

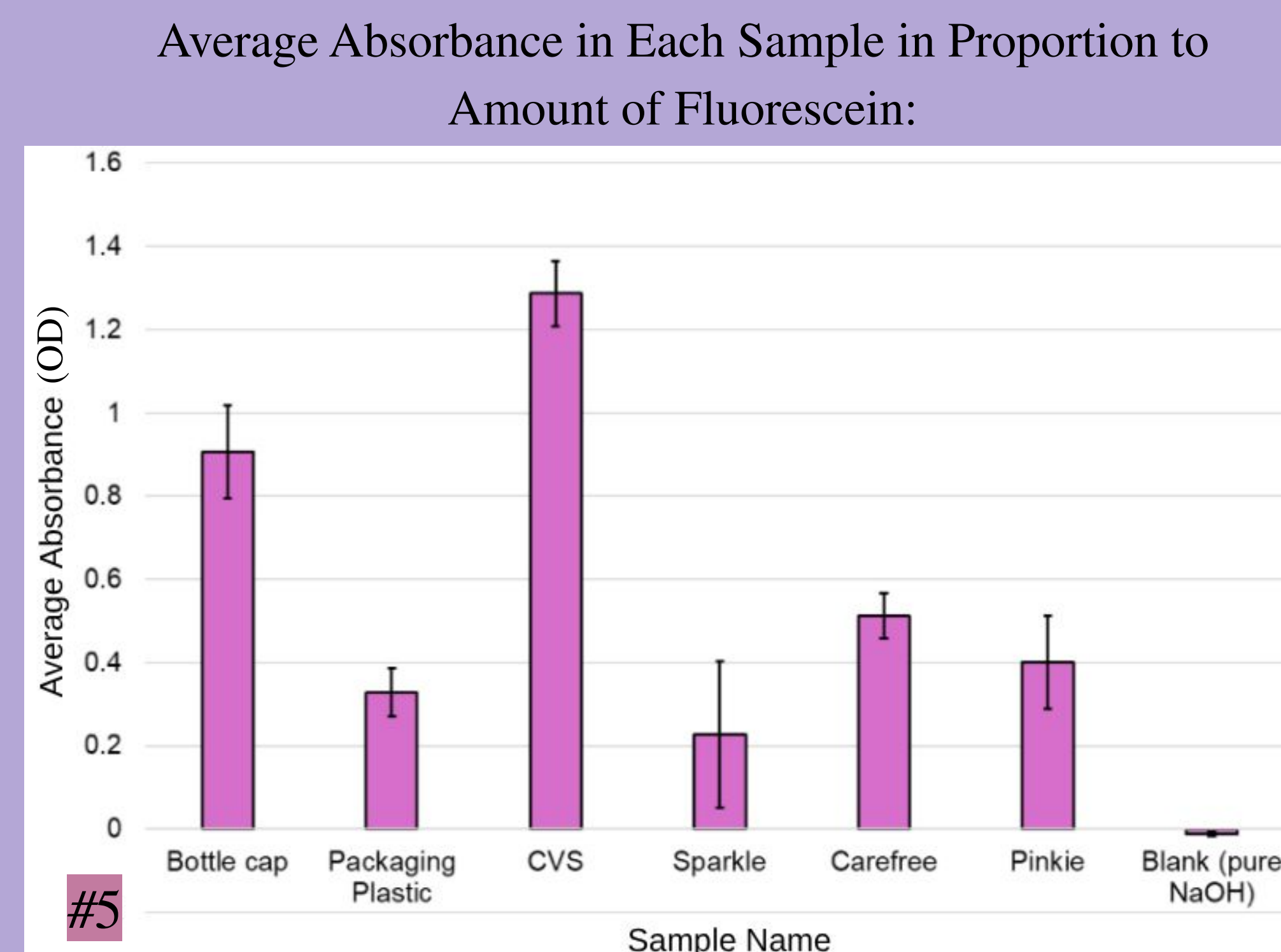
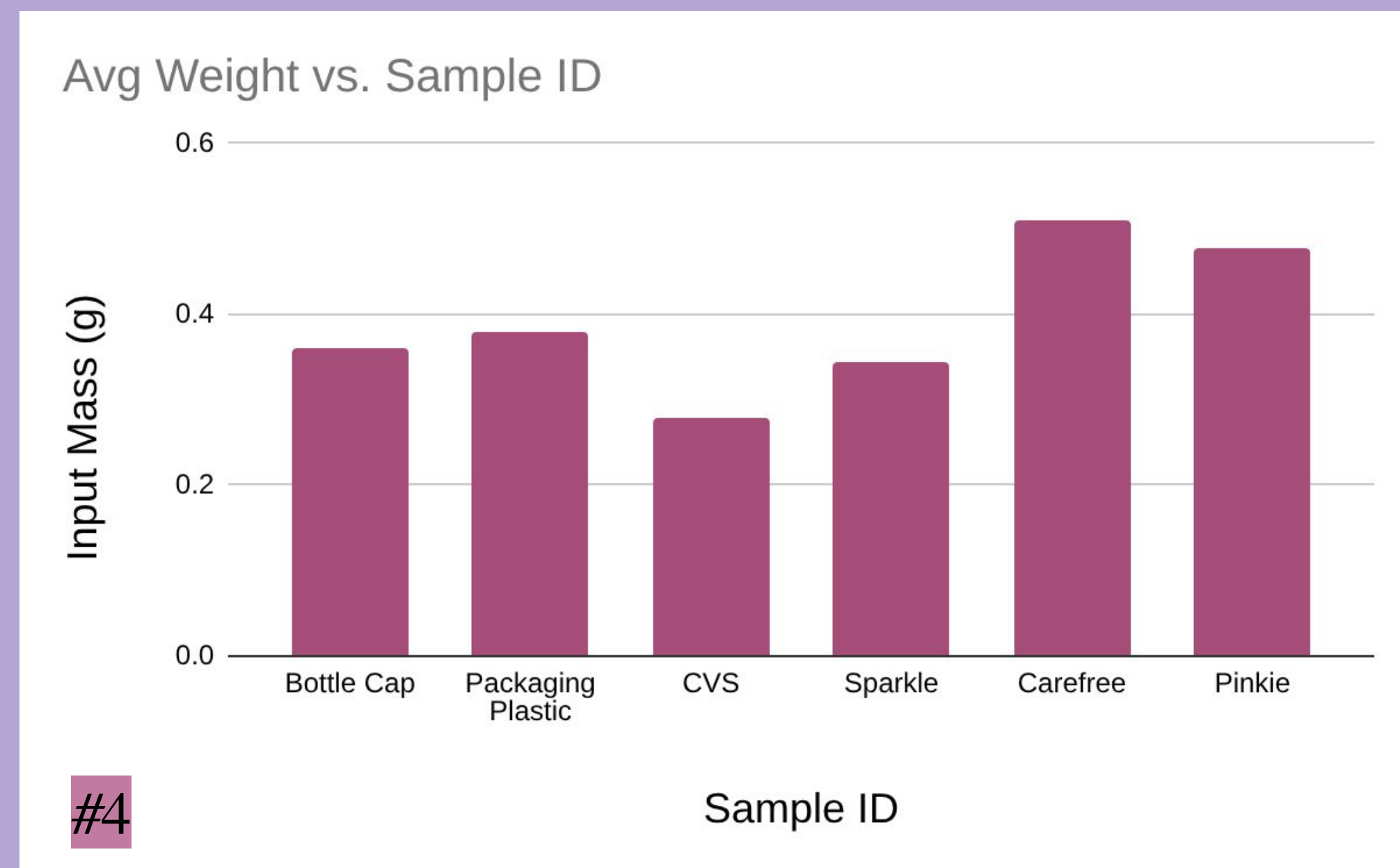
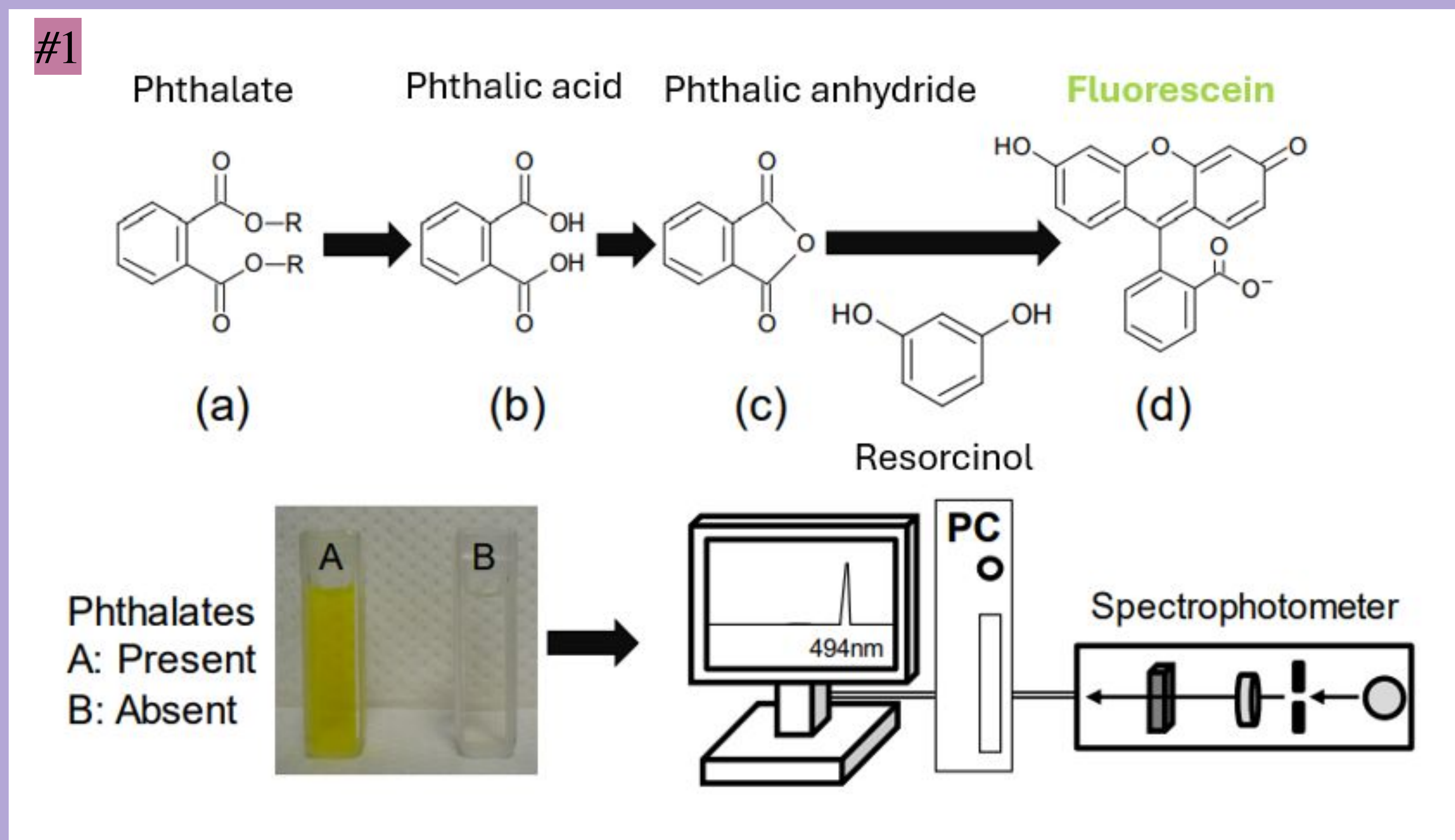
Which brand of sanitary pads contains the highest amount of phthalates?

Menstrual products have been found to contain a multitude of toxic chemicals and harmful substances. These additives -particularly phthalates and other plasticizers- are known to have negative impacts on the endocrine system, reproductive system, and human health overall. As a female myself, I've grown increasingly concerned –and curious– as to which brands could be doing the most harm, and whether the brands that charge more under the guise of being organic and toxin-free, truly are the safer option.

The drugstore sanitary pads (CVS and Carefree) will contain more phthalates than the organic brand pads (Sparkle and Pinkie: Teen & Tween).

On average, a person menstruates from age 13 years to 51 years, every 28 days, with a 3–7-day range. This means that they will have 456 periods for about 38 years and use more than 10 000 menstrual products in their lifetime (Lancet Regional Health-Americas, 2022). However, nearly all of these products contain high levels of plastics. Phthalates -a group of chemicals- are added to plastics to make them softer, more flexible, and durable. The issue with these substances is the fact that not only are they harmful towards the environment, but also our bodies. Phthalates have been found to be an endocrine-disrupting chemical (EDC), meaning they disrupt hormones and the function of the endocrine system as a whole. Long term exposure can have adverse effects on the functioning of certain organs, negatively impact the chances of pregnancy, childbirth, and the reproductive system overall. The best way to measure phthalate presence is through gas chromatography-mass spectrometry (GC-MS). However, these machines are only available in the lab setting and expensive to use. Therefore, an alternative solution for measuring phthalates was developed through colorimetric determination.

METHODOLOGY & DATA



- conducting trials with a GC-MS machine for improved accuracy and more brands of menstrual pads
- testing tampons and other feminine hygiene products for phthalates and other types of plasticizers
- a more innovative approach would be to create a menstrual product that is entirely reliant on natural components, benefits female reproductive health, and will not come into contact with other plasticizers during the manufacturing process.

- Though accessible, spectrophotometry is still not as accurate as GC-MS
- The sample masses were slightly varied, therefore the data was normalized

The data collected supported the hypothesis that phthalate concentration differed among the four sanitary pads tested. Using resorcinol-based colorimetric assay and spectrophotometry, CVS and Carefree consistently produced higher absorbance values than Sparkle and Pinkie. Due to greater absorbance reflecting stronger interaction with resorcinol and therefore higher phthalate presence. These results suggested that CVS and Carefree contain more phthalates than the two organic brands. Since phthalates are known as EDCs that can cause hormonal imbalance with repeated exposure, it is important for manufacturers to clearly disclose the presence of phthalates or other potential EDC's, so that consumers can make an informed decision regarding their purchases.

This graph shows the average absorbance of each sample (bottle cap, packaging plastic, and each brand of pads) in optical density (OD). A high absorbance is directly proportional to fluorescein presence which correlates to the amount of phthalates. Bottle cap plastic produced a high absorbance of around 0.95 OD, serving as a useful comparison due to the fact that it is known to contain plasticizers. Among the sanitary pads, CVS showed the highest average absorbance at approximately 1.30 OD, suggesting the strongest phthalate presence of all sanitary pad brands tested. Carefree measured around 0.55 OD, indicating a moderate level of phthalates. In contrast, the two organic brands showed much lower absorbance values: Pinkie measured about 0.45 OD, and Sparkle was the lowest at around 0.30 OD, reflecting significantly reduced phthalate content. The blank (pure NaOH) remained near 0.00, confirming that the color change occurs only when phthalates or similar plasticizers are present. Overall, the data clearly indicates CVS and Carefree contain higher levels of phthalates, while Sparkle and Pinkie contain lower levels.

Yanagisawa, H., & Fujimaki, S. (2019). Simple Colorimetric Determination of Phthalates in Polymers by Dye Formation. *Analytical sciences : the international journal of the Japan Society for Analytical Chemistry*, 35(11), 1215–1219. <https://doi.org/10.2116/analsci.19P165>

Regional Health-Americas T. L. (2022). Menstrual health: a neglected public health problem. *Lancet regional health. Americas*, 15, 100399. <https://doi.org/10.1016/j.lana.2022.100399>

Wang, Y., & Qian, H. (2021). Phthalates and Their Impacts on Human Health. *Healthcare (Basel, Switzerland)*, 9(5), 603. <https://doi.org/10.3390/healthcare9050603>

Figure 1: Yanagisawa, H., & Fujimaki, S. (2019). Simple Colorimetric Determination of Phthalates in Polymers by Dye Formation. *Analytical sciences : the international journal of the Japan Society for Analytical Chemistry*, 35(11), 1215–12

Figures 2, 3, and 6 photographed by Finalist, 2025

Figures 4 and 5 created by Finalist using Google Sheets, 2025