

AZOLE RESISTANT MYCOBIOTA IN INDOOR ENVIRONMENTS – WHAT IMPLICATIONS FOR PUBLIC HEALTH?

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Fungi causes a range of diseases in humans including allergic syndromes and severe fungal infections, such as acute invasive aspergillosis in immunocompromised patients. Azole resistance is an increasing problem in the management of fungal diseases. Detection of azole resistant colonies amongst susceptible isolates in complex bioaerosols mixtures, as found in the environment, may be feasible using agar supplemented with azole drugs. The aim was to determine the prevalence of azole resistance in occupational settings using azole-supplemented agar as a screening tool.

Environmental samples were collected from six occupational settings from Lisbon: electrostatic dust cloths (EDCs) from bakeries and dairy; air conditioning filters from waste forklifters, taxis and personal vehicles; bedding material from swine farms; raw materials/feed from bakeries, dairy and swine farms. Samples were inoculated onto 2 different media for mycobiota characterization and onto saboraud agar media supplemented with 4 mg/L itraconazole (ITC), 1 mg/L voriconazole (VCZ), or 0.5 mg/L posaconazole (PCZ).

Azole-resistant species were identified in 71 out of 143 (49,6%) samples collected in all the environments: in 17/53 samples from 8/10 bakeries; in 15/16 waste forklifters filters; in 8/15 samples from all swine farms; in 8/19 taxi filters; in 18/28 personal vehicles filters; in 5/12 samples from one dairy. *Mucor* sp. and *Aspergillus* sp. (sections *Nigri* and *Circumdati*) growth was observed in 1 mg/L VCZ media. Isolates of *Aspergillus* sections *Nigri*, *Circumdati*, *Candidi* and *Aspergilli*, and of *Syncephalastrum racemosum* were identified as non-susceptible to 4 mg/L ITC in forklifters filters. *Cladosporium* sp. and *Penicillium* sp. not susceptible to one or more azole drugs in the tested concentrations were also prevalent in the assessed environments.

The use of passive methods (EDC, filters, raw materials/feed) allowed the characterization of azole-resistant mycobiota in different Portuguese occupational environments, unveiling critical worksites. Molecular analysis of azole-resistant species should be developed in future studies for an accurate assessment of occupational exposure to resistant mycobiota and characterization of risk factors for workers.

Setting	Samples collected		Samples with fungal burden	Samples with azole-resistant fungal burden			N. of fungal species detected	
	Type	N	N	N	<i>Aspergillus</i> sp.	Mucorales	Total	Azole-resistant
Bakeries (10 units)	EDC	27	13* 17**	15	1	2	7* 5**	10
	Raw materials	26	3* 5**	2	0	1	2* 4**	2
Waste forklifters (16 units from 2 waste plants)	Filters from air conditioning system	16		15	10	2		
Swine farms (5 units)	Bedding material	5		3	0	1		
	Feed	10		5	0	0		
Taxis (19 units)	Filters from air conditioning system	19	4* 6**	8	1	0	2* 3**	7
Personal vehicles (28 units)	Filters from air conditioning system	28	15* 15**	18	1	0	7* 4**	5
Dairy (1 unit)	EDC	2		2	0	1		
	Feed	10		3	0	3		
	Total	143		71				

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