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Investigation of fungal infestation on metallic and polymer surfaces using synchrotron-based macro ATR-FTIR microspectroscopy

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Fungi possess the ability to colonize a wide array of surfaces, including metallic surfaces; the product of colonization is the proliferation and formation of a fungal biofilm followed by the degradation and alteration of the metallic surface. In particular, microbially-induced corrosion on the surface of metals occurs due to changes in the local acidity, creating galvanic and differential aeration cells, with the galvanic corrosion rate being shown to be a function of temperature. Three common fungi (*Aspergillus niger* ATCC 9642, *Aureobasidium pullulans* ATCC 9348 and *Epicoccum nigrum* ATCC 42773) were utilised to study the fungal spores adhesion, hyphae development followed by the biofilm formation on different types of metallic surfaces (stainless steel SL316, titanium commercial grade 2, polyester-coated steel and anti-fungal paints (Microban®). Growth behaviour and molecular characteristics of fungal infestation on these surfaces were monitored using scanning electron microscopy and synchrotron-macro ATR-FTIR microspectroscopy. It was found that three fungal species studied were able to attach and colonise the metallic surfaces after 18 h incubation. Hyphae development was observed after 3 days of fungal interactions with metallic surfaces except anti-fungal paints surfaces. The latter were colonized by fungi after 7 days. ATR-IR microscopy revealed that only *E. nigrum* and *Aspergillus niger* were found to deposit pigments on these surfaces.

Keywords or phrases (comma separated)

Aspergillus niger, Aureobasidium pullulans, Epicoccum nigrum, fungal infestation, ATR IR

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No

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No

Are you an ECR? (<5 yrs</br>since PhD/Masters)

Yes

What is your gender?

Male

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