRESSION)



0 ppm

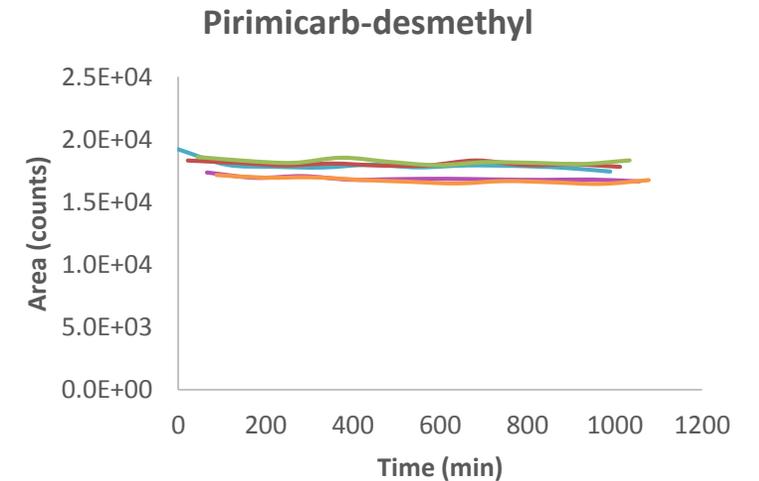
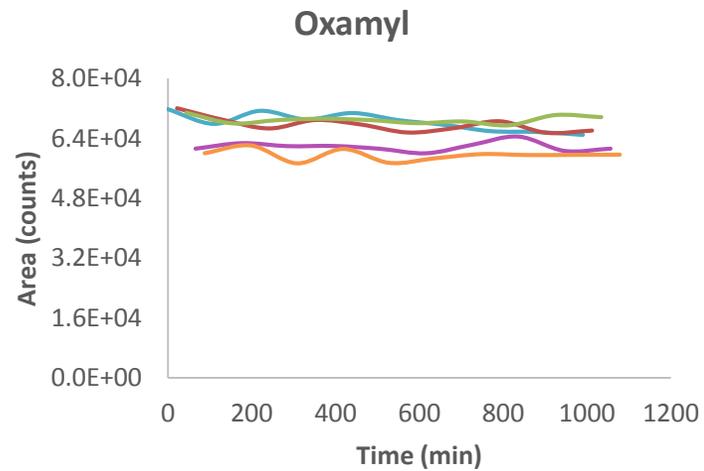
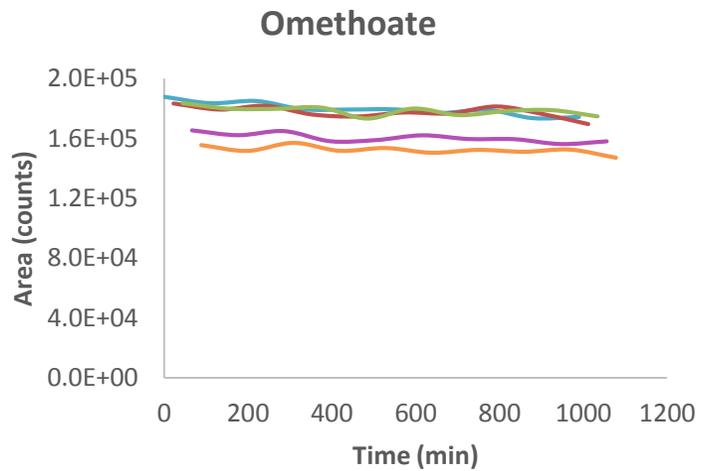
12 ppm

60 ppm

300 ppm

600 ppm

COMPOUNDS NEGATIVELY AFFECTED (SUPPRESSION)



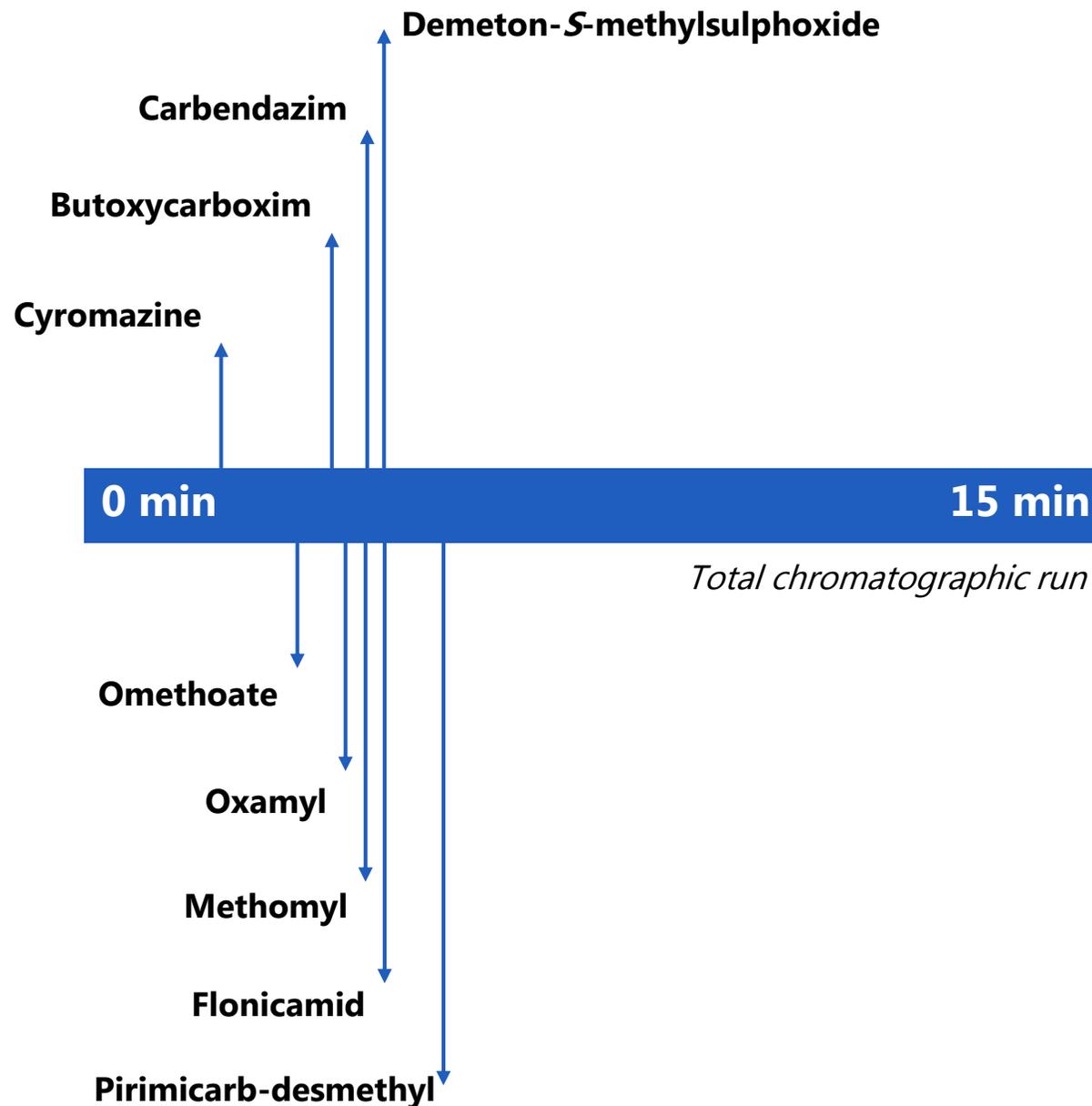
0 ppm

12 ppm

60 ppm

300 ppm

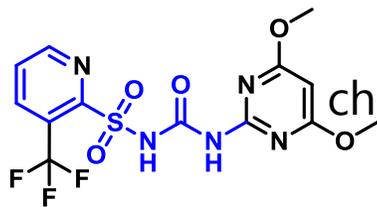
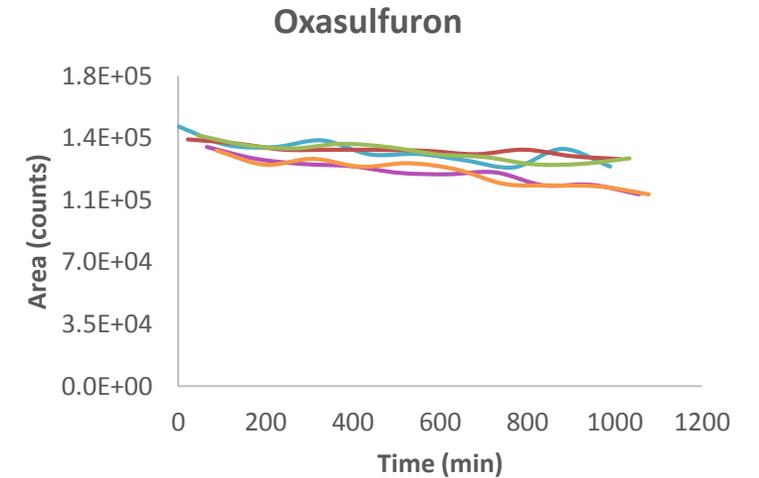
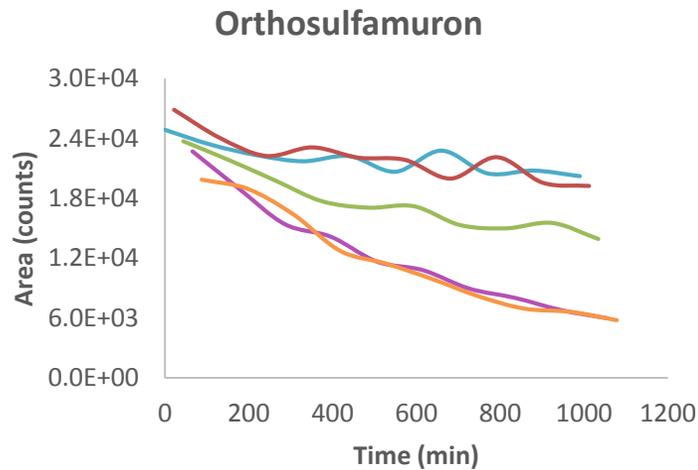
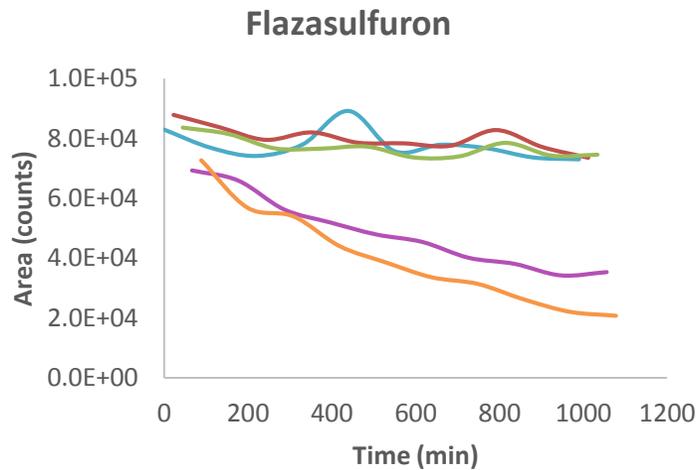
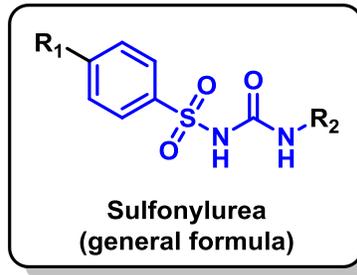
600 ppm



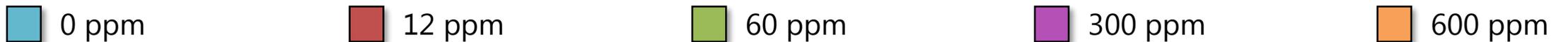
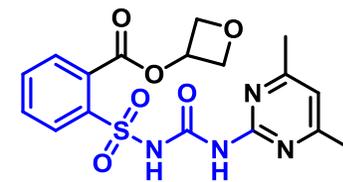
Signal suppression due to high L-AA concentration

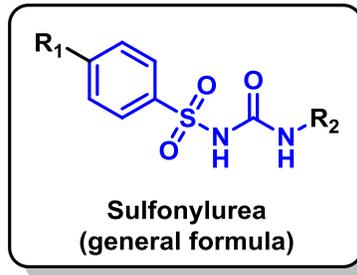
- The elution times of the nine compounds presenting signal suppression were between 2.0 min and 5.3 min
- Not all compounds with $t_R \leq 5.3$ min showed signal suppression
 - Further evaluation necessary

COMPOUNDS NEGATIVELY AFFECTED (DEGRADATION)



Other urea derivatives (such as chlorbromuron, chlorfluazuron, chlorotoluron, difenoxuron, diflubenzuron, diuron or flufenoxuron) did not showcase such a behaviour





4572 *J. Agric. Food Chem.* 2002, 50, 4572–4575

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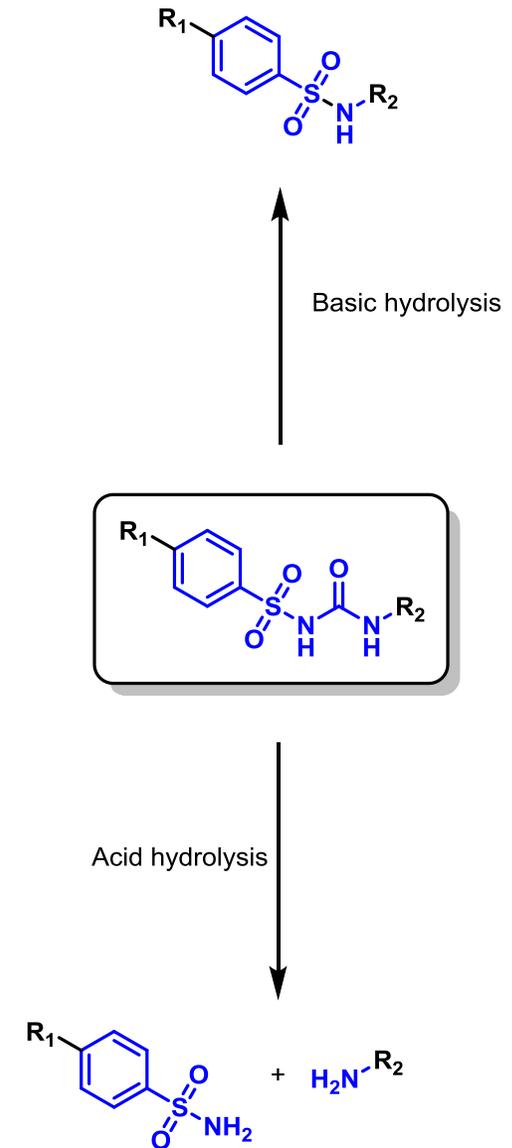
Degradation of Sulfosulfuron, a Sulfonyleurea Herbicide, As Influenced by Abiotic Factors

SUPRADIP SAHA AND GITA KULSHRESTHA*

Division of Agricultural Chemicals, Indian Agricultural Research Institute, New Delhi 110012, India

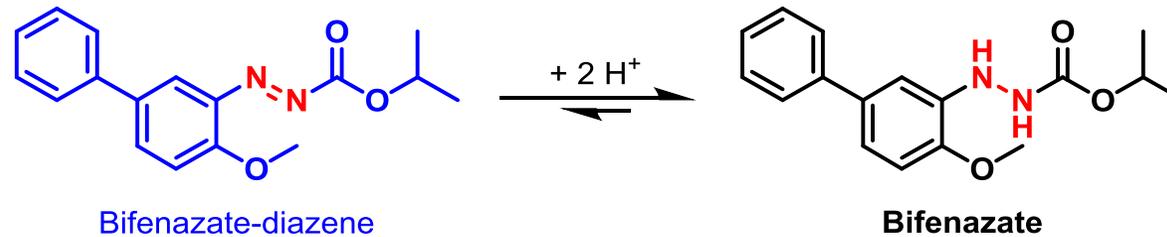
A laboratory experiment was conducted to study the stability of sulfosulfuron [1-(2-ethylsulfonylimidazo[1,2-*a*]pyridin-3-ylsulfonyl)-3-(4,6-dimethoxypyrimidin-2-yl) urea] in a controlled environment of pH, temperature, solvent, and surface. In another experiment the photostability of sulfosulfuron was studied after irradiation under sunlight. Under alkaline condition, it yielded 1-(2-ethylsulfonylimidazo[1,2-*a*]pyridin-3-yl)-3-(4,6-dimethoxypyrimidin-2-yl) amine, and under acidic condition it degraded to 1-(2-ethylsulfonylimidazo[1,2-*a*]pyridin)-3-sulfonamide and 4,6-dimethoxy-2-aminopyrimidine. Photodegradation included breaking of a sulfonyleurea bridge, as in the case of acidic hydrolysis and contraction of the sulfonyleurea bridge was the major pathway of alkaline hydrolysis.

KEYWORDS: Sulfosulfuron; stability; pH; temperature; photolysis



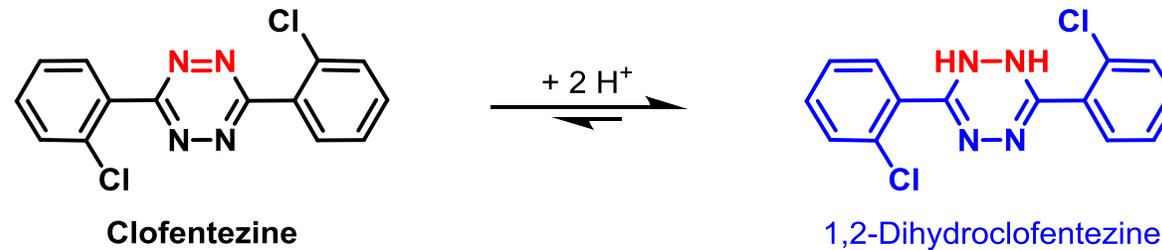
Bifenazate

- Bifenazate (sum of bifenazate plus bifenazate-diazene expressed as bifenazate) Annex II



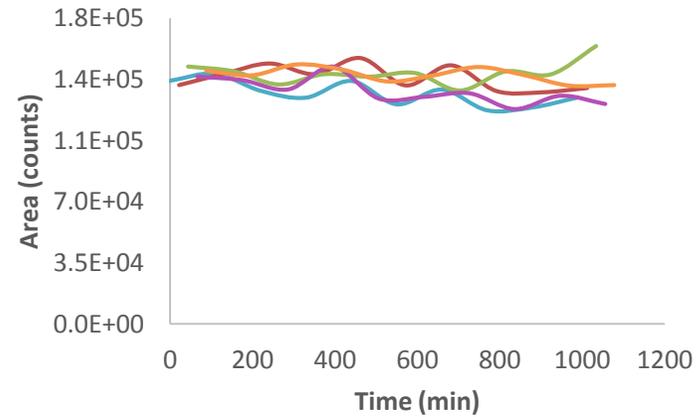
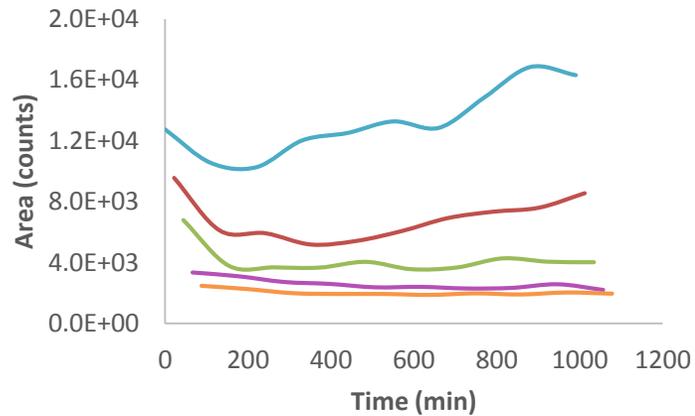
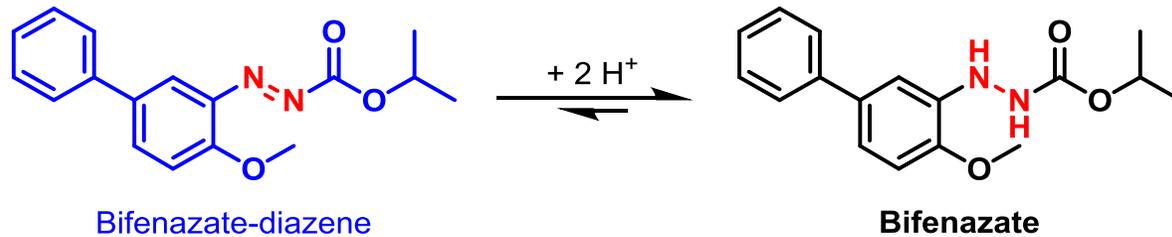
Clofentezine

- Clofentezine Annex IIIB



Bifenazate

- Bifenazate (sum of bifenazate plus bifenazate-diazene expressed as bifenazate) Annex II



0 ppm

12 ppm

60 ppm

300 ppm

600 ppm

POSITIVE EFFECT (STABILISATION)

Bendiocarb	Cymoxanil
Dazomet	Dithianon
DMA	DMPF
Fenpicoxamid	Formetanate
Methiocarb-sulphone	Phosmet
Methiocarb-sulphoxide	Trichlorfon

NEGATIVE EFFECT (SUPPRESSION)

Bendiocarb	Carbendazim
Cyromazine	Demeton- <i>S</i> -methylsulphoxide
Flonicamid	Methomyl
Omethoate	
Pirimicarb-desmethyl	
Oxamyl	

NEGATIVE EFFECT (DEGRADATION)

Flazasulfuron	Oxasulfuron
Orthosulfamuron	

OTHER CASES (INTERCONVERSION)

Bifenazate	Clofentezine
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- Several compounds undergo degradation processes in injection vials in an acetonitrile:water (20:80, V/V) solvent at room temperature ($20\text{ °C} \leq T \leq 30\text{ °C}$)
- Concentrations equal to or higher than 300 mg/L of L-ascorbic acid have been shown to **decrease or halt in-vial degradation processes** for 12 compounds
 - Accurate concentration is made possible in some cases, at least detection in others
- Some compounds present decreased signal due to **ion suppression**
- Sulphonylureas can undergo **degradation processes** in the acidified solution

THANK YOU



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