

Development of Added VALUE materials from Wastes for ENvironment Applications (DAVAWENA) in Ateneo de Davao University

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Abstract:

Waste valorization studies in the Chemistry Department of Ateneo de Davao University will be presented. Some of these studies include (1) the low-cost recovery of bromelain solids from industrial pineapple wastes using ethanolic cashew leaf polyphenol extracts, (2) green extraction of chitin from local fish in the Philippines, and (3) commercial microwave-assisted synthesis of Polyethylene Terephthalate (PET) from Bis-(2-hydroxyethyl) Terephthalate (BHET) obtained from chemically recycled waste PET bottles. In study (1), a simple, low-cost procedure for the collection of solids with bromelain using industrial pineapple waste and polyphenols extracted from cashew leaf. An alternative method was introduced that allows for solids that have higher protease activities from pineapple core and pulp to be obtained from pineapple extract compared to typical extraction and purification methods. In study (2), the optimized parameters that yielded the purest chitin biopolymer in terms of percent mass loss are: 1:10 scale-to-acid ratio for bangus and 1:14 scale-to-acid ratio for tilapia, and 8:2 water-to-bromelain ratio per 1 gram of demineralized bangus scales and 9:1 water to bromelain ratio per 1 gram of demineralized tilapia scales. In study (3), BHET was re-synthesized into PET using a microwave-assisted process, further improved with the aid of the catalyst, para-toluenesulfonic acid (p-TSA). The optimized conditions were 120 W microwave power, 90 minutes irradiation time, and 1.0 % p-TSA catalyst concentration via the Box- Behnken design.