

Microbiological quality assessment of sand from beaches in Portuguese coast: 15 years of experience



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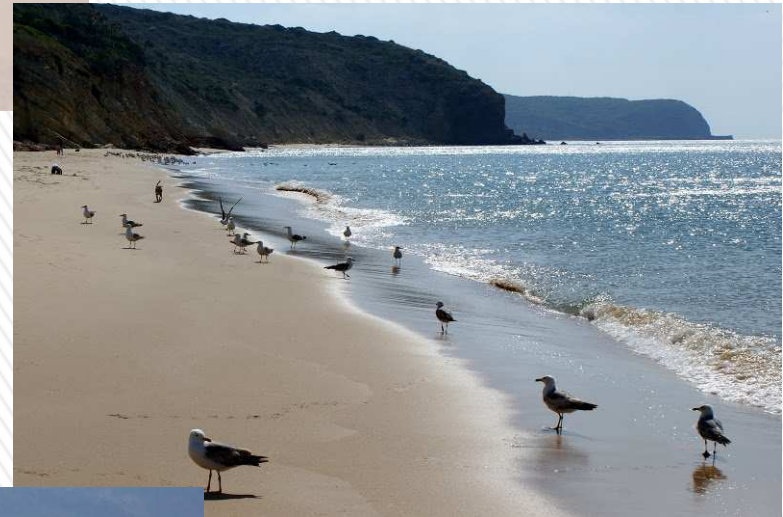


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Sources of contamination



Quality indicators:

Bacteria Indicators of Human Contamination

Total coliforms, *Escherichia coli* , Faecal *Enterococci*

Potential Pathogenic Bacteria

Staphylococcus spp. coagulase positive, *Pseudomonas aeruginosa*

Yeasts

Candida albicans



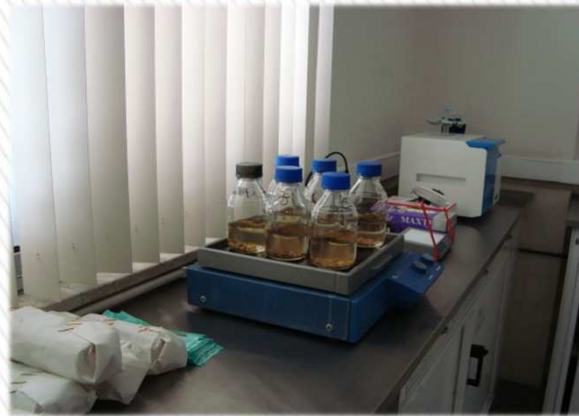
Molds

Aspergillus niger, *Aspergillus fumigatus*, *Penicillium* spp.,
Alternaria spp., *Cladosporium* spp., *Fusarium* spp., *Mucor* spp.

Scytalidium spp, *Scopulariopsis* spp and Dermatophytes



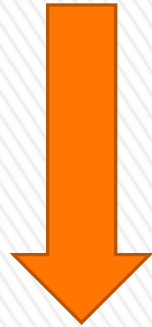
The analytical procedures, applied to the sand washing solution, were adapted from reference methods used in bacteriological analysis of recreational water.



Different selective culture media are used for the isolation and characterization of the microorganisms.



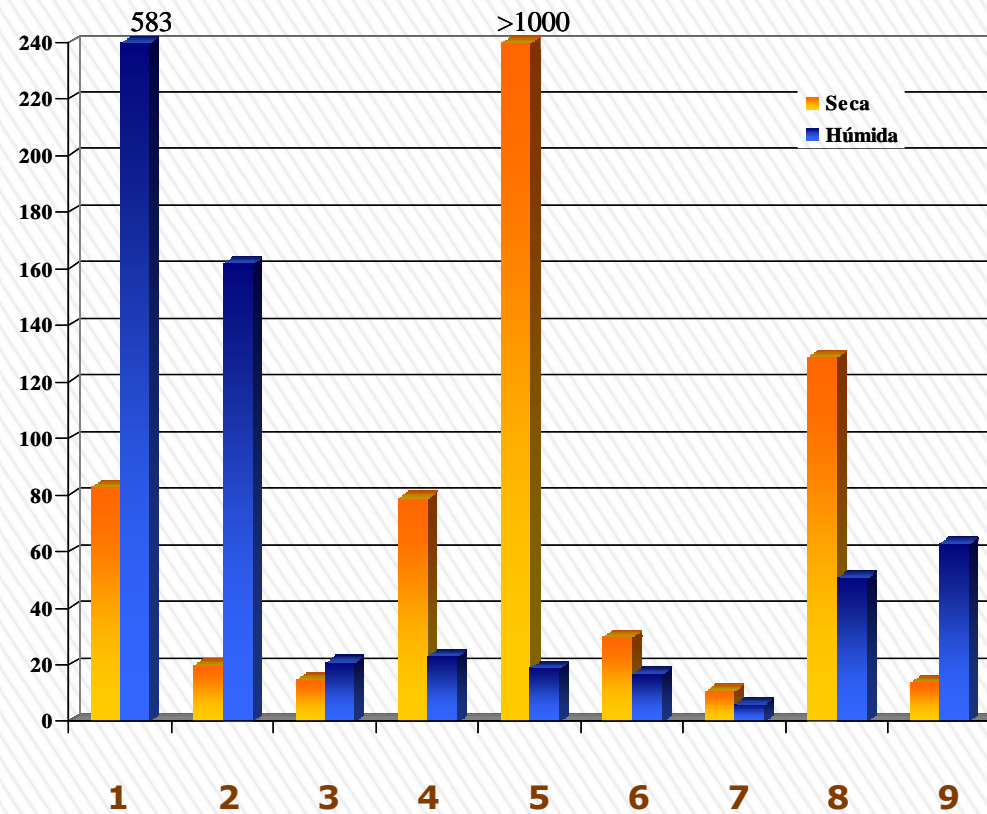
Microbial control of the beach sand during bathing season



IMPORTANT

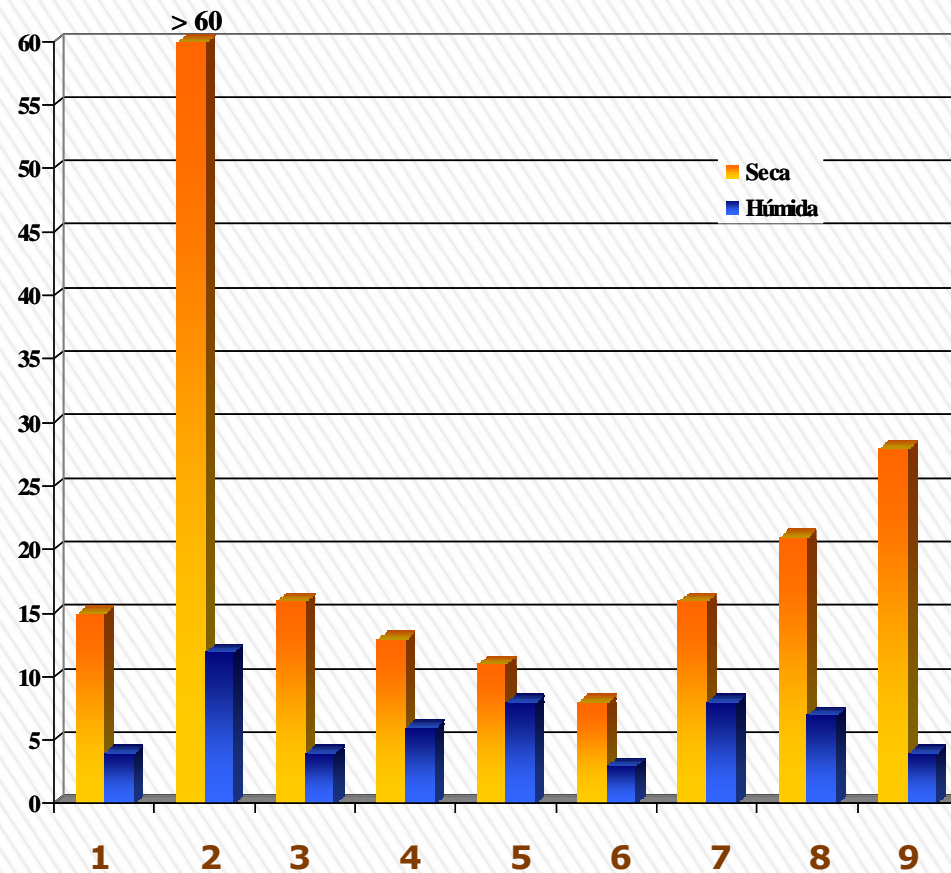






Sum of the number of bacteria surveyed in the dry and wet area in the samples taken during the 2001 bathing season





Sum of the number of fungi surveyed in the dry and wet area in the samples taken during the 2001 bathing season



→ Harvests made at 3 points in the dry sand



→ Microbial control should be done before the beginning of the bath season and during all summer.



→ The municipalities responsible for beaches, promote the cleaning and in some cases even the disinfection of sand.



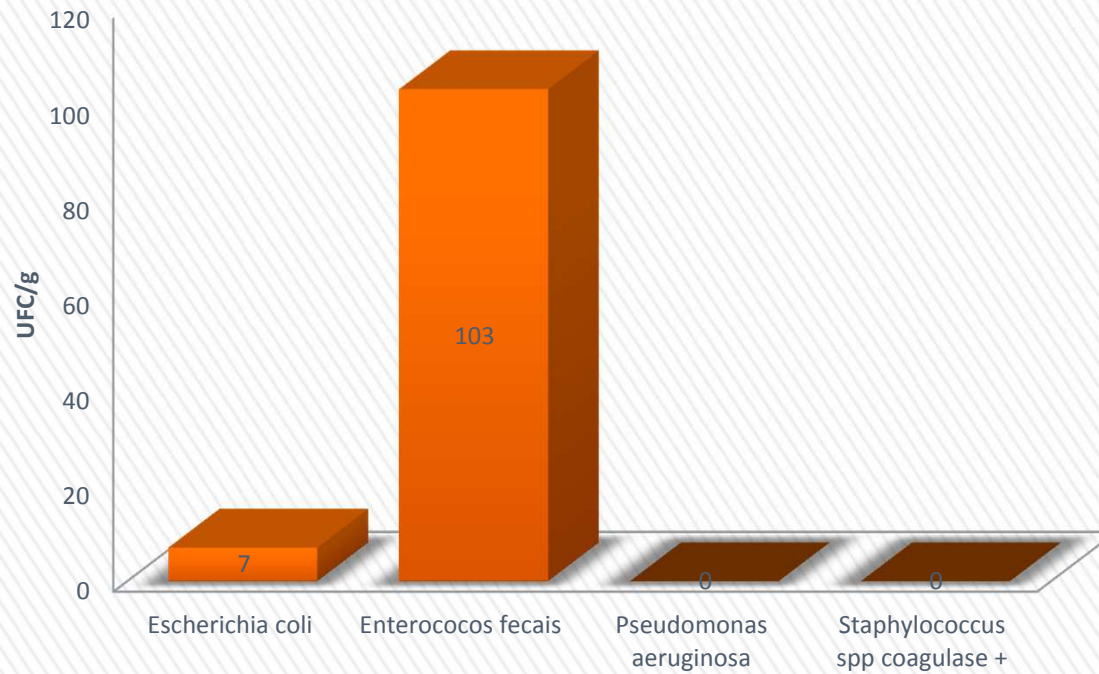
Bacteria found in more quantity

- Total coliforms
- Faecal *Enterococci*
- *Staphylococcus* spp
- *Bacillus* spp

Bacteria found in small quantity

- *Pseudomonas aeruginosa*
- *Staphylococcus coagulase positive*





Sum of the number of bacteria surveyed in the samples taken during the 2013 bathing season



Given the results of mycological control, the best indicators of pollution from the sands of the beaches are:

Filamentous fungi (Molds)

Fusarium, Aspergillus niger spp, Mucor spp, Alternaria spp

Yeasts.

Candida albicans



Aspergillus fumigatus is almost absent

Cladosporium spp and *Penicillium* spp → very common



normal flora in the environment



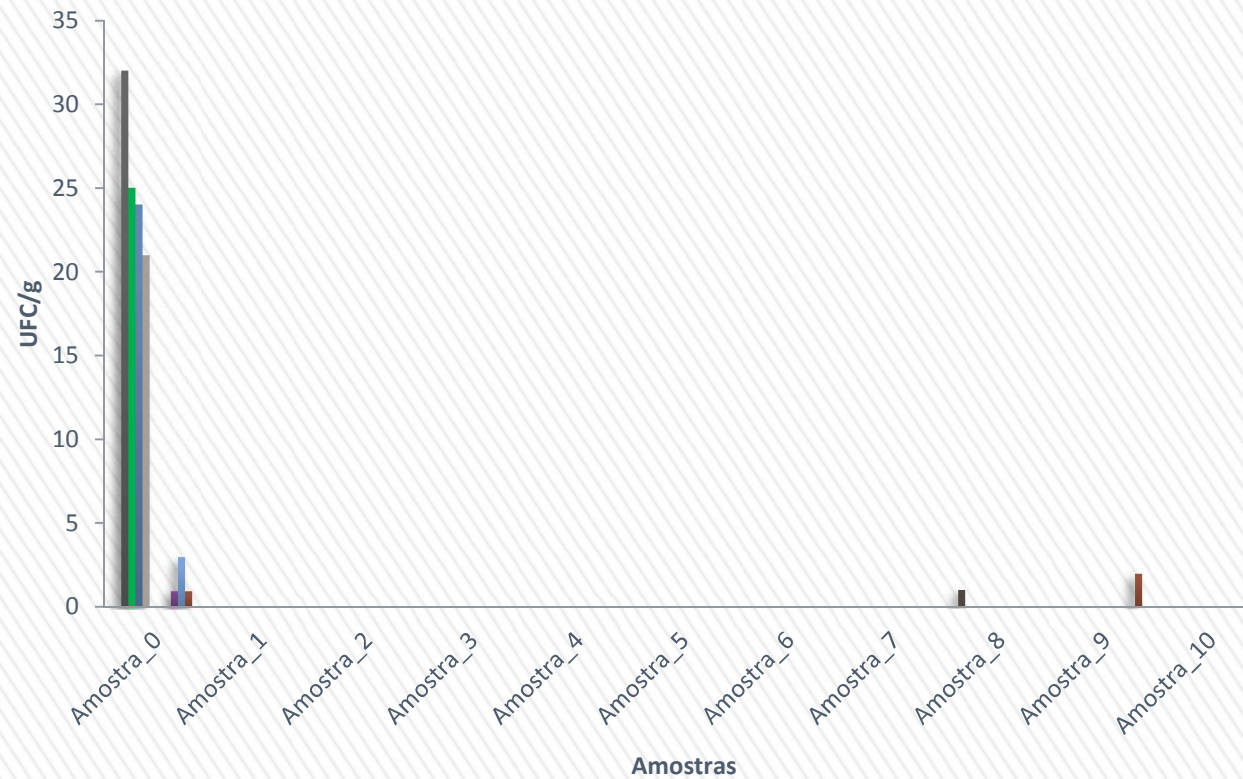
First years the number of isolates was higher

Actually the number of isolates is low, except in the first sample, before treatment

It is possible to have a low contamination during all bath season

Peaks of contamination can occur after days of rain → most common microorganism faecal *Enterococci*





Number of isolates surveyed in samples in each beach taken during the 2013 bathing season



Sanitary management of beaches can play a very important role with regard to public health.

Sanitation and disinfection done by specialist is important to maintain a good quality of sand.



Sr. António Bagulho



Thank you for you attention

