



**TRUBIOL**

**Plant Antifreeze & Plant Anti-Heat**

# About TruBiol SRL

- A biotechnology company.
- Develop innovative solutions for Agriculture, Environment, Health and Energy sectors.
- We have patented solutions and academic publications in these areas.
- In addition to TruBiol for the agricultural sector, we continue our R&D projects on Bio-Pesticide, Bio-Sensors, Bio-Fortification.



# What is the problem?

## Agricultural Frost

Damage to the flower or fruit on the plant due to temperatures dropping below 0°C is referred to as **agricultural frost**. The occurrence of agricultural frost in industrial agricultural products can lead to significant damage for the producer.

## Over-heating

Over-heating, defined as above-average temperatures, negatively impacts plant growth and development. It disrupts photosynthesis, respiration, water balance, and can lead to yield loss, reduced quality, and plant death.



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# The Solution

## TruBiol Plant Antifreeze and TruBiol Plant Anti-Heat



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# The Solution

## TruBiol Plant Antifreeze and TruBiol Plant Anti-Heat

- Special Formulation with Completely Herbal Content.
- Contains Various Enzymes and Amino Acids.
- Produced from Recycled Vegetable Material.
- Zero toxic or synthetic chemicals
- Innovative and Unique formulation



# TruBiol Reported As Key Player

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## Global Natural Plant Antifreeze Market Growth 2023-2029

### Market Research Report Summary

Global Natural Plant Antifreeze Market Growth 2023-2029 report is published on June 29, 2023 and has 90 pages in it. This market research report provides information about Manufacturing (Chemicals), Chemicals industry. It covers Global market data and forecasts. It is priced starting at **USD 3,660.00** for Single User License (PDF) which allows one person to use this report.

Please read the description and table of contents of this research report given below to check whether it meets your research requirements. If not, then please do not hesitate to contact us using "Report Enquiry" form given below. We can customize this research report or suggest a new fully customized market research report to meet your research goals and data requirements.

2029, at a CAGR of % from 2023 through 2029.

Global key Natural Plant Antifreeze players cover TruBiol, CropAid International, Wiltpruf, Epono, EHE Century, Nobel Agriculture, Wfxsl and Bisaier, etc. In terms of revenue, the global two largest companies occupied for a share nearly % in 2022.



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# TruBiol Reported As Key Player



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the market size.

## Increase in Demand for Crop Protection

The increase in demand for crop protection significantly increases the demand for antifreeze among the farmers as they plant anti-freeze to help in preventing the formation of larger ice crystals in tissues and reduce the cellular damages of plant and crop losses due to colder temperatures. Hence, such factors help in increasing the adoption rates.

Furthermore, many key players are focusing on producing innovative high-quality products in order to attract larger consumer bases. For instance, Trubiol company produces, TruBiol Plant Antifreeze includes plant-based amino acids, enzymes, and macro and micro feeding elements. The product does not include any toxic chemicals and does not leave any chemical residue when applied.

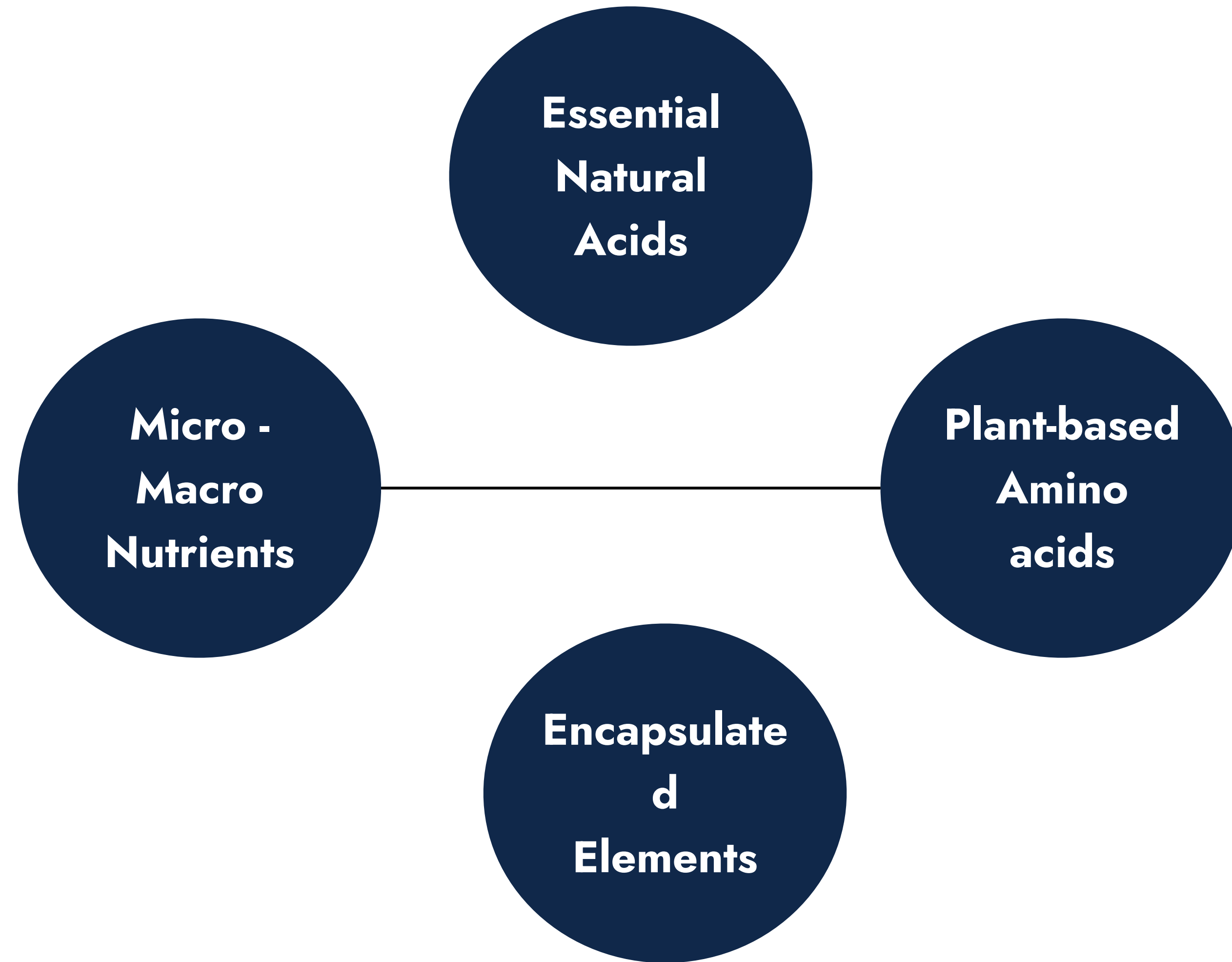
## Toxic Nature of Anti-freezers

The toxic nature of anti-freezers can significantly affect the growth of the global plant antifreeze market, as some of the anti-freezers *such as* glycerine, and ethylene glycol contain toxic properties and also leave a chemical residue in plants, which can cause adverse health effects to humans which could cause a declination in adoption rates.



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# Unique Formulation



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# Advantages of TruBiol Products

Plan-based Organic  
Ingredients

Synthetic  
Chemicals-free

Increases  
Nitrogen Binding

Leaves No  
Residue

Adjust pH  
of Soil

Easy  
Application

1/200 Dilution  
Ratio

Does not Harm  
to Personnel

Environment  
Friendly

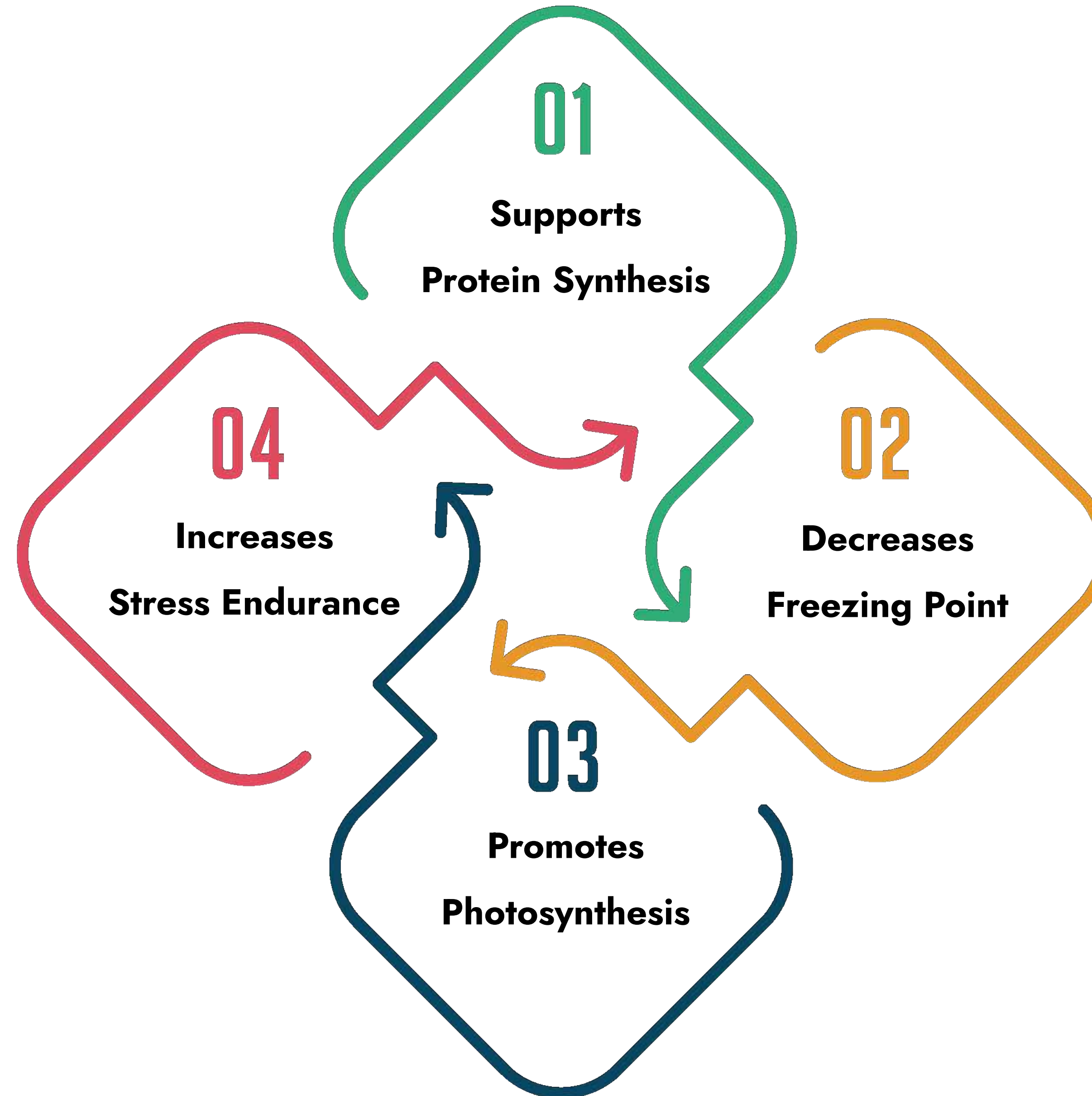
Plant-based  
Enzymes





# **4 Steps of Protection**

# 4 Step of Protection



# TruBiol vs Traditional Applications

Antifreeze Irrigation

Antifreeze Candles

Nebuzilation Application

Mobile Gas Blowers

Wind Turbines

Helicopter



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# TruBiol vs Traditional Applications

	Antifreeze Irrigation	Antifreeze Candles	Nebulization	Gas Blowers	Wind Turbines	Helicopter	TruBiol
High Efficiency	✓	✓	X	✓	✓	✓	✓
Ease of Use and Not Expensive	X	X	X	X	X	X	✓
Low Setup Cost and Maintenance Cost	X	✓	X	X	X	X	✓
Not Highly Dependent On Labor	✓	X	✓	✓	✓	X	✓
Effective up to 15 days	X	X	X	X	X	X	✓
Does not cause burns and water loss in the plant	X	✓	✓	X	✓	✓	✓
No Gas Emissions - No No Nutrient Leaching	X	✓	X	X	✓	X	✓
Helps Plants Development	X	X	X	X	X	X	✓





**How to Apply?**

# Instruction for use

- TruBiol products are concentrated. Can be diluted 1:200 ratio.
- Always dilute TruBiol with pH neutral tap water.
- Check the recommended dilution ratio based on crop.
- Beware of rain and wind free conditions before the application.
- Choose calm weather conditions.
- Apply at least six hours before frost or over-heating.
- Using an atomizer spray it all over the plant.
- It's not advised to use TruBiol with amino acid breakers like pesticides.
- Bio-mineral content of TruBiol is easily absorbed by the leaves, stems, and roots of plants.



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# General Recommended Amount

Type	How to Apply	Coverage
Trees	Dilute 5%. Add 1L TruBiol Plant Antifreeze to 200 L tap water. Spray the solution over the leaves with an atomizer.	5L-6L / Ha
Crops	Dilute 5%. Add 1L TruBiol Plant Antifreeze to 200 L tap water. Spray the solution over the leaves with an atomizer.	4L-5L / Ha
Seeds	Dilute 5%. Add 1L TruBiol Plant Antifreeze to 200 L tap water. Place seeds on a cloth and spray the solution on the seeds with an atomizer.	







# Field Studies

# Field Studies - TruBiol Plant Antifreeze

- Initial field studies started in December 2021.
- Some of trees TruBiol Plant Antifreeze tested against agricultural frost for;  
**Plum Olive Apricot Almond Tomato Lemon Pomegranate**  
**Barley Pistachio Hazelnut Walnut Tea Watermelon Grape**
- Temperature during the test was reported between -7°C and 3°C degrees
- Test fields were Manisa, İzmir, Iğdır, Konya, Gaziantep, Adana, Malatya and İstanbul regions of Türkiye  
Result: Even agricultural frost was reported three times during the test period, **TruBiol Plant Antifreeze protected trees from the frost.**



# Field Studies - TruBiol Plant Anti-Heat

- In Turkey, between Jun and July 2023 TruBiol Plant Anti-Heat tested against agricultural over-heat for;

**Ground Beans    Tomato    Lemon    Walnut    Pistachio    Pomegranate**  
**Citrus Trees    Banana    Olive    Grass    Peanut**

- Temperature during the test was reported to +52°C degrees on the field.
- Test fields was at Konya, Adana and Aegean regions of Turkiye  
Result: Even agricultural over-heat was reported during the test period, **TruBiol Plant Anti-Heat protected crops from the over-heating sun burns and harvest lost.**



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# Field Studies



# Field Studies



# Field Studies 2022, March Manisa - TruBiol Antifreeze Almond Application.



- **Result:** Agricultural frost was prevented, product development was supported.

# Field Studies 2022, March Manisa - TruBiol Antifreeze Plum Application.



- **Result:** Agricultural frost was prevented, product development was supported.

# Field Studies 2024, March Konya - TruBiol Antifreeze Barley Application.



- **Result:** Agricultural frost was prevented, product development was supported.



# Field Studies

2024, March Konya - TruBiol Antifreeze Lemon Application.



- **Result:** Agricultural frost was prevented, product development was supported. Made *Planococcus citri* away.

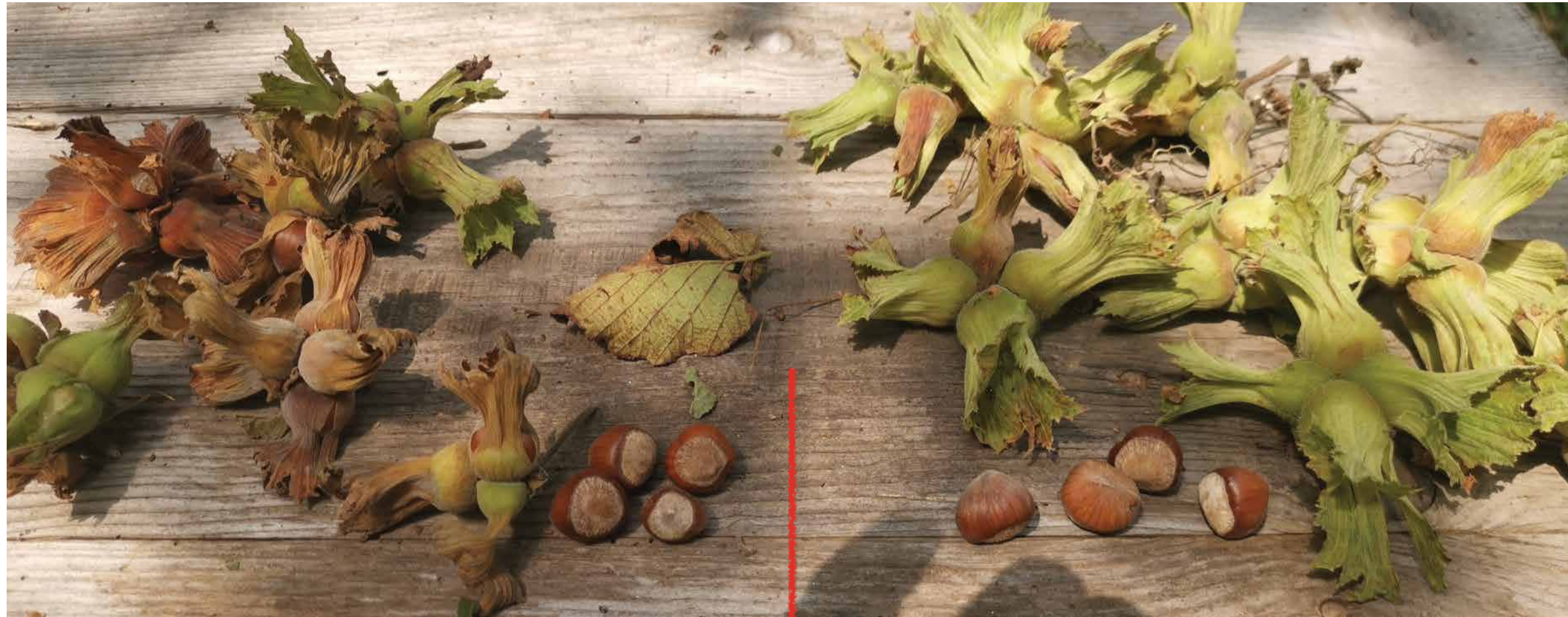
# Field Studies 2024, March Giresun - TruBiol Antifreeze Hazelnut Application.



- **Result:** Agricultural frost was prevented, product development was supported.

# Field Studies

- 2024, March Giresun - TruBiol Antifreeze Hazelnut Application.  
After the harvest.



TruBiol Antifreeze  
**Not Applied**

TruBiol Antifreeze  
**Applied**

# Field Studies

2024, Mart Gaziantep -  
TruBiol Antifreeze Pistachio  
and Almond Application.

**Result:** Agricultural frost  
was prevented, product  
development was supported.  
New seedling eye reported.



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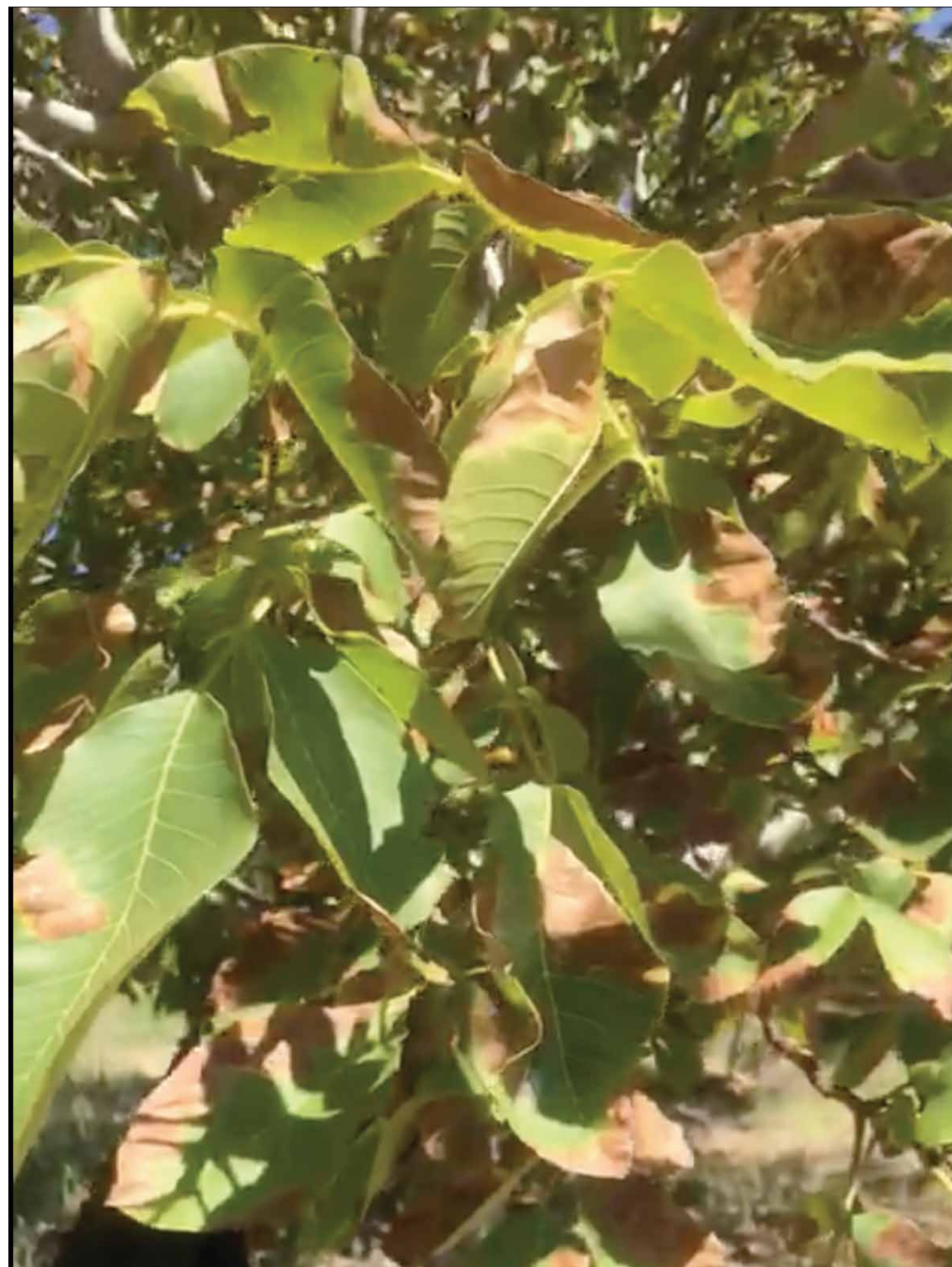


# Field Studies

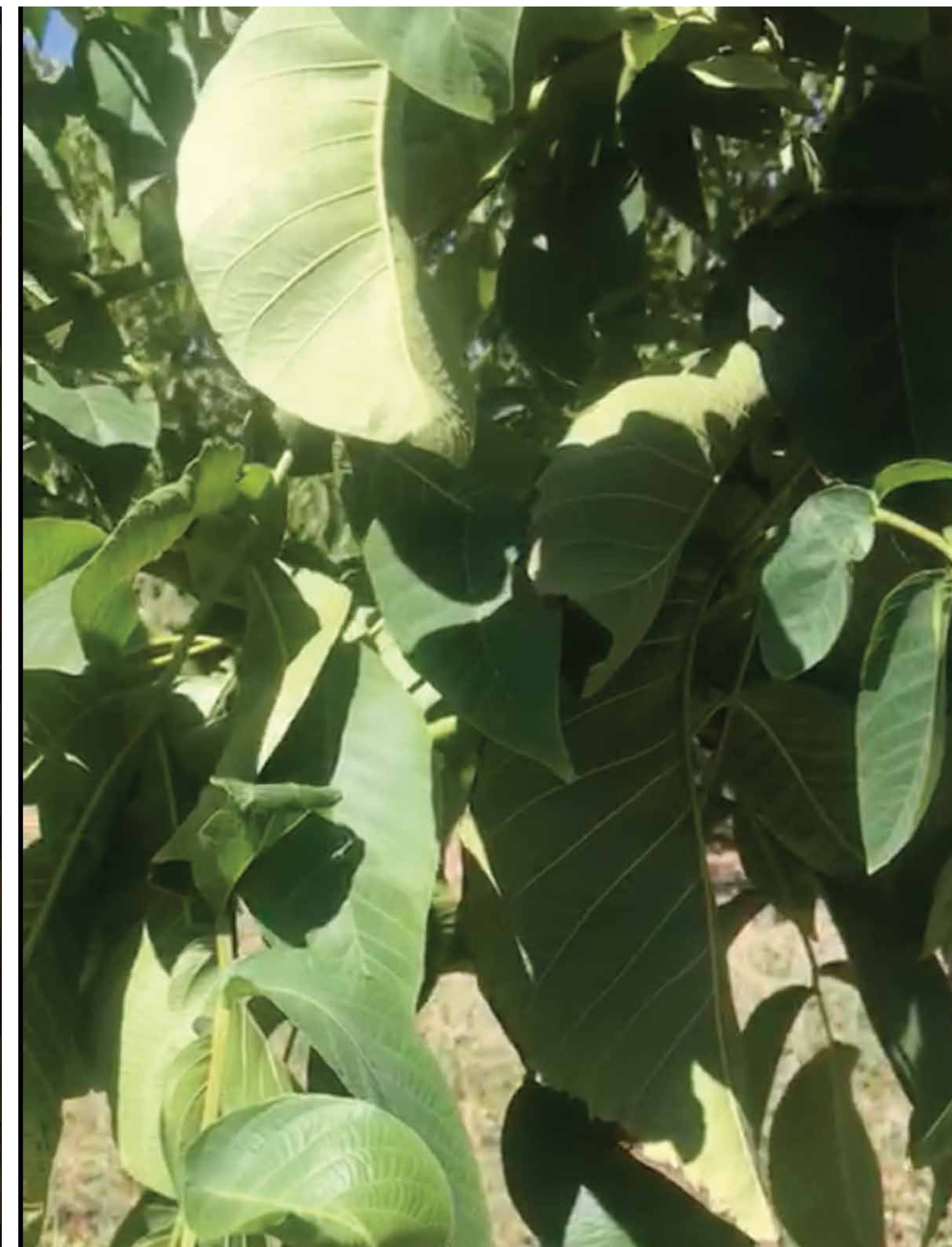
2024, TruBiol Anti-Heat  
Walnut Application,  
Kaman - Turkiye

**Result:** Sunburn and yield  
lost prevented.

Also TruBiol Anti-Heat  
**prevented anthracnosis**  
on walnut trees.



TruBiol Anti-Heat  
**Not Applied**



TruBiol Anti-Heat  
**Applied**



**Yield Increase**

# Yield Increase

After the field test below increase were reported

Almond yield increased  
by **43%**



Apricot yield increased



Plum yield increased  
by **10%**



Olive oil yield increased  
by **18%**



Barley yield increased  
by **24%**



Lemon yield increased  
by **24%**



Hazelnut yield increased  
by **35%**



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# EGE University Faculty of Agriculture Department of Horticulture Test

**Test Objective:** The effect of TRUBIOL Plant Antifreeze Product on tomato seedlings under low temperature (0°C for 7 hour ) was investigated.

**Result:** TRUBIOL Plant Antifreeze application was found to increase the adaptation of plants to low temperature stress by decreasing the water potential in the cells of seedlings and increasing the dry matter content of seedlings.



## GENEL DEĞERLENDİRME

TRUBIOL Bitki Antifriz solüsyonunun, domates bitkilerinde don olayına karşı koruyucu etkisini belirlemek amacıyla gerçekleştirilen bu denemede Seyran F1 domates çeşidinin fideleri kullanılmıştır.

Don olayını simüle etmek için domates fideleri önce 15°C'de ardından 7 saat 0°C'de tutulmuştur. Yapılan kısa süreli don olayını simüle eden denemede, TRUBIOL Bitki Antifriz uygulamasının etkinliği uygulama yapılmamış kontrol grubu fideler ile fizyolojik tepkileri karşılaştırılarak değerlendirilmiştir. TRUBIOL Bitki Antifriz uygulamasının kısa süreli (7 saat) 0°C'de tutulan domates bitkilerinin yaprak hücrelerinde, membran bütünlüğünü korumada etkili olabileceği belirlenmiştir. Ayrıca TRUBIOL Bitki Antifriz uygulamasının, fidelerin hücrelerinde su potansiyelini azaltarak ve fide kuru madde oranını artırarak, düşük sıcaklık stresine bitkilerin adaptasyonunu artırıcı etkide olduğu belirlenmiştir.

E.Ü. Ziraat Fakültesi Bahçe Bitkileri Bölümündeki iklim odasında oluşturulan kısa süreli (0°C'de 7 saat) düşük sıcaklık stresi altındaki Seyran F1 domates çeşidi domates fidelerine uygulanan TRUBIOL Bitki Antifriz etkilerinin araştırıldığı bu rapor 11 sayfa olarak tarafımdan hazırlanmıştır. Gereği bilgilerinize arz olunur. 02.01.2023

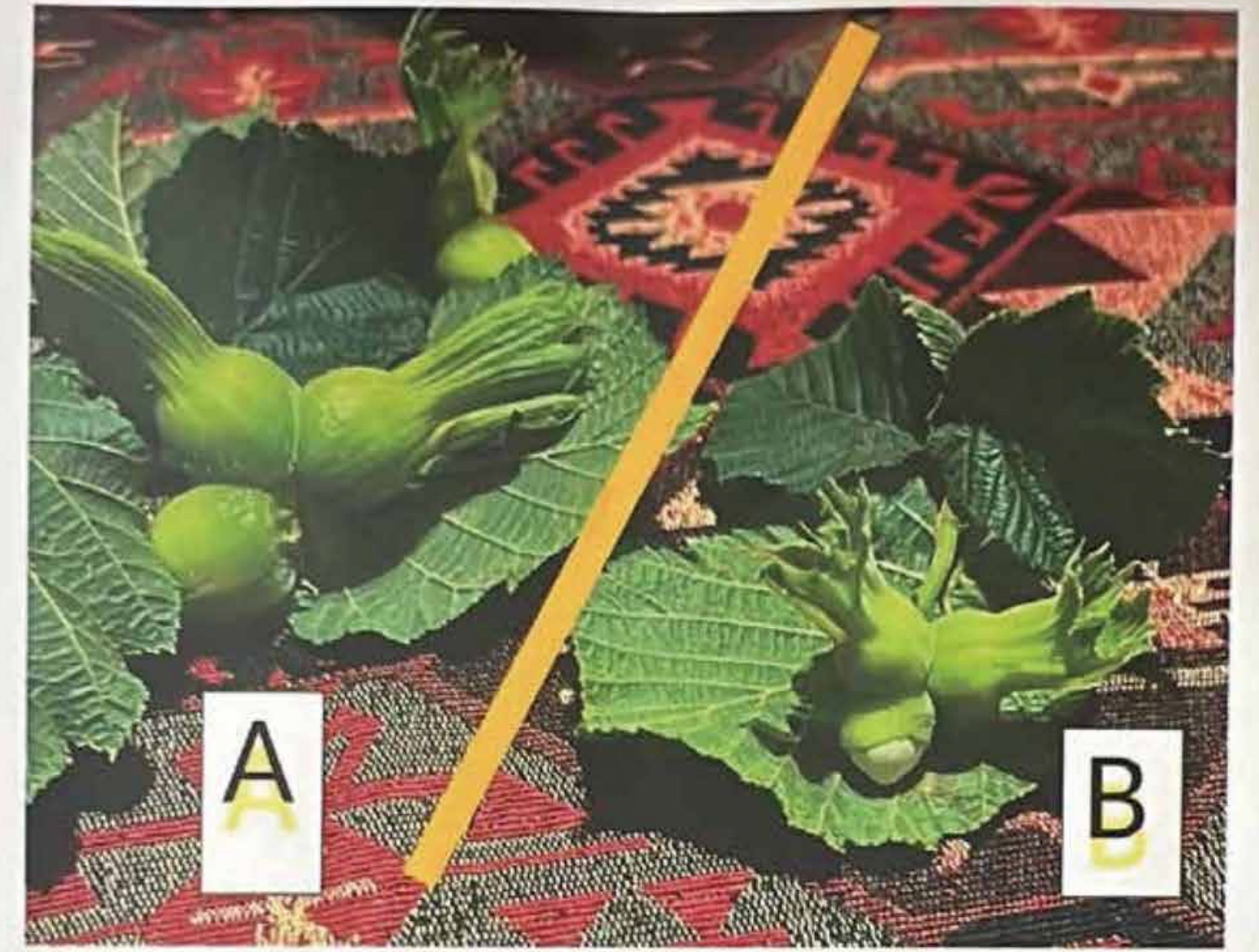
Prof. Dr. Hülya İLBİ  
E.Ü. Ziraat Fakültesi  
Bahçe Bitkileri Bölümü



# Giresun Chamber of Agriculture TruBiol Antifreeze Hazelnut Application Report

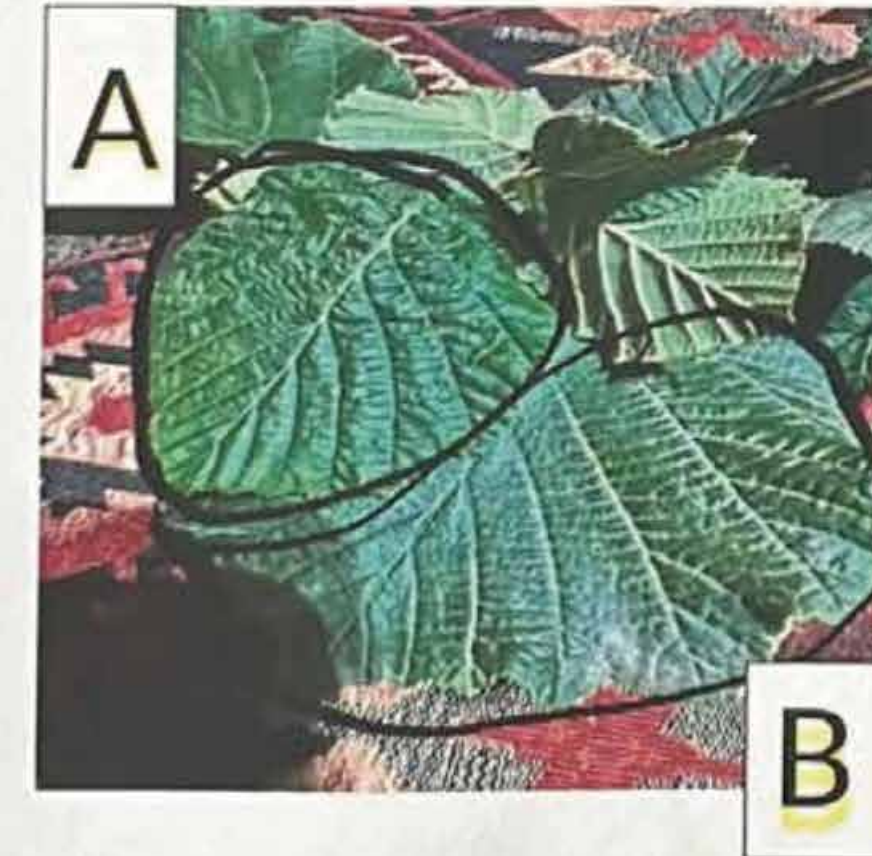
**Test Purpose:** Analysis of the effect of Trubiol plant antifreeze on hazelnuts.

**Result:** With the Trubiol Plant Antifreeze application hazelnut trees are not affected by agricultural frost and the TruBiol supports the development of hazelnuts.



Fotoğraf 29 Mayıs 2024 tarihinde çekilmiştir.c

Fotoğrafta, "A" (Trubiol Antifriz ürünü Uygulanmış meyvenin,) Fotoğraf "B" kontrol grubuna kıyasla daha büyük ve daha iyi formda olduğu açıkça görülmektedir.



Fotoğraf 29 Mayıs 2024 tarihinde çekilmiştir.

Görüldüğü gibi, "A" grubundaki (kontrol) yapraklar, "B" grubuna (Trubiol Antifriz ürünü Uygulanmış) kıyasla çok daha küçüktür ve daha açık bir renge sahiptir.

Ayrıca, "A" grubundaki yapraklarda dehidrasyon (su eksikliği) belirtileri görülmektedir. Buna karşın, "B" grubundaki yapraklar daha büyük ve daha koyu renklidir ve daha sağlıklı görünmektedir.



Giresun Ziraat Odası Başkanı  
Nurittin KARAN

# Eurofins Denmark Analysis

Alanine 0.456%

Glutamic Acid 3.37%

Lysine 0.157%

Serine 0.20%

Tryptophan 0.020%



Test	Parameter	Result	Unit	U(%)	Est. value
<b>Amino-acids profile ( with tryptophan)</b>					
DI004	ISO 13903:2005 / IC-UV				
	Alanine	0.456	g/100 g	14	
	Arginine	0.0942	g/100 g	14	
	Aspartic acid	0.578	g/100 g	14	
	Glutamic acid	3.37	g/100 g	14	
	Glycine	0.337	g/100 g	14	
	Histidine	0.0576	g/100 g	14	
	# Hydroxyproline	<0.2 (LOQ)	g/100 g		
	Isoleucine	0.239	g/100 g	14	
	Leucine	0.272	g/100 g	14	
	Lysine	0.157	g/100 g	14	
	Ornithine	<0.05 (LOQ)	g/100 g		
	Phenylalanine	0.121	g/100 g	14	
	Proline	0.292	g/100 g	14	
	Serine	0.262	g/100 g	14	
	Threonine	0.164	g/100 g	14	
	Tyrosine	0.245	g/100 g	14	
	Valine	0.260	g/100 g	14	
DJ011	ISO 13903:2005 / IC-UV				
	Cysteine +Cystine	0.0330	g/100 g	14	
	Methionine	0.0310	g/100 g	14	
DJ009	EU 152/2009 / LC-FLD				
	Tryptophan (Total)	0.0362	g/100 g	10	



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**Thank you!**

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