

A picture of health?

Microorganisms in Portuguese colour photograph collections and related occupational environments

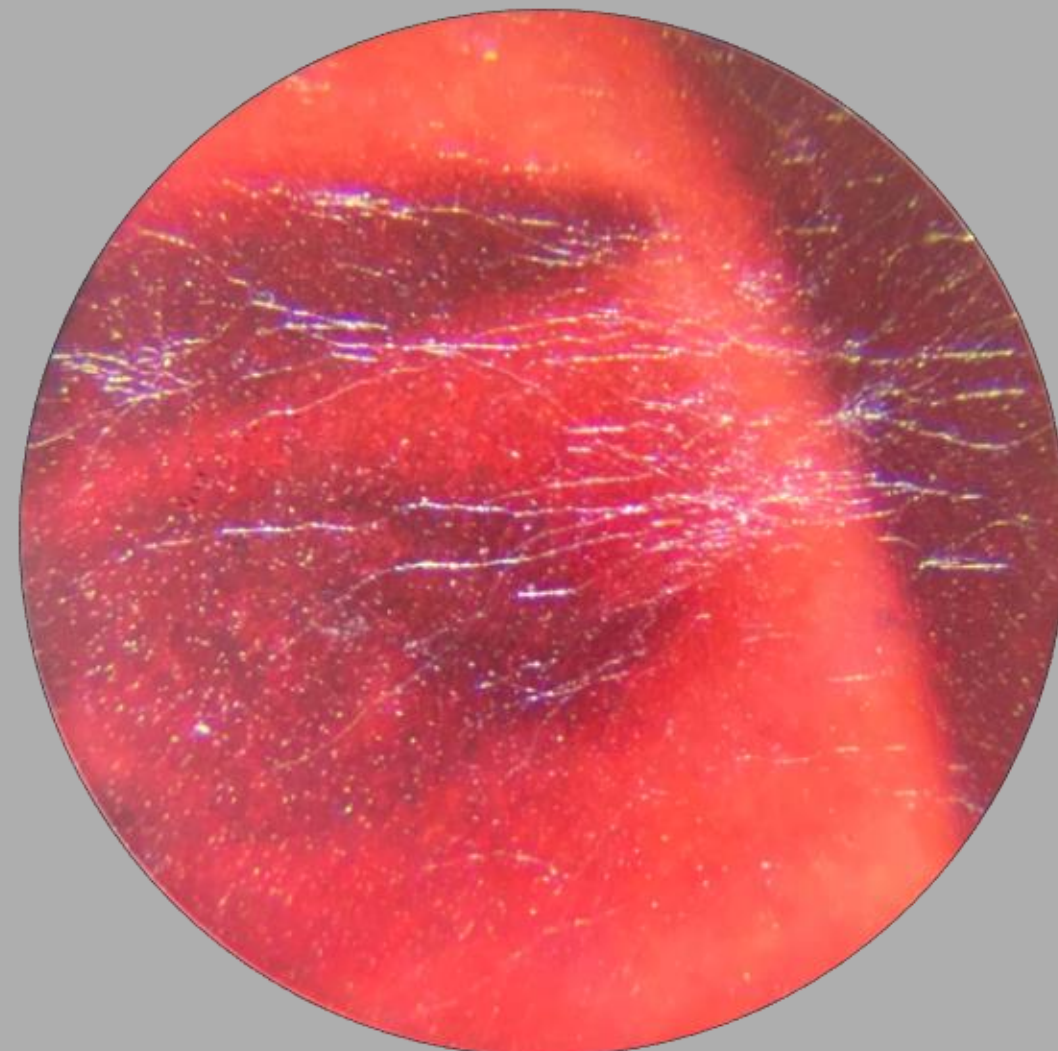
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INTRODUCTION
Colour photograph collections

Microbiological degradation is an issue affecting colour photograph collections, also **potentially hazardous** to those working with these collections, especially in the long term.

After collection surveys, the photographs and occupational environments of three in **Portuguese institutions** were assessed for comparison. [1]



Filamentous fungi on a colour transparency (13x18 cm). Detail in woman's portrait (support side, cellulose acetate). Viewed with portable handheld microscope (60x).

CASE STUDIES				
COLLECTIONS	A	B	C	
Colour photographs (chromogenic film)	c. 4.500	c. 36.000	c. 12.000	
Context	Scientific	Documental	Commercial	
Dates	1953 - 1990s	c. 1940s - 2013	1940s - 1988	
Microbiological degradation - Survey results [1]	75.6%	18.4%	64.7%	
ENVIRONMENTS	3 locations	5 locations	3 locations	
Outdoors (Greater Lisbon)	AO	BO	CO	
Indoors	Work areas	AW Unmonitored T & RH	BW1 & BW2 Unmonitored T & RH	CW - 21°C, 50% RH, HVAC w/ filters
	Storage areas	AS 22°C, unmonitored RH	BS1 - 18°C, 50% RH BS2 - 10°C, 40% RH	CS - 5°C, 35% RH, HVAC w/ filters

GOALS

- Characterise microorganisms causing collection deterioration & their related environments
- Assess potential health implications for cultural heritage professionals

METHODS
[2-17]

Conservation & restoration + Public health

SAMPLES

ENVIRONMENTS (n = 11 locations)
 1x active method:
 * Air (impaction): MAS-100 (1 minute, 100L/min)
 3x passive methods:
 * EDCs (30 days) + Settled dust (SD) + Mops

COLLECTIONS (n = 45 objects)
 1x passive method:
 * Surface swabs (SS), 3 areas per object

CONTEXTUAL INFORMATION
 obtained through
 Walkthrough surveys
 Documentary sources

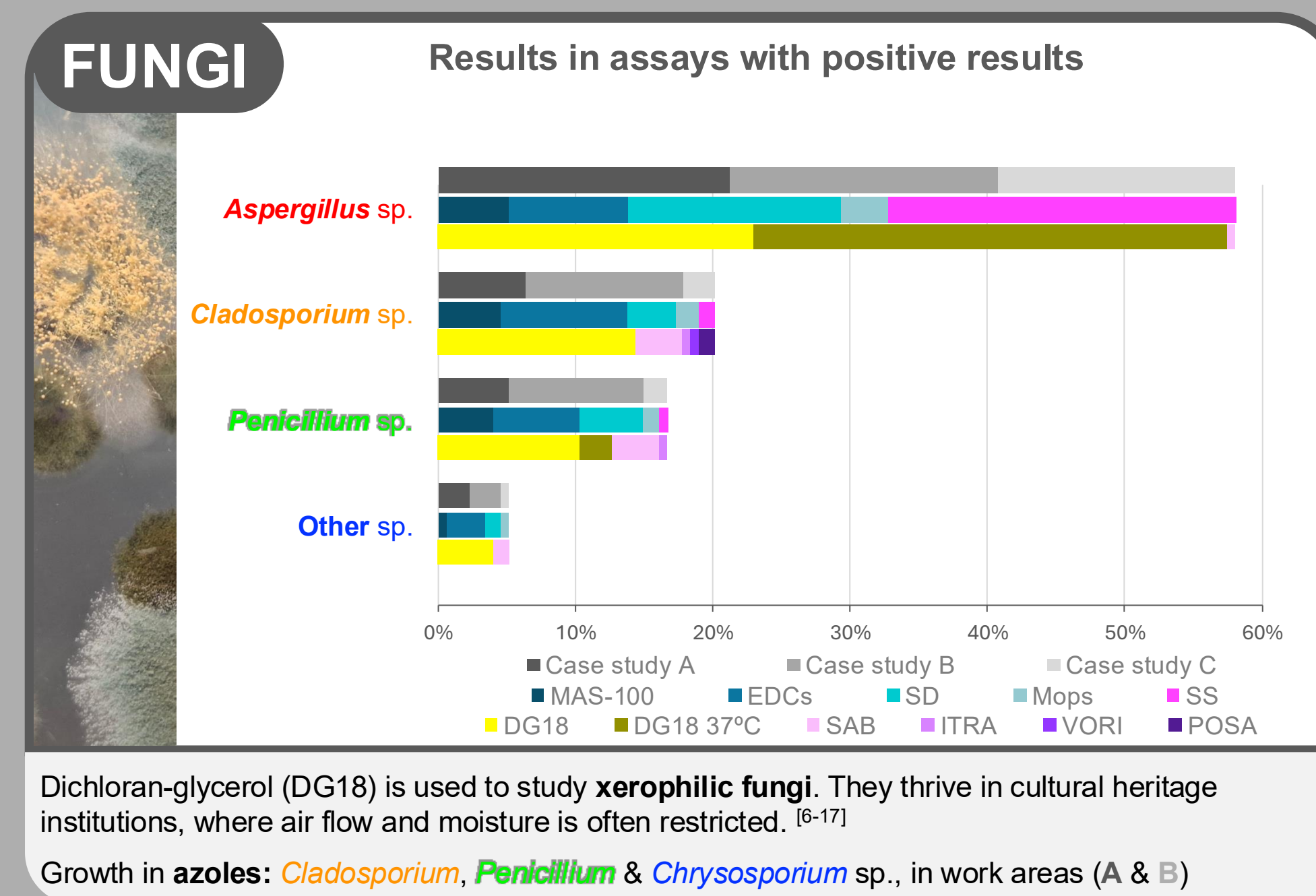
ASSAYS

Culture-based methods
 Bacteria: TSA (30°C), VRBA (37°C)
 Fungi:
 - DG18 (27° & 37°C)
 - Azole screening (EUCAST guidelines)

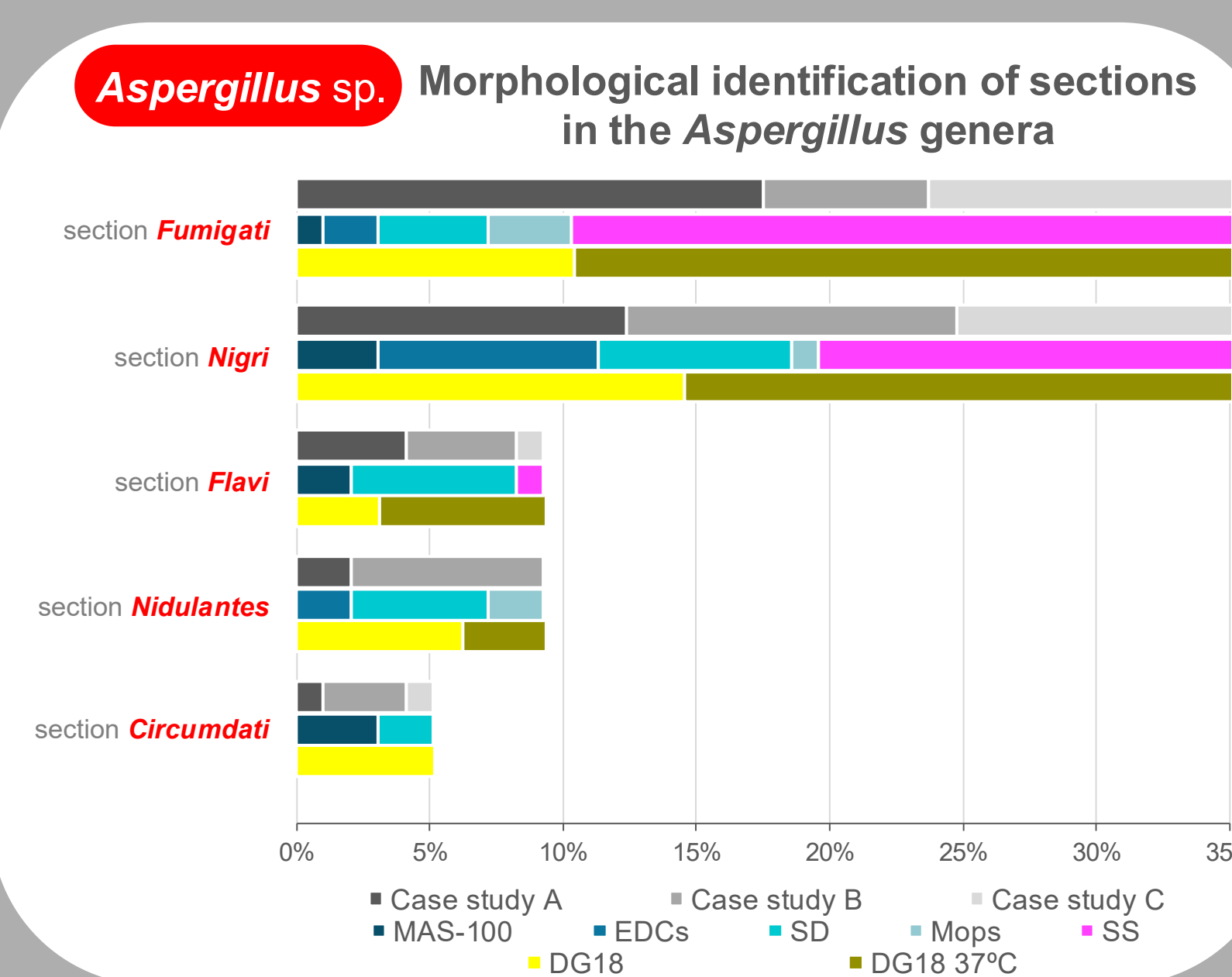
Quantification (fungi & bacteria) & **fungi identification** (macro & micro)
 Toxigenic fungal detection, qPCR

RESULTS
[2-20]

Following inoculation & incubation



Identification of fungi morphology [16-17] with compound light microscope (400x). Samples prepared with lactophenol cotton blue



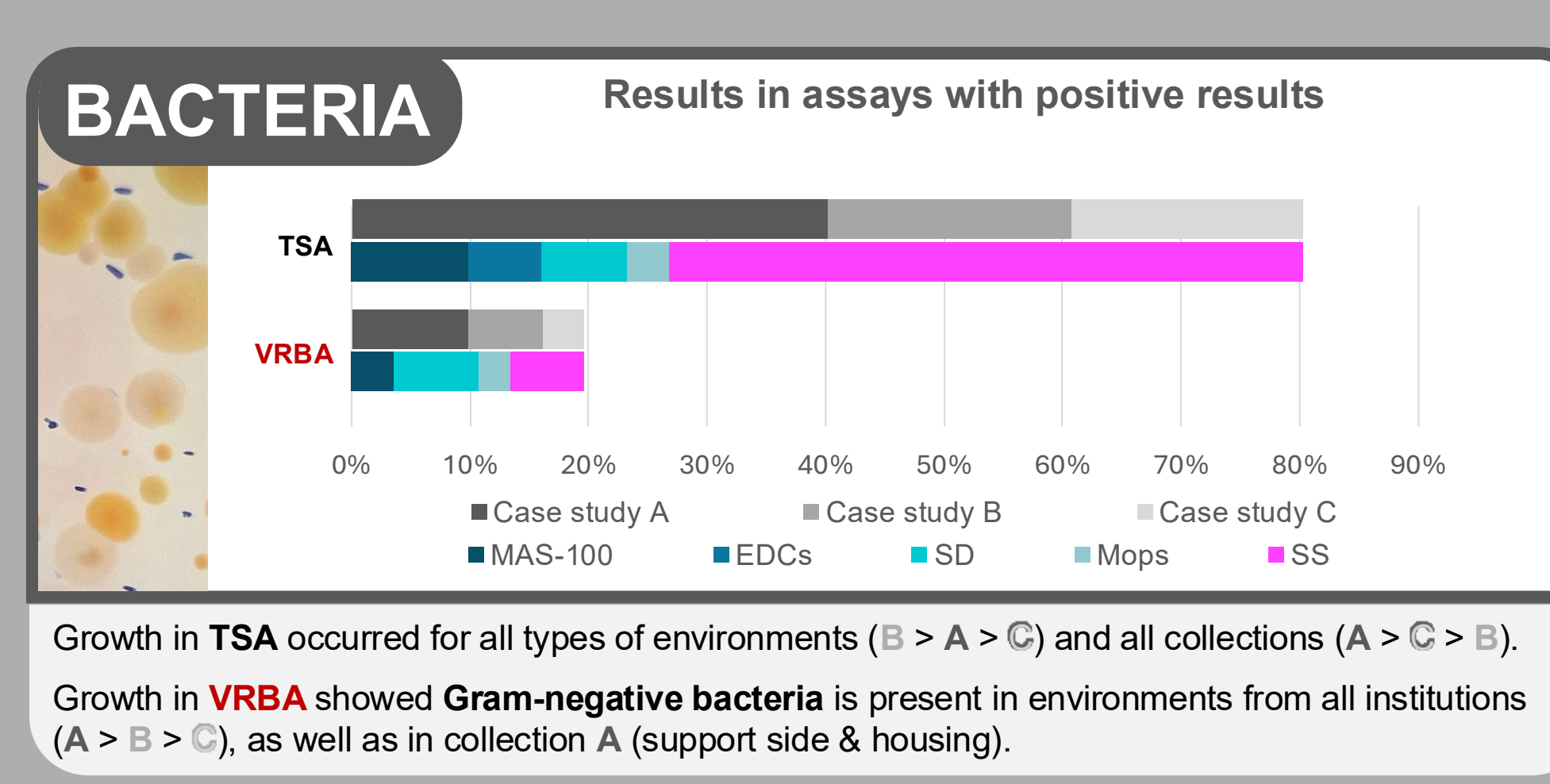
section Fumigati
 All institutions, all climates
 Collections A & C, on support side (cellulose acetate film, 52.0%)
 A. *Fumigatus* is a 'critical threat' to public health & associated with health issues [3-4, 10, 12, 13, 18-20]

section Nigri
 All institutions, all climates
 All collections, often on emulsion side (gelatine & dyes, 55.6%)

section Flavi
 All institutions, indoors, inc. cold areas (BS2)
 Collection A: 1 sample, support side
 ID: A. *parasiticus* - Produces highly carcinogenic mycotoxins [8]

section Nidulantes
 Environments: AW, BW1, BW2 & BS2
 ID: A. *versicolor* - Moderate xerophilic, can grow at low T°; produces mycotoxins [8-9, 11, 14]

section Circumdati
 All institutions
 - Indoors: only in BW1 & BS1



Cladosporium sp. **Other sp.** **Penicillium sp.**

Acremonium sp.
Aerobasidium sp.
Chrysosporium sp.
Chrysosporium sp.
Oidiodendrum sp.

CONCLUSIONS

Using different sampling methods & assays helped identify potentially harmful microorganisms across case studies.
 The presence of A. section *Fumigati* in all indoor environments & two collections should be researched in more detail.

NEXT STEPS

Complete characterization with toxin & molecular analysis

Test efficacy & safety of collection treatment strategies

Develop guidelines to prevent cross-contamination & avoid exposure from professionals

SUPPORT & PARTNERS

Logos of supporting institutions: República Portuguesa, fct, Museu e Monumentos de Portugal, MNAC, NOVA, LAQV requimte, Politécnico de Lisboa, Escola Superior de Saúde de Lisboa, H&TRC, U, Fundação Calouste Gulbenkian, BIBLIOTECA DE ARTE E ARQUIVOS.

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REFERENCES & DOWNLOAD