Antimicrobial Properties of American Hazelnut Oil and Extracts

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Products

- Nuts
- Shells
- Husks
- Other stuff (leaves, wood etc.)

Previous Results

		Nutmeat	Shell	Leaf	Involucre
		mg CE/g			
Total Phenolics	Hybrid	18.7(3.0)	162.0(20.1)	234.9(22.1)	160.8(15.7)
	Wild	23.5(3.9)	140.8(11.1)	207.7(26.2)	155.7(18.6)
		Proportion hydrogen peroxide consumed			
Antioxidant	Hybrid	0.63(0.02)	0.81(0.01)	0.95(0.01)	0.97(0.01)
	Wild	0.67(0.03)	0.79(0.01)	0.98(0.01)	0.97(0.01)

There is already a market for other natural phenolic extracts

- Resveratrol from grapes, mulberries and sprouted peanuts

- Rosemary/sage extract (carnosic acid)- toothpaste etc.

Which lead us to two objectives

1. characterize American hazelnut phenolic extracts
2. investigate the antimicrobial properties of American hazelnut oil and phenolic extracts.

Methods (abridged version)

Step 1

- Collect husks from 6 wild selections (2016)
- Either freeze fresh or air dry in onion bags

Phenolics

- Extract phenolics
- Use HPLC to characterize
- Make a bunch of it for later use

Step 2

- Crush a bunch of hazelnuts to make oil
- Make a bunch of it for later use
- Do not eat on salads (although you really want to)

Step 3

- Test the extracts and the oil against 16 different specimen cultures

Results

Oil

- Disk diffusion assays-No zones of inhibition
- The control (cinnamon oil)- Large zones

Think up another way to do it (well assays)

- Find the same thing

Confusing?

- Orhan et al. (2011) found European hazelnut oil to be antimicrobial

- Orhan I, Ozcelik B, Sener B. Evaluation of antibacterial, antifungal, antiviral, and antioxidant potentials of some edible oils and their fatty acid profiles, Turkish Journal of Biology, 2011; 35: 251-258.

Phenolics

- Fresh husks twice as much as dried
- Glycosides of quercetin (rutin, quercitrin and spiraeoside)

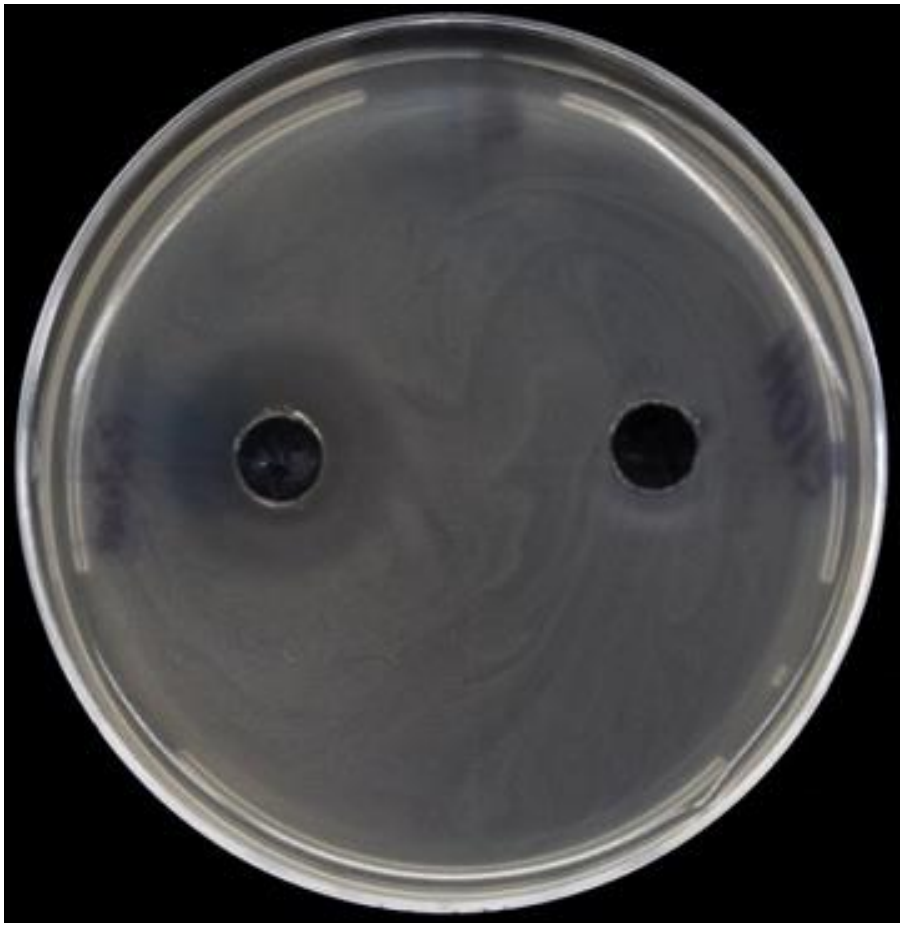
- While the profile is different than European, both are mostly glycosides of quercitin

Antimicrobial Impacts

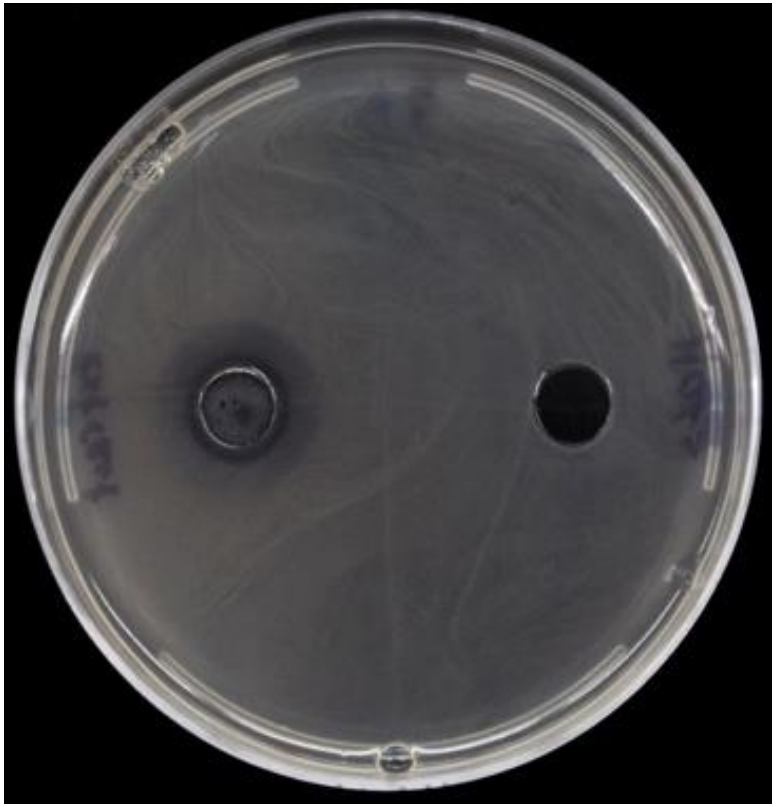
- Moderate to strong inhibition (10 of 16)
- No impact on yeast
- Gram-negative bacteria more sensitive than the Gram-positive bacteria

- *Staphylococcus aureus* showed a 2-phase zone

Example well assay (E. coli)



Example well assay (*Staphylococcus aureus)*



So, why do we care?

- Lots of husk
- Potential for use improves the potential for the crop

One Last Thing

- Sun Protection (SPF) commercial lab 2016
- 11 subjects
- SPF 4.4±0.4

Summary

- Glycosides of quercitin
- Oil limited impact
- Phenolics are antimicrobial on some bacteria

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