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Developing a simple method for identification of plastics

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Today the plastic is a hugely consumed ready-made product. The amount of consumption of plastic product reaches thousands of tons of kilograms per year. Therefore, huge amounts of solid plastic waste are observed in Sri Lanka and it has been a great environmental problem for all the living beings. In all recycling factories sorting is done by laborers manually with their experience and ability. But there are some cases where they fail to determine the plastic despite their experience. In this case they have to abandon these plastics without recycling. So the aim of this study is to develop a simple method for sorting of plastic. In this research plastics are classified using their densities and the properties of flame for different plastics were also studied.

In order to measure the densities, samples of PP, LDPE, HDPE, PVC, PC, PS, ABS and PET were dipped in the water. Samples of PP, LDPE and HDPE floated on water. Therefore they were dipped in 20 cm of isopropanol. The density of isopropanol was changed by adding water. Required water volumes for each sample were 15 cm 25 cm
40 cm respectively. The samples PVC, PC, PS, ABS and PET sank in water. Therefore they were dipped in a saturated sugar solution. Only ABS and PS were seen floating in the sugar solution. PS can be identified from ABS by using Petrol. Only PS formed a sticky gum with petrol.

In the flame test, both LDPE and HDPE gave a yellow I white flame without smoke; PP gave yellow I white flame with slight smoke; ABS gave a yellow I white flame with a heavy smoke; PVC gave yellow I white flame inside the burner, but no flame without burner only a slight smoke; PET gave yellow I white red flame and black smoke with and without the burner; PC gave neither a flame nor smoke with or without burner. Only black color pieces were observed.

The results and the observations clearly show that simple density based method and a flame based method can be used, in combination, to identify different kinds of plastics.

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