Distinct antimicrobial activities in *Pistacia atlantica* aphid galls

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Gall-formers are considered parasitic organisms manipulating plant traits for their own benefit. Gall-formers of many domains are known, including more than 1,440 gall-forming insect species from at least five different orders. Insect's galls have been shown to protect their inhabitants from natural enemies such as predators and parasitoids by various chemical and mechanical means, but much less attention has been given to defence against microbial pathogens likely to grow in the humid and nutrient-rich gall environment. The large, cauliflower-shaped, galls formed by *Slavum wertheimae* on buds of *Pistacia atlantica* have been shown to host thousands of aphids, and their sugar rich secretion for up to 8 month, suggesting such protection could be of benefit to the inhabiting aphids. We have if *S. wertheimae* galls do indeed have antimicrobial properties using plate diffusion assay and essential oils testes on bacteria and filamentous fungi. Our results suggest that indeed those galls do express antibacterial and antifungal activities distinct from those found in non-galled leaves. Antibacterial activity was especially profound against *Bacillus spp.* (known insect pathogen) and against *Pseudomonas aeruginosa* (known plant pathogen). Antifungal activity was demonstrated against multiple filamentous fungi. Our results provide experimental evidence for a new protective antimicrobial role of galls. These results suggest not only *S. wertheimae* galls as a possible source for antimicrobial compounds but also call for an examination of other gall systems as a possible source for such compounds.

**Keywords** *Pistacia*; gall; anti-fungal; anti-bacterial