



PRESS RELEASE

BIOMASK

Due to the current pandemic, the plastic crisis has been exacerbated by the massive generation of mask waste. A large part of these masks are produced or contain non-biodegradable plastics of petrochemical origin such as polypropylene (PP), therefore, their massive use since the pandemic poses serious environmental problems. BIOINICIA proposes as an alternative the use of biobased and compostable and biodegradable in the environment polymers that replace polypropylene.

Recent studies suggest that the use of compostable polymers to generate masks can reduce the carbon footprint of conventional masks by between 30 and 70%. Being compostable, the circularity of the useful life reduces the environmental impact and the CO₂ emission in the waste treatment processes. In addition, the PROVEIL® BIOMASK reduces environmental toxicity when it becomes waste after use, offering an environmentally sustainable solution to the new mass consumption product generated by the pandemic.

PROVEIL® BIOMASK is made with materials of natural origin, biodegradable in the environment and complying with compostability standards. In addition, the nose clip of the mask is industrial compostable. In this model only the rubber bands are not compostable yet. These components must be disposed of as plastic waste for recycling.

RESULTS

The biodegradability and disintegration of the PROVEIL® BIOMASK mask have been evaluated following the ISO 20200 standards for Disintegration in industrial composting; ISO 14855 on Biodegradation in industrial composting and the AS 5810 standard on Disintegration in domestic composting. The disintegration study was carried out in 3 environments: industrial, soil and home composting. The

biodegradation studies indicated that it passed the norm in all the environments tested, disintegrating completely at 46, 70 and 81 days, respectively, for each one of the environments. On the other hand, industrial biodegradation was analyzed at 58°C, obtaining complete biodegradability at 90 days, except for the rubber bands.

To assess biodegradation in real environmental conditions, disintegration studies were carried out in-situ in the marine environment. After 9 months, the mask had completely disintegrated in its majority.

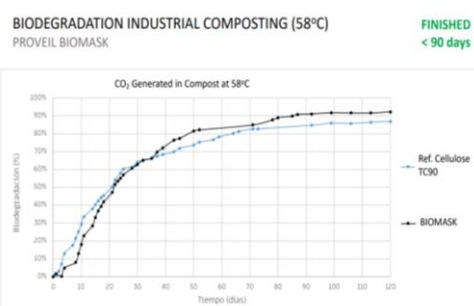
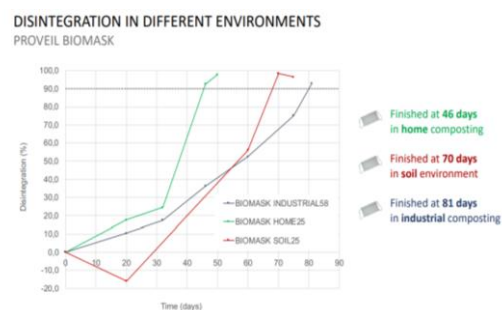


Fig 1. Biodegradation and disintegration tests

The filtration of PROVEIL® BIOMASK masks complies with the standard for hygienic masks UNE CWA17553:2020, with a certified bacterial filtration efficiency greater than 98% and aerosol filtration

efficiency measured in collaboration with the IATA-CSIC greater than 93%.

In terms of reusability, PROVEIL® BIOMASK masks can be disinfected with sprays of 70% alcoholic solution between one use and another to prevent the inhalation of microorganisms derived from the use of the mask itself, while the filtration and breathability properties remain unchanged, according to measures carried out in collaboration with the IATA-CSIC.

In view of the results obtained with the PROVEIL® BIOMASK masks, Bioinicia continued with the development, producing the world's first certified FFP1 industrial compostable PPE mask with a filtration efficiency to aerosols greater than 98%. Disintegration studies in industrial composting of this type of mask showed very positive results since it completely disintegrates in 22 days, following the ISO 20200 standard, as can be seen in the figure on the right.

Currently, further studies are being carried out to certify this PPE-type mask as FFP2, since, according to measures carried out in collaboration with the IATA-CSIC, it has filtration and breathability properties compatible with those of a mask of the type FFP2.

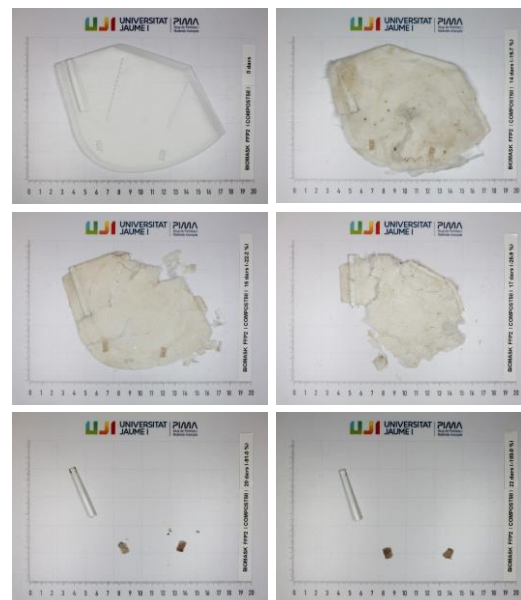


Fig 2. Disintegration tests of the FFP1 PPE biomask

PROVEIL® BIOMASK presents unique characteristics in the current market:

- **Biodegradability in the environment and/or industrial compostability**

PROVEIL® BIOMASK presents a patented sustainable product derived from biomass that can be organically recycled.

- **Innovation in filter media**

The use of the proprietary electrospinning technology to generate nanofiber filters uses a very small amount of raw material (< 1 g/m²) to obtain high-efficiency filters.

- **High protection**

The use of filters based on nanofibers allows obtaining masks with high filtration efficiency against aerosols in accordance with EN149 using a small amount of material. This means that a mask made with nanofibers not only has a high bacteria filtration efficiency (BFE) but also to tiny aerosols with viral load, making it the first personal protective equipment that can be organically recycled.