

INNOVATIVE SOLUTIONS IN GREEN AGRICULTURE: BIODEGRADABLE COMPOSITIONS OF COMBINED EFFECT BASED ON AGRICULTURAL WASTES

THE MAIN IDEA:

The elaboration, development and the prospective implementation of innovative, biodegradable complex materials and energy-saving, reagent-saving and resource-saving green chemistry technologies, based on bio-wastes treatment, using the principles of circular economy, environmental safety and for the sustainable development.

Dr. Aram R. Mikaelyan

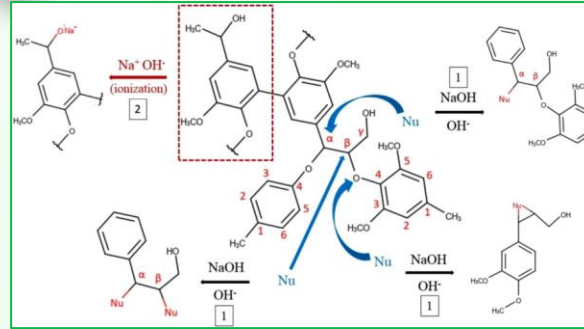
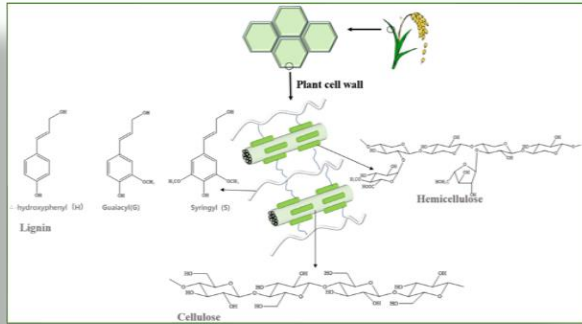
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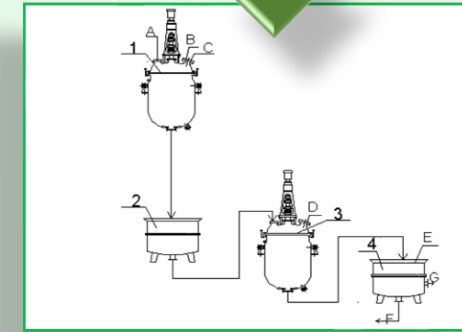
Horizon Europe thematic area: Cluster 6.

HORIZON-CL6-2025-02-FARM2FORK-16: Making food systems more resilient to food safety risks through the deployment of technological solutions

The main directions of our research



The green technology of obtaining of innovative biodegradable compositions and safe plant life-cycle regulators based on efficient recycling of biowastes



Wine-making wastes utilization based green technology of obtaining of multifunctional eco-friendly compositions



Tartaric acid derivatives based eco-friendly antimicrobials against the multi-drug resistant pathogens



Wine-stone derived tartaric acid based complex preparations for plant growth stimulation

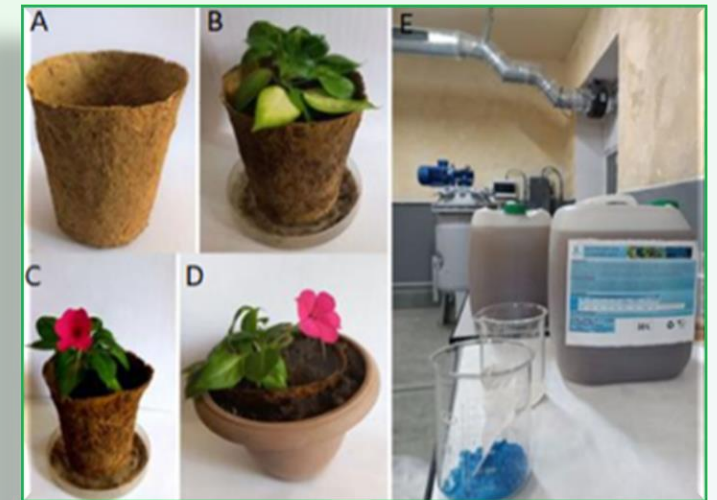
Our achievements:

- Innovative biodegradable planters and other active compositions, were obtained based on bio-wastes recycling (the treatment by the microwave and ultrasonic systems) and the addition of “Complex” preparations of plant growth stimulation, using the green technologies, using the circular economy principles.

Table 2. The effect of ‘Complex-Co’ on actual yield

Cereal Crops	Sample	Harvest (Centner ha ⁻¹)			Grains harvest difference in comparison to control	
		Total	Including Grain	Straw	Centner ha ⁻¹	%
Barley (<i>Hordeum L.</i>)	Control	72.9	31.7	41.2	-	-
	Experimental	80.5	35.0	45.5	3.3	10.4
	<i>LSD</i> _{.05}	8.7	7.6	7.8	1.4	-
Emmer (<i>Triticum dicoccum</i>)	Control	52.6	23.9	28.7	-	-
	Experimental	60.1	27.4	32.7	3.5	14.6
	<i>LSD</i> _{.05}	9.7	8.4	7.1	1.6	-
Triticale (<i>Triticale Wittm ex A.</i>)	Control	95.4	41.5	53.9	-	-
	Experimental	124.7	54.2	70.5	12.7	30.6
	<i>LSD</i> _{.05}	11.0	5.2	7.1	1.9	-

*LSD*₀₅ – The least significant difference with alpha of 0.05.

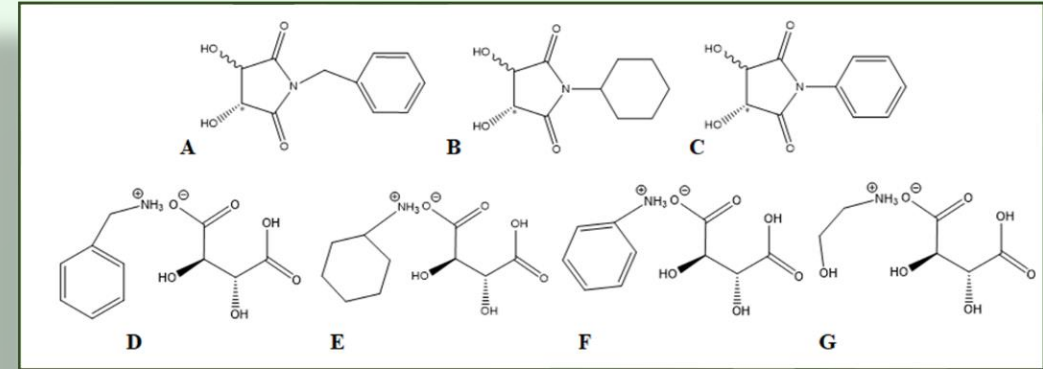
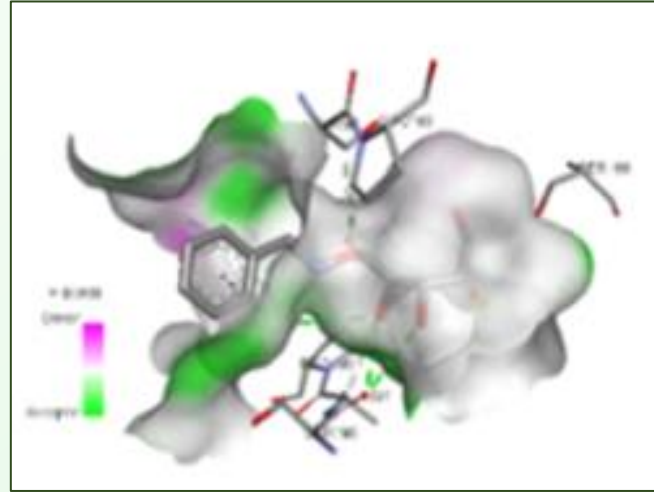


Our achievements:

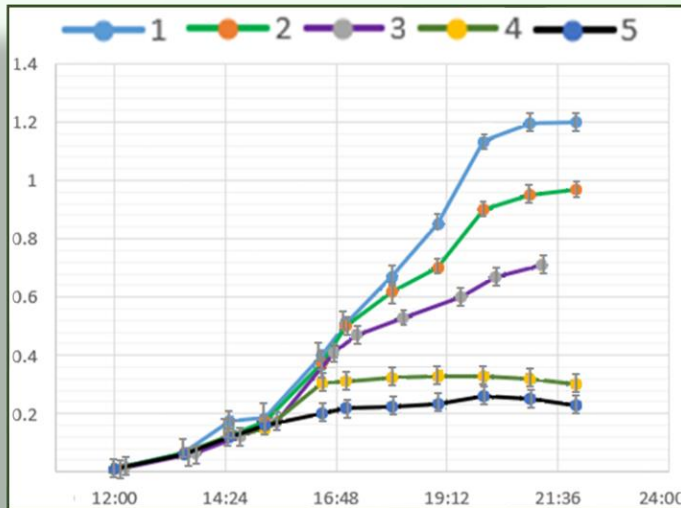
- Innovative eco-safe effective antimicrobials with antioxidant properties against the multi-drug resistant pathogens and spoilage agents, based on natural tartaric acid derivatization green technology

Minimal Inhibitory Concentration of tartaric acid new derivatives

Compound	MIC	
	<i>P. syringae</i>	<i>P. aeruginosa</i>
BI	6,6 mcg/mL	66 ng/mL
BAS	7,68 mcg/mL	76 ng/mL
CAS	7,47 mcg/mL	7,47 mcg/mL
CI	3,18mcg/mL	31,8 ng/mL
PHI	50 mcg/mL	6,18 mcg/mL
PhAS	50 mcg/mL	7,29 mcg/mL



They are effective against: *Pseudomonas aeruginosa*; *Salmonella enteritidis*; *Klebsiella pneumonia*; *Pectobacterium carotovorum*; *Staphylococcus aureus*; *Xanthomonas syringae*; *Rhodococcus fascians*; *P. syringae*, etc.



Potential application:

- Additive for ecologically safe food packaging
- Fish and other aquaculture fodder additives
- Agricultural application
- Disinfection and sanitary

Our team domestic collaborations:

- *“Agrobiotechnology Scientific Center”, Branch of Armenian National Agrarian University;*
- *“Armbiotechnology” Scientific and Production Center of National Academy of Science of Republic of Armenia, Laboratory of Ecological Safety;*
- *Yerevan State University, Laboratory of Applied Biology and Ecology, Scientific group of Ecological Monitoring.*



Our foreign partners:

- *Prof. Serkos A. Haroutounian, Agrarian University of Athens;*
- *VVInEx GmBh Germany.*

The partners we are seeking for:

- *Global circular economy and green chemistry technologies program investors*
- *Green agriculture organizers*
- *Ecotoxicological research scientific organizations*



Our Team:

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Thank you For Attention !