## Image analysis techniques: a tool to study the residence time of microplastics on sandy beaches?

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## Abstract

Nurdles, or pre-production thermoplastic resins, are an important source of microplastic pollution in marine and coastal ecosystems due to losses mainly during their production and transport. As a consequence of their behavior in the aquatic environment, microplastics received great attention because of their harmful effects on marine organisms. As they enter the marine environment, pellets begin to undergo photooxidation and erosion, turning yellow. The yellowing degree can be used to infer their residence time in the environment, contributing to studies on toxicity, sources, and the role of microplastics as a threat to human health and biota. In this study, we have tried to use the RGB color to evaluate the vellowing degree of 225 photographs of pellets found on sandy beaches from Santa Catarina island. We created two proposals for the intervals of the yellowing degree, the first by using only values from the blue (B) band and the second with values from the blue and the red (R) band. We compared both proposals with the visual classification from the images, the results showed a low efficiency of the created intervals (51.77% for band B and 50.44% for bands B and R). The results also showed that both proposals can well classify the low yellowing degree classes as null yellowness (70.31%) and low yellowness (72.37%), but can't classify the moderate yellowness class (0%). The high yellowing degree classes classified with the first proposal showed overlap in the results, high yellowness (44.74%) and very high yellowness (0%), then we tried the second proposal and the results were 31.58% for high yellowness and 38.46% for very high vellowness. Based on this work, we discussed the limitation of the methodology and future perspectives to classify the yellowing degree.

Keywords: Marine pollution 1. Plastic pellets 2. Plastics industry 3.

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