Quave Research Group

MEDICAL ETHNOBOTANY AND ANTI-INFECTIVE DRUG DISCOVERY

Project Title: **Green chemistry for the extraction of plant natural products**

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Award amount: $2844.47

Total amount spent: $2844.47

Project Objective:
To reduce the amount of solvent waste produced during photochemistry (the extraction and study of plant-derived natural products) by at least 50% by purchasing a heating mantel and Soxhlet glassware, replacing the current maceration protocol with a Soxhlet extraction protocol.

Results:
Soxhlet extraction is a continuous, hot extraction method used to isolate substances from solid material, using a solvent. The solvent is heated via the mantle. It then vaporizes and condenses back into the sample (plant material), extracting the desired components. This process happens repeatedly to maximize extraction. Maceration is a simple, cold extraction method involving soaking dried plant mass in a solvent for 72-144 hours.

We compared our existing Maceration extraction technique to a method developed using our new Soxhlet apparatus. Starting with approximately 40g of Schinus terebinthifolia (Brazilian peppertree) dried plant mass, and 100% MeOH ACS solvent, we tested two different plant mass to solvent ratios, 1:10 and 1:5.

Technique	Time (hr)	Plant Mass (g)	Solvent Volume (mL)	Extract Mass (g)	Yield (%)
Maceration	144	40.00	400	11.8	**29.5**
Soxhlet 1	10	40.42	405	17.17	**42.5**
Soxhlet 2	10	40.15	200	17.76	**44.2**

Compared to our standard Maceration extraction, the new Soxhlet extraction not only uses 50% less solvent, but takes less than one-tenth of the time, and yields approximately 50% more extract. We look forward to using our 3 new Soxhlet extractors on a variety of plant species.

Soxhlet Apparatus