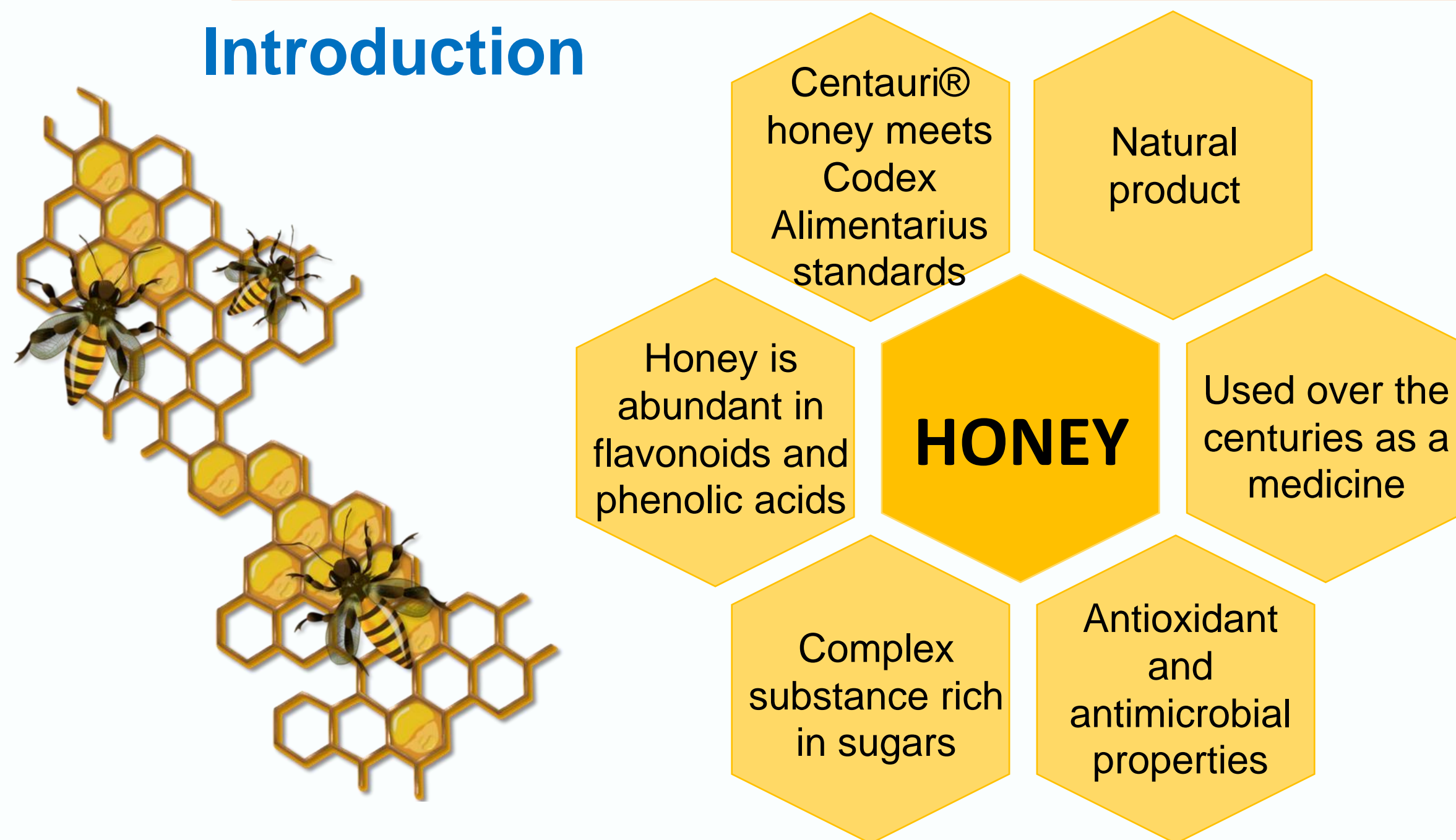


## ANTIMICROBIAL AND THERAPEUTIC PROPERTIES OF CENTAURI® HONEY

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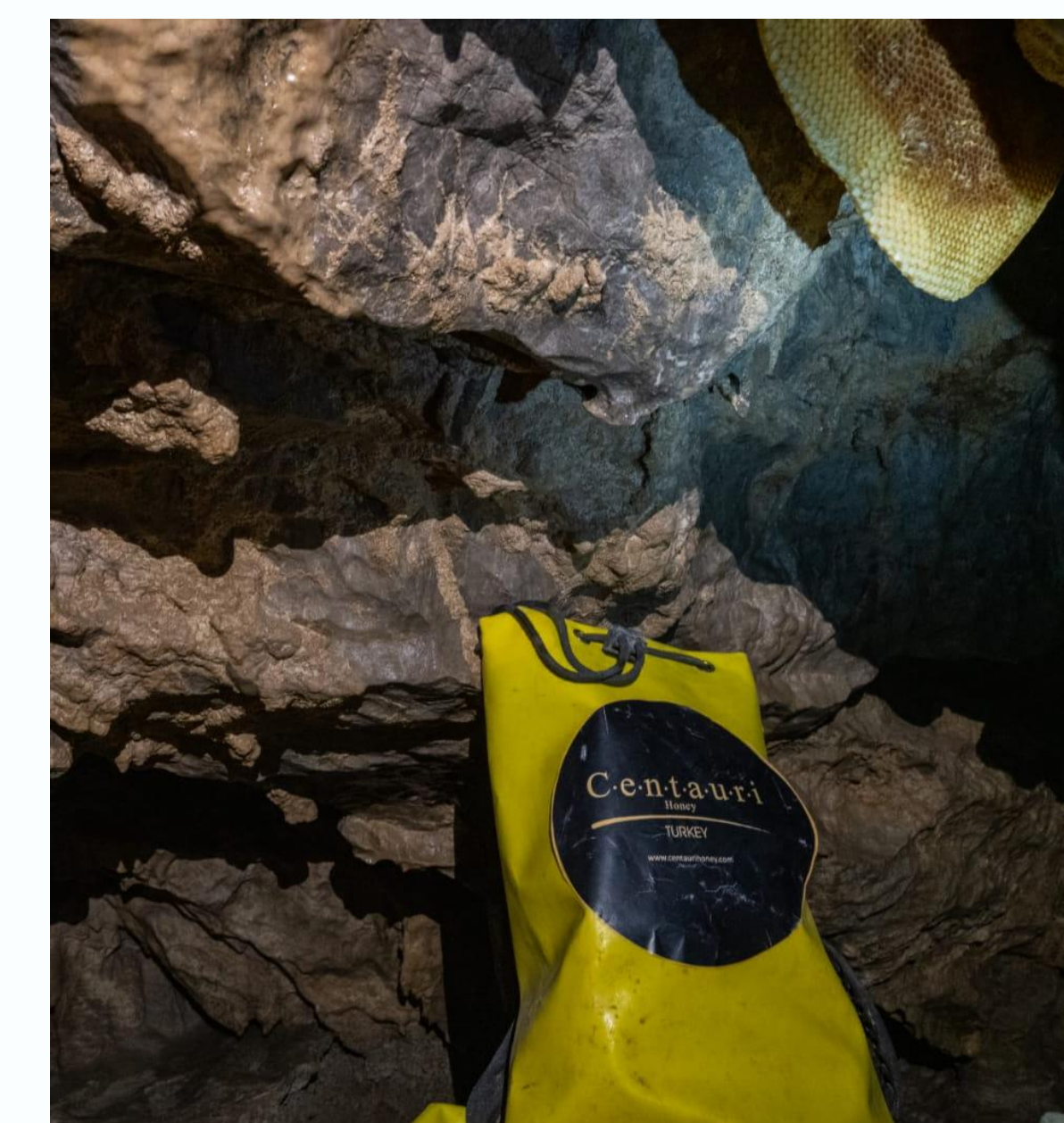
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### Introduction



Centauri Cave Nymph Honey is a Cave honey extracted from 2500 meters above sea level from a deep cave by professional speleologists in the Caucasus Mountains of Turkey.

The bee colony is located 50 kilometers from the nearest human residences away from other bee colonies.



### Aim

Evaluate the antimicrobial activity of Centauri® honey, and its formulations supplemented with propolis (AP) and gold (AG) to enhance biological properties, while also evaluating their general toxicity to ensure safety.

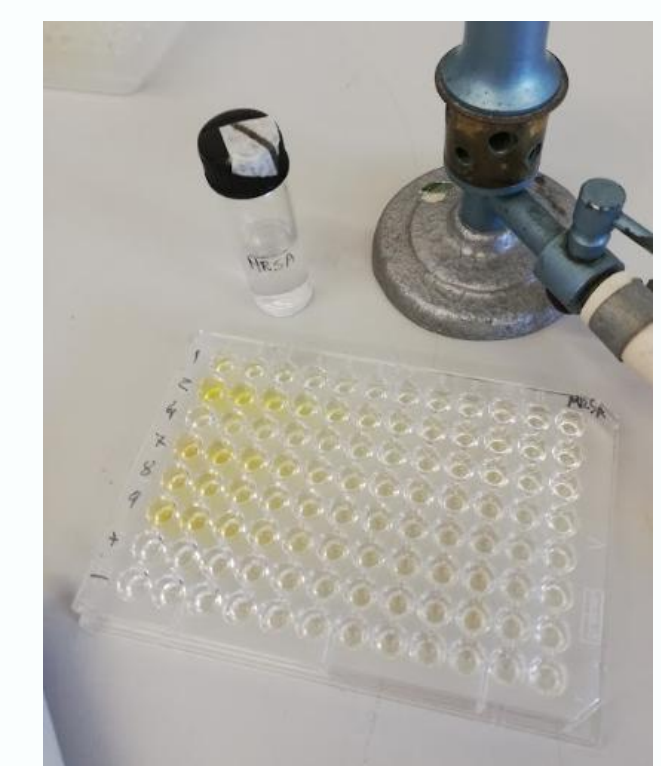
### Methodology

Five Centauri® honey samples were collected in August 2022 from different regions of Turkey (A–E). Centauri® honey A was supplemented with propolis (AP) and gold (AG).



**General toxicity:** *Artemia salina* L. lethality bioassay

**Antimicrobial evaluation:** Minimum Inhibitory Concentrations (MICs) and Minimum Bactericidal Concentrations (MBCs)

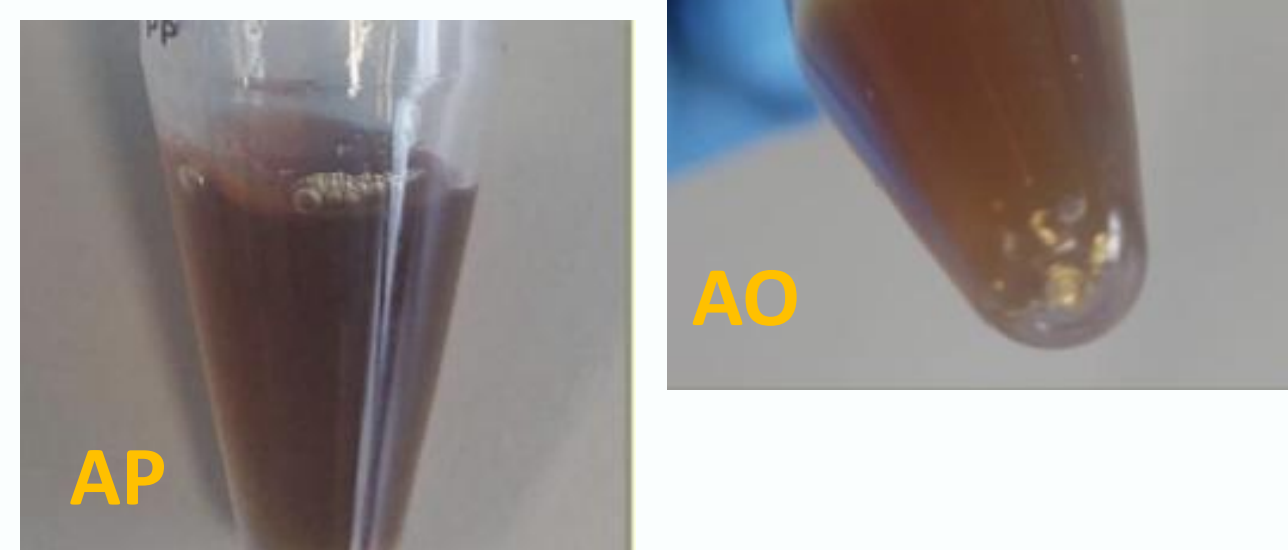


### Results and Discussion

#### Supplementation of Centauri® honey

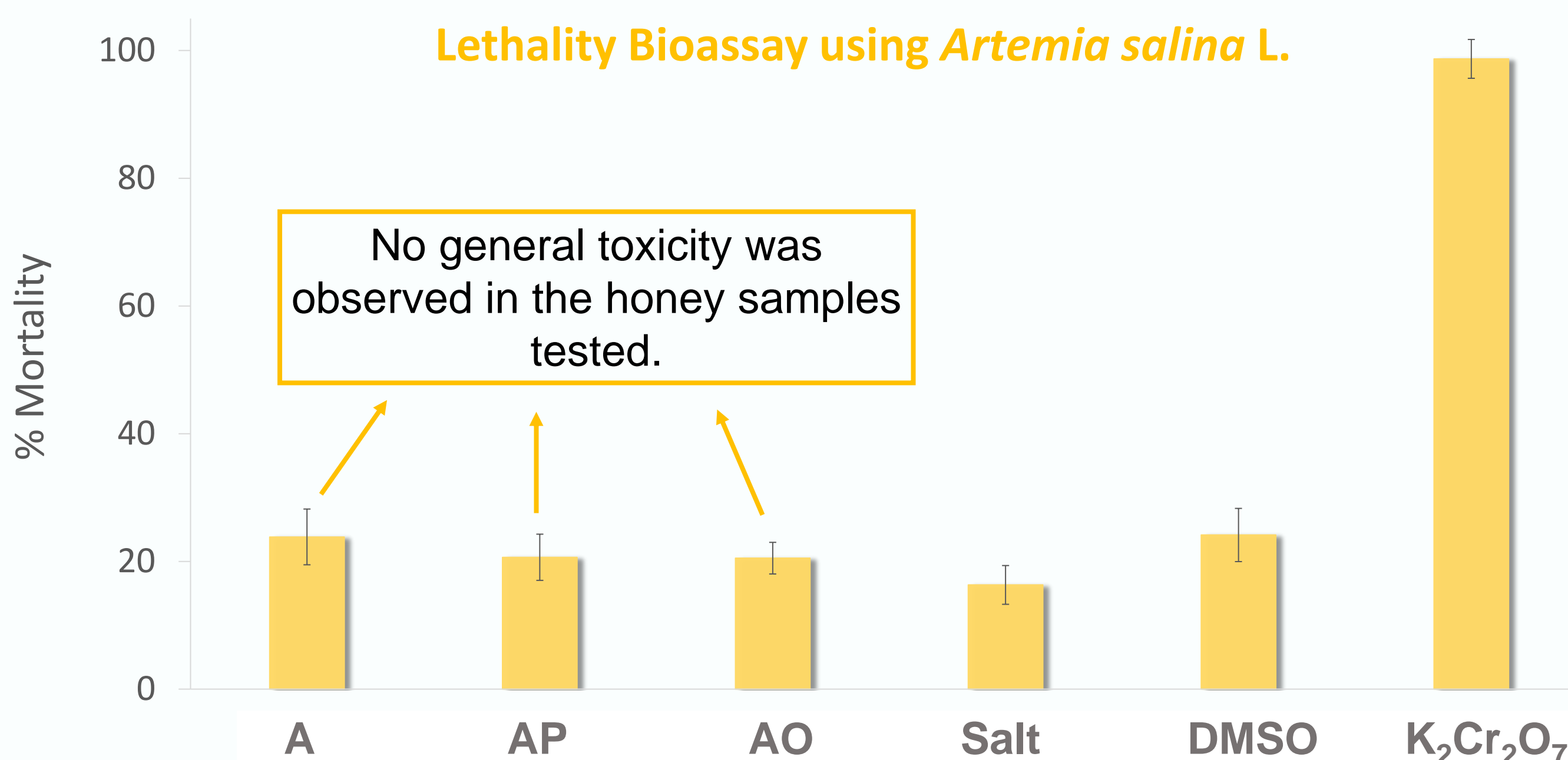
Centauri® honey with propolis (AP)

Centauri® honey with gold (AO)



**Figure 1** – Visual appearance of the honey samples supplemented with propolis and gold.

#### Lethality Bioassay using *Artemia salina* L.



**Figure 2** – Graph showing *Artemia salina* mortality after 24 hours of exposure to honey samples. Potassium dichromate ( $K_2Cr_2O_7$ ) was used as the positive control, while salt water and DMSO were used as the blank and negative controls, respectively. Samples tested at a concentration of 100 ppm in a salt water.

#### Antimicrobial activity

**Table 1** - MIC and MBC values of honey samples in percentage (% v/v) DMSO was used as negative control. Data represents the median values of at least three replicates.

	<i>S. aureus</i>		<i>E. faecalis</i>		<i>P. aeruginosa</i>		<i>E. coli</i>		<i>S. cerevisiae</i>		<i>C. albicans</i>	
Sample	MIC	MBC	MIC	MBC	MIC	MBC	MIC	MBC	MIC	MBC	MIC	MBC
AP	0.195	50	0.195	12.5	0.390	25	3.13	>25	0.049	0.098	1.56	1.56
AO	0.195	50	0.390	6.25	0.195	>25	3.13	12.5	0.195	1.56	1.56	6.25
A	6.25	12.5	12.5	25	3.13	12.5	0.05	>3.13	50	50	50	>50
B	6.25	>50	6.25	>50	6.25	12.5	0.05	>3.13	50	>50	50	>50
C	12.5	50	50	>50	25	50	0.05	>25	50	>50	50	>50
D	25	50	12.5	>50	12.5	12.5	0.05	25	50	>50	50	>50
E	3.13	>25	3.13	>25	3.13	3.13	0.05	6.25	50	>50	50	>50
Positive control	0.0001	0.05	0.00005	0.05	0.00005	0.05	0.0001	0.05	0.0008	0.05	0.0002	0.006
	Vancomycin				Norfloxacin				Nystatin			

#### Samples A–E:

- ✓ Antimicrobial activity even at the lower concentration tested (50% v/v)
- ✓ Higher antimicrobial activity against *E. coli* at 0.05% (v/v).

#### Supplemented Samples AP and AO:

- ✓ Enhanced effects, especially against Gram-positive bacteria (*S. aureus* and *E. faecalis*) and yeast (*S. cerevisiae* and *C. albicans*)

### Conclusion

Centauri® honey samples A–E, AP, and AG exhibit promising antimicrobial effects against all tested strains. Samples A–E showed antimicrobial activity, particularly against *E. coli* at 0.05% (v/v). The supplemented samples (AP and AG) demonstrated enhanced effects, especially against Gram-positive bacteria and yeast. AP exhibited the strongest antifungal activity against *C. albicans* (MIC 0.0488%, MBC 0.0977%), showing both inhibitory and fungicidal effects.

Centauri® honey shows strong antimicrobial potential, particularly when combined with propolis or gold, suggesting its possible applications in healthcare and food preservation.

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### References

Filipe, M. S., Kowalczyk, T., Kukula-Koch, W., et al. (2024). Evaluating the quality, physicochemical properties, and biological activities of Centauri® honey from Turkey. Food Bioscience, 62, 105028. <https://doi.org/10.1016/j.fbio.2024.105028>