Preliminary Assessment of Microbial Contamination from Winter Sampling Campaign in Portuguese Elementary School

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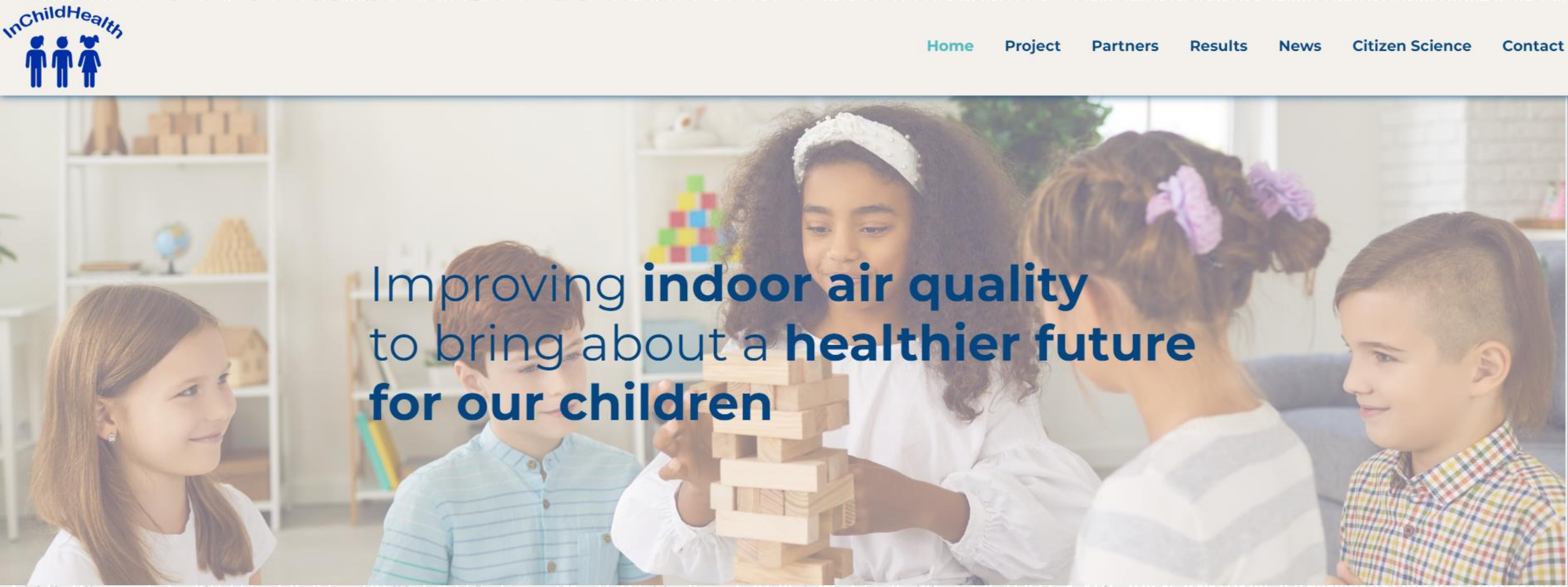
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IAQ IN SCHOOLS AND HEALTH RISKS[1,2]

- Microbial contamination risks health in indoor environments.
- Schools: high risk for respiratory/infectious diseases.
- Children in schools are especially vulnerable.
- They spend long hours in these settings.
- Indoor air quality (IAQ) management is critical.

ADDRESSING AIR QUALITY INDOORS

- Assessing airborne bacteria and fungi remain crucial for the prevention of respiratory health problems[3]
- Active air sampling remains the gold standard for compliance with legal frameworks on indoor air quality[4]
- Passive sampling methods, such as settled dust, are simple and cost-effective[5]
- Allow longer sampling periods, providing insights into prolonged exposure[3]

MAS-100

VS.

Settled dust collected through a UV-sterilized filters

Objective: assess bacterial and fungal contamination across rural and urban elementary school areas

SAMPLING CAMPAIGN

- Conducted in **10 schools** within the Metropolitan Lisbon Area.
- Samples collected during **cold season (N=10)**.
- Locations sampled: **classrooms (N=10)**
- **Sampling Method:** Settled dust collected using UV-sterilized coffee filters placed inside disinfected vacuum tubes.
- **Surfaces Sampled:** Shelves, plinths, and floors around students' desks and near the door in all sampled rooms.

FILTERS EXTRACTION AND INOCULATION

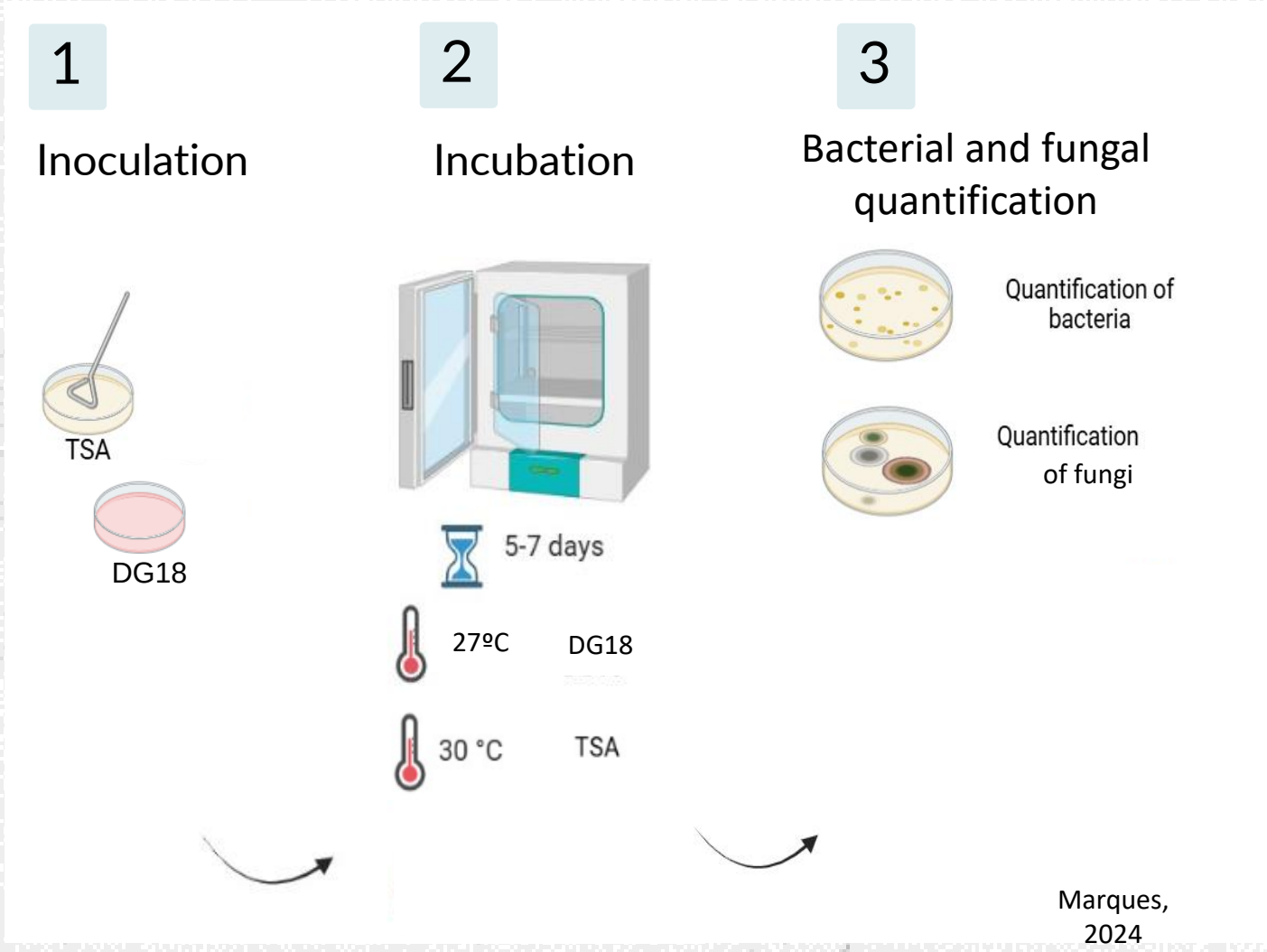
Extraction Method: Samples extracted using a **NaCl + Tween 80 solution**.

Extracted samples inoculated onto **DG18 (Dichloran Glycerol)** and **Tryptic Soy Agar (TSA)**

Incubation Conditions:

DG18: Incubated at **27°C for 4-6 days**.

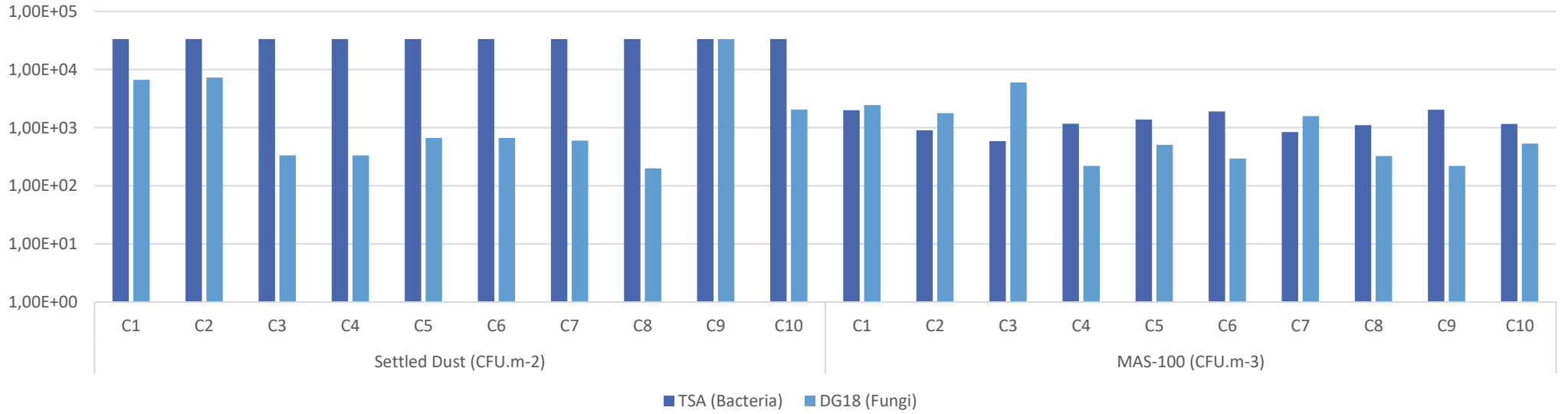
TSA: Incubated at **30°C for 7 days**.



BACTERIAL VS. FUNGAL CONTAMINATION

Cold Season Contamination:

- The MAS-100 (CFU/m³) data shows high variability from one classroom to the next (e.g., TSA from 590 to 2040; DG18 from 220 to 5965).
- For Settled dust:
  - Bacteria (TSA): The settled dust (CFU/m²) values are uniformly high and identical (33.333) across all classrooms.
  - Fungi (DG18): The settled dust values show a different pattern of contamination than the active sampler.



Bacterial vs. fungal contamination

- Bacteria (TSA): Uniformly High in All Classrooms
  - Settled dust shows a consistent, high-level bacterial reservoir on surfaces everywhere.
  - Active air sampling failed to identify this universal baseline problem.
- Fungi (DG18): The Case of Classroom C9
  - Active Air (Snapshot): Clean → "False sense of safety."
  - Settled Dust (Cumulative): Extreme contamination → "Massive hidden reservoir.“

Highlights

Sampling methods employed are complementary tools, providing two essential pieces of the risk puzzle.[6,7]

Relying solely on air snapshots provides a false sense of safety and an incomplete picture.

Combining both methods is necessary to see both the instantaneous airborne threat and the historical exposure potential.

This comprehensive view is crucial for effective public health interventions and managing infection risks in schools[8].

Next Steps

Contextual and operational information collection

- Cleaning procedures applied

Compare results from both seasons:

- MAS-100
- Personal air samplers
- Andersen 6-stage air sampler
- Passive samples (EDC, EDCT, Settled dust, Dust filers, Mops)

Risk assessment

Fill the gaps in IAQ policies, supporting regulators and exposure assessors on primary schools' IAQ improvement.

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THANK YOU

Thanks for your attention and looking forward to hearing your questions.