



# Handmade masks: more environmentally friendly than compliant masks. Comparative study of the Red Sea and Black Sea coast

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**Abstract.** The main objective of this study was to understand the degree of pollution with face masks on the Black Sea and Red Sea coasts. We also sought to understand the causes of the difference in pollution with masks between the two tourist coastal regions. The degree of pollution with protective masks is far higher on the Black Sea coast (Mangalia), 0.042 masks per linear meter of coastline, compared to only 0.003 masks per linear meter in Hurghada (Red Sea coast). This difference is caused by several factors, but the most important is that Egyptian people use hand made masks which are reusable after washing.

**Key words:** face mask, hand made, Covid 19, pandemic, Red Sea, Black Sea.

**Introduction.** The pandemic year 2020 brought us a lot of changes in the way of life, but at the same time, nature breathed a sigh of relief due to the decrease of anthropogenic pressure on the environment (Kumari & Toshniwal 2020; Berman & Ebisu 2020). However, nature has suffered from pollution with masks and protective gloves not properly collected or recycled (Aragaw 2020; Fadare & Okoffo 2020).

The starting point of this study was the preliminary observation that the Black Sea coast is much more heavily polluted with protective masks and disposable gloves than the Red Sea coast. As a result, the causes of these differences in pollution intensity with protective masks and disposable gloves were investigated in parallel in the Hurghada (Egypt) and Mangalia (Romania) areas.

**Material and Method.** The Red Sea is poorly or almost not supplied with water by African or Asian rivers (Edwards 2013). The western part of the Black Sea, compared to the Red Sea, is supplied with fresh water from the European continent through rivers such as the Danube, the Dniester, the Dnieper, etc. In order to avoid as much as possible the error caused by the pollution differences inflated by the nearby rivers, Mangalia was chosen as a study area, which is also less intensely visited by tourists compared to other Romanian resorts.

The degree of pollution was assessed by recording the number of masks per linear meter of coastline in Hurghada for the Red Sea and Mangalia for the Black Sea, respectively. The investigated coastline was 3 km, with measurements on randomly marked sectors.

The type and source of masks of the inhabitants and tourists from Hurghada, respectively from Mangalia, respectively, was evaluated, randomly, by interview.

The study period was the end of the 2020 season, more precisely the end of August in Romania and the end of December in Egypt. Although there is no end of season in Egypt, in the pandemic year 2020 December marked a decline in tourism in Hurghada, similar to the end of the tourist season in Europe.

**Results and Discussion.** Most tourists in and around Mangalia are Romanian and almost all are European. Hurghada tourists are a complex mix of tourists from different continents, most of them Germans, Russians and Ukrainians.

The degree of pollution with protective masks is far higher on the Black Sea coast, 0.042 masks per linear meter of coastline, compared to only 0.003 masks per linear meter in Hurghada (Red Sea coast) (Table 1). This difference is caused by several factors, which we will list in order of importance:

1) the Egyptians do not wear disposable masks, but handmade masks that can be reused after washing. Europeans mostly wear disposable surgical masks that are not reusable (Figure 1);

2) the protective rules against Covid 19 in Egypt did not require the wearing of the mask outdoors until after January 1, 2021 (after the completion of our study). This meant that European tourists in Egypt, wearing disposable masks, did not wear masks on the beach and therefore did not throw protective masks in the coastal area;

3) tourism management and maintaining cleanliness on the beach is very important for the prosperity of tourism. This is understood and not neglected by the Egyptians, because tourism is their only source of income. The management of the coast, the resort, the landscape, the biodiversity and the keeping alive of the values of the national identity are impeccably capitalized by the Egyptian people (Figure 2);

4) even if the study area was chosen so as not to be influenced by the masks brought by the rivers, this is certainly not perfectly achievable. Certainly a contribution to this large number of masks found on the Romanian coast are brought by currents off the Black Sea.

Table 1

Data collected in Hurghada (Egypt) and Mangalia (Romania) about the pollution with face masks and disposable gloves

<i>Data investigated</i>	<i>Hurghada (Egypt)</i>	<i>Mangalia (Romania)</i>
Number of protective masks per linear meter	0.003	0.042
Number of disposable gloves per linear meter	0.000	0.000
The type of mask	Reusable protective mask	Disposable protective mask
The source of the masks	Private manufacturing	Mainly pharmacies
Source of disposable gloves	Mainly pharmacies	Mainly pharmacies



Figure 1. Handmade mask of the type worn by the Egyptians (left) and disposable mask of the type worn by the Europeans (right).



Figure 2. Egypt protects the environment and promotes its national values among tourists.

**Conclusions.** The degree of pollution with protective masks is far higher on the Black Sea coast (Mangalia), 0.042 masks per linear meter of coastline, compared to only 0.003 masks per linear meter in Hurghada (Red Sea coast). This difference is caused by several factors, but the most important is that Egyptian people use hand made masks which are reusable after washing.

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