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# Chemical Degradation of Synthetic Polymers Surgical Masks

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## Introduction

With the Covid-19 pandemic, the consumption of surgical masks soared worldwide[1].To prevent the spread of this respiratory disease, it became mandatory to use masks in several countries. The masks are mostly constituted by polypropylene. In this way, the massive use by the population of these products may be a potential risk to the environment and health. The disposable face mask that get to the environment, discarded in landfill, oceans or littering at public spaces, etc., could be emerging a new source of microplastic [2].This project aims to evaluate the decomposition of masks when subjected to aggressive environments (acid and base) and subjected to environmental conditions for a certain period of time.

## Methodology

We left a mask buried in the ground, subject only to environmental conditions, for 3 months.
The chemical “attack” was carried out in surgical masks (the masks were cut into pieces of approximately the same size) with three different solutions: $HNO_3$, HCl and NaOH under stirring for 24 h. At the end of time, the sample masks were washed with distilled water and dry. Following, the sample masks were analysed by FTIR to evaluated degree of decomposition. the The project we had the opportunity to carry out allowed us to understand why there is still no ideal treatment for surgical masks that are discarded in unsorted garbage, contrary to medical waste masks that are subject to disinfection treatment before their disposal.


Figure 1: The chemical “attack”tin surgical masks with three different solutions

## Results and Conclusions

Based on the FTIR profiles, the changes in the components were not significant, since the variations between the initial mask and after being subjected to each of the two acids and the base ($HNO_3$, HCl and NaOH) were practically nil (they were not easily visible), as well as the mask only subject to environmental conditions for a few months. Thus, showing, in almost all, the same characteristics between the beginning and the end of the experiment, we can say that its degradation was practically nil, since there are no significant alterations in the polymeric structure.
It was possible to conclude that the material that makes up the masks is quite resistant, not being easily degraded even under severe conditions such as those used in the tests. Therefore, it is expected that this type of material when discarded into the environment will remain intact for a long period of time. However, there are already some alternatives to this plastic material, e.g. masks made of rice paper and wool.

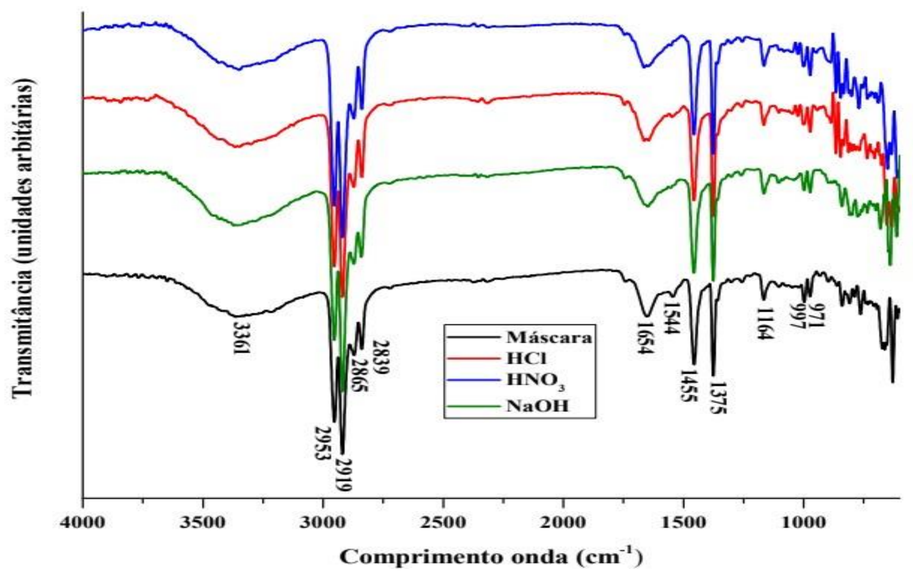


Figure 2: Results of analises by FTIR

## Acknowledgements

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## References

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