

TITLE:

Rainwater Harvesting for Non-potable Reuse in Gardens: a comparison of runoff water quality from green roofs versus traditional roofing applications

AUTHORS:

Natasha Nicholson (student)
Dr. Shirley Clark (advisor)

AFFILIATION:

Penn State Harrisburg

ADDRESS:

Penn State Harrisburg
777 West Harrisburg Pike
Middletown, PA 17057

ABSTRACT:

The use of harvested rainwater is one approach for freeing up potable water for more essential applications. Roofs are a readily available surface area that can easily be adapted for rainwater collection; however, some surface materials are not benign and may be more likely to leach contaminants. In this study, several commonly available roofing materials (uncoated galvanized, coated galvanized, cedar shakes, asphalt shingles, treated woods, plexiglass control, and a green roof) were evaluated for runoff water quality for approximately a year and a half. The runoff samples were analyzed for zinc, copper, pH, total phosphorus, total nitrogen, and conductivity. Data from this study showed that traditional roofing materials such as uncoated galvanized metal and treated woods are more likely to leach heavy metals, nitrates, and ammonia than other materials studied. Currently, the water quality data is being compared to recorded storm data and inter-event times to determine what factors affect the quality of the runoff. In addition, the results are being compared to water quality requirements for various grey water uses and for toxicity to ornamental plants. This data can then be used to improve existing rainwater harvesting direction and develop more accurate application guidelines.