

Plastic water bottles, source of phthalates?

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Introduction

- Plastic is in just about everything and plastic water bottles are used in the millions everyday in the U.S. (Pace, n.d).
- Plastics contain phthalates which are added to increase the flexibility, durability, longevity, and transparency of plastics.
- Phthalates are found in personal-care products, plastic bottles, medical tubing, and in food. These are things used in our everyday lives, and due to their ability to act as endocrine disruptors in humans, knowing the sources of exposure is crucial for public health.
- This study was conducted to determine the presence of phthalates in disposable water bottles after incubation at three different temperatures to determine the optimal storage temperature that would ensure the least amount of phthalates.
- It was hypothesized that water stored at higher temperatures would have higher levels of DMP compared to water stored in colder temperatures (Al-Saleh, 2011).

Experimental Design

- Water bottles incubated at three different temperatures and tested every two weeks for phthalate levels over an eight-week period.
- The extraction method that was used for the experiment was a liquid-to-liquid extraction (Cai, 2007).
- The remaining solution was analyzed through a HPLC and phthalate levels were recorded.

Experimental Design

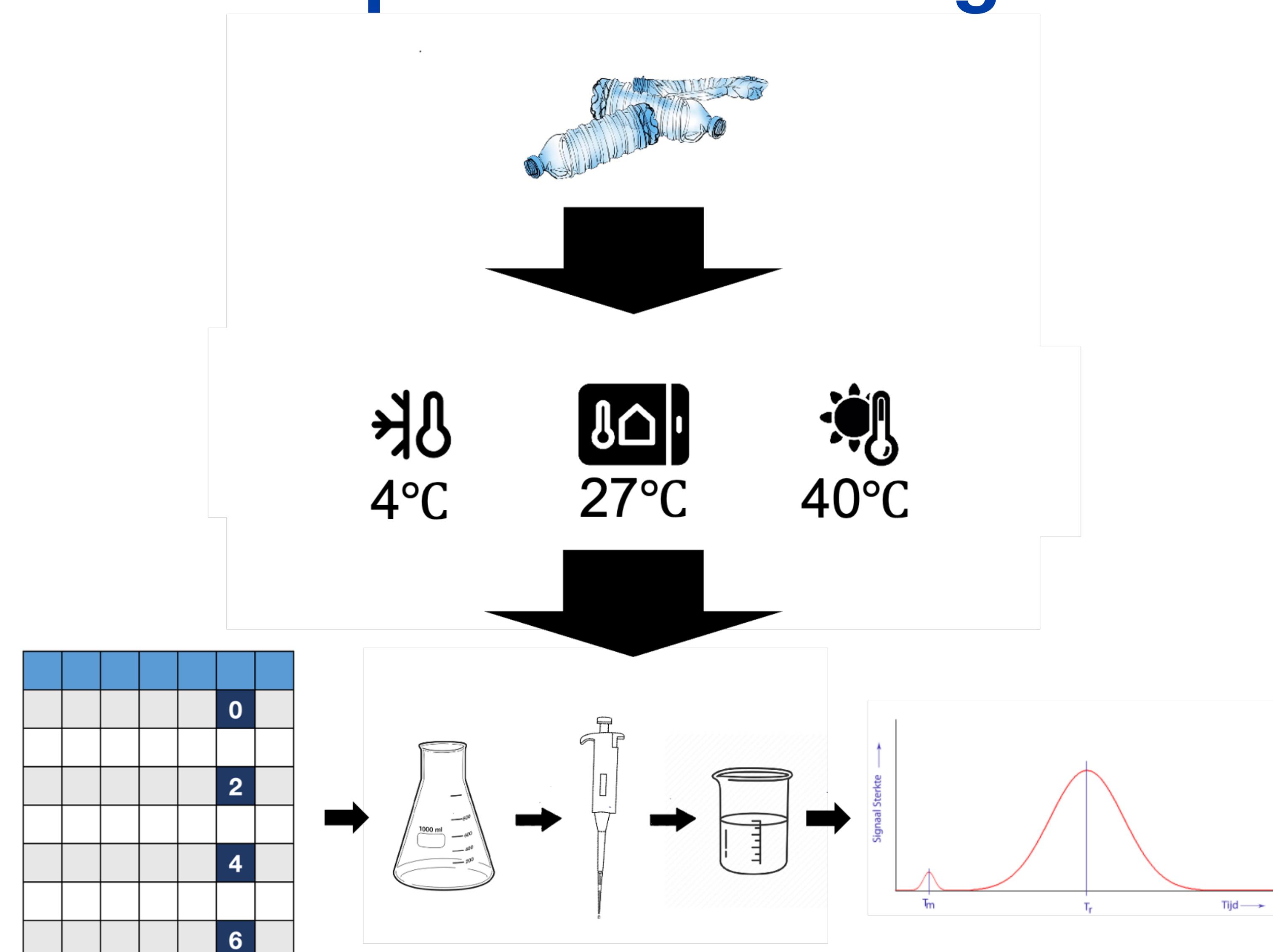


Fig 1. Experimental design

Results

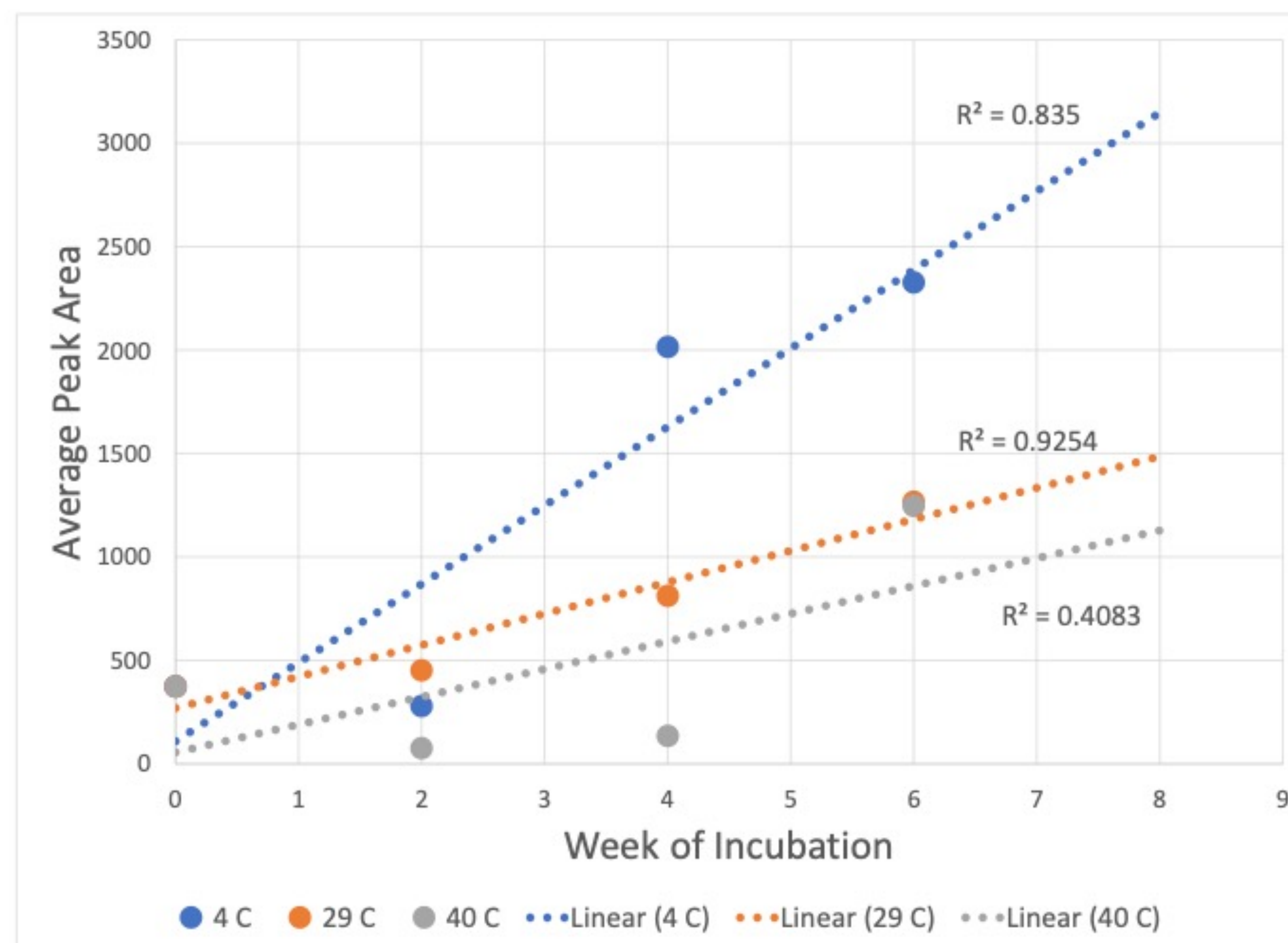
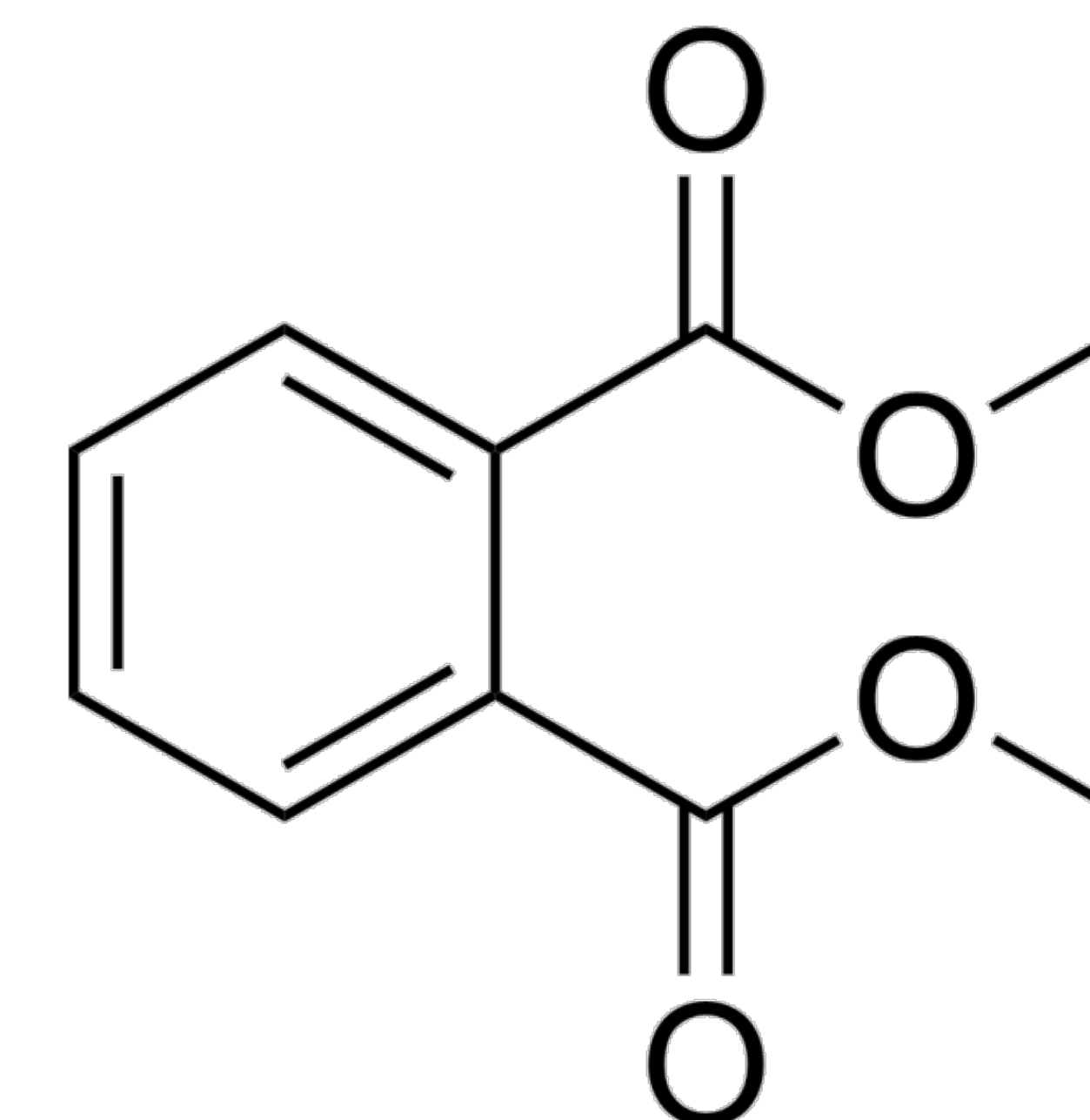


Fig 2. Change in phthalate level at each incubation temperature over a 6 week period

Fig 3. Structure of dimethyl phthalate (DMP)



Discussion

- The phthalate levels have increased over time. The colder temperatures had higher levels of phthalates detected, with the higher temperature having the lowest phthalates levels.
- If week 8 follows the upward trend of the equation of the line it can be predicted that the phthalate levels would be higher.
- Water bottles at the temperature of 4°C had the highest amount of phthalates. Contradictory to other studies.
- It should be noted that storage of water bottles should be minimized at all temperatures to reduce the amount of phthalates.
- Even though water bottles contain small amounts of phthalate, these chemicals should still not be dismissed due to the health issues which could arise from exposure.

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