EVALUATION OF AZOLE-RESISTANT MYCOBIOTA AND MYCOTOXINS PROFILE IN TEA

Ana Beatriz Simões,1 Carla Viegas,1,2,3 Susana Viegas,1,2,3 Liliana Aranha Caetano,1,4

1 H&TRC—Health & Technology Research Center, ESTeSL—Escola Superior de Tecnologia da Saúde, Instituto Politécnico de Lisboa, 1900-096 Lisboa, Portugal; 2 NOVA National School of Public Health, Public Health Research Center, Universidade NOVA de Lisboa, 1600–560 Lisbon, Portugal; 3 Comprehensive Health Research Center (CHRC), 1169–006 Lisbon, Portugal; 4 Research Institute for Medicines (iMedULisboa), Faculty of Pharmacy, University of Lisbon, Lisbon, Portugal; *liliana.caetano@estel.ul.pt

Study Goals

- Identify and quantify the mycobiota through microbiological and molecular analysis.
- Characterize the susceptibility profile of fungi to antifungal drugs of the azole group.
- Assess the contamination of tea by mycotoxins.
- Relate the results obtained with the origin (organic or conventional agriculture) and the type of tea packaging (bulk or tea bags).

Materials & Methods

Gathering Samples

- Supermarkets
- Herbalist Shops

Sample Treatment (4)

- Extraction
- Infusion

<table>
<thead>
<tr>
<th>Material</th>
<th>Treatment</th>
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<tr>
<td>4,4g tea per 40ml of 0.9% NaCl with 0.05% Tween80™</td>
<td>2g per 100ml boiling water for 6 minutes</td>
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Expected Outcomes

- Detailed characterization of the contamination present in tea samples commercially accessible in Portugal, focusing on the distribution of fungal species azole and toxigenic resistant, as well as in the characterization of the mycotoxin profile.
- Risk assessment of tea consumption for human health.
- Propose measures to monitor and control fungal contamination (including resistant and toxigenic fungi) in commercially available tea.

References


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Background

- Tea (infusion of the Camellia sinensis leaves) is one of the most common beverages worldwide, namely, black tea and green tea (1).
- Fungal contamination of tea by mycotoxins (produced by filamentous fungi such as Aspergillus) confer potential risks to human health and can cause serious diseases (2).
- Continued exposure of Camellia sinensis to fungicides in conventional agricultural can promote the development of azole resistance among fungal species, such as A. fumigatus (3).
- Azole resistance limits therapeutic options against fungal diseases (e.g. aspergillosis), representing a threat to public health.

Fungal Burden

- MEA
- PDA

Azole Resistance

- Saboraud (control)
- Saboraud + Itraconazole 4 mg L⁻¹
- Saboraud + Voriconazole 2 mg L⁻¹
- Saboraud + Posaconazole 0.5 mg L⁻¹

Mycotoxins

- HPLC with MS-MS
- Aflatoxins
- Octaazotxin A

Real-Time PCR

- Aspergillus sections: Circumdati, Flavi, Fumigati, Versicolores

Colonies Forming Units

Microscopy

Independent variables

- Tea bags vs bulk
- Conventional vs biological origin

Measured variables

- Fungal burden
- Toxigenic species
- Azole resistance
- Mycotoxins distribution