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Analysis of Oyster Plant (*Tradescantia spathacea*) Extracts via Maceration, Soxhlet Extraction, Thin Layer Chromatography and Cytotoxicity Assays

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Abstract: The Oyster plant (*Tradescantia spathacea*) is a fleshy or succulent perennial garden herb. It is utilized for ornamental purposes in many tropical and subtropical climates. Medicinally, the plant is used for colds, sore throat, whooping cough, nasal bleeding, and also as an anti-inflammatory. Oyster Plants were grown and harvested from the organic garden at St. Thomas University. The different parts of each plant – leaves, stems, roots and flowers – were separated, cleaned, and dried at 40°C. Specimens were then grinded and prepared as extracts using maceration and Soxhlet extraction. All the extracts were rotevapored and analyzed by thin layer chromatography (TLC) with different mixtures of polar and nonpolar solvents. The spots were developed and visualized with iodine and UV light. Root and leaf fractions contained the majority of organic compounds. The present work reports the best solvent for extraction and the most effective conditions for TLC separation. Preliminary experiments testing ethanol-containing extracts for anticancer properties are also discussed.

Keywords: *medicinal plant, extraction, separation, chromatography, cancer, cytotoxicity*

Introduction

Natural products from plants play crucial roles in human life and are critical to the field of medicine. Plant components have been shown to be valuable sources for anticancer drug discovery.[1] Numerous studies have demonstrated that extracts from herbal medicines or mixtures have anticancer potential *in vitro* or *in vivo*.[2,3] Recent data suggests *Tradescantia spathacea* inhibits growth of a breast cancer cell line and affects Wnt/β-catenin signaling.[4] In addition, phenolic and flavonoid contents present in *T. spathacea* were recently reported to have antioxidant activities.[5] The aim of our work is to isolate potential new anticancer compounds from *T. spathacea* extracts through bioassay guided fractionation.

Fig 1. *Tradescantia spathacea,* an invasive plant species in Florida, grown in an organic garden at St. Thomas University.

Materials and Methods

All plants were grown under similar conditions. Solvents mixtures used for extraction were: ethanol/hexane 3:1; ethanol/hexane 1:1; ethanol and hexane alone. The dry material was extracted in one day using a Soxhlet extractor with ethanol and dichloromethane. Extracts were analyzed through thin layer chromatography (TLC).

MCF7 breast cancer cells (American Type Culture Collection) were cultured for 24 hours on 96-well plates in Eagle's Complete Media: Eagle's Minimum Essential Medium, 10% fetal bovine serum, 1X insulin-transferrin-selenium, and 1X penicillin/streptomycin. Leaf extracts prepared with ethanol/hexane 3:1, ethanol/hexane 1:1, and ethanol alone were solubilized in DMSO and added to the cells 24 hours later. Three extract concentrations were screened: 200, 100 and 20 µg/mL. After 24 hours, the culture media was replaced with RPMI1640 (without phenol red), 10% fetal bovine serum. A MTT cell viability assay was performed. Data from extract-treated cells were compared to that obtained from untreated controls.

Results

Preliminary data indicated that dichloromethane is a better extracting solvent. Compounds were separated with CH_2Cl_2/Isopropanol 4:6 and with petroleum ether/acetone/ cyclohexane 5:3:5. Numerous compounds of different polarities were found in roots and leaves (Fig.2). Preliminary data from MTT assays indicated a trend of greater cytotoxicity in 200µg/mL ethanol/hexane 3:1 leaf extracts compared to untreated controls.

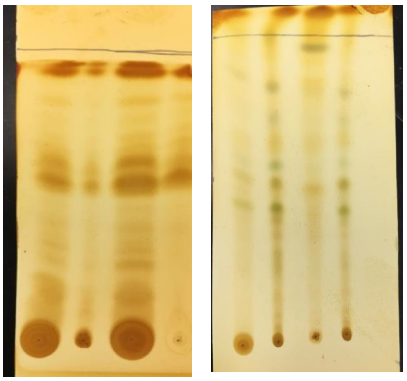

Fig.2: TLC of roots / TLC of leaves

Discussion

Column chromatography was done to separate the main components with promising results. More components were found in root and leaf extracts than stem and flower extracts. The infrared spectra of solids isolated from leaf extracts suggested the presence of phenolic and other polar compounds. Cytotoxicity assays are being replicated, and higher extract concentrations are being tested. Once the data is assessed, extracts will be tested in cell-invasion assays to study metastatic processes, and crude extracts with anticancer properties will be chemically fractionated to isolate active compounds.

Conflicts of Interest: Authors have no conflicts of interest.

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