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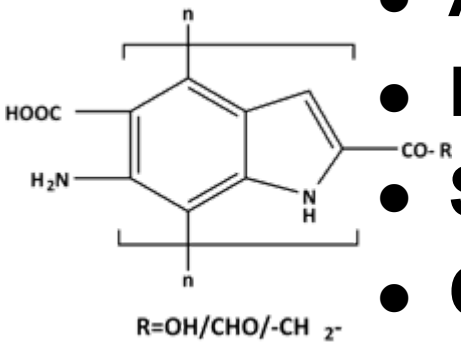
# Physicochemical properties, molecular structure, antioxidant activity, and biological function of extracellular melanin from *Ascosphaera apis*

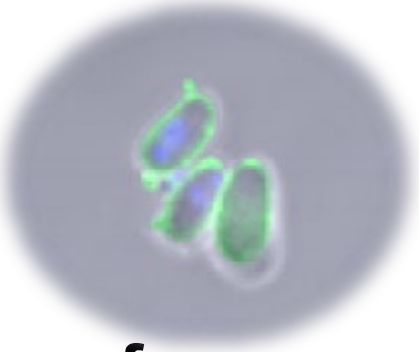
**Key words: Melanin; Molecular structure; Antioxidant activity; Subcellular localization; *Ascosphaera apis***

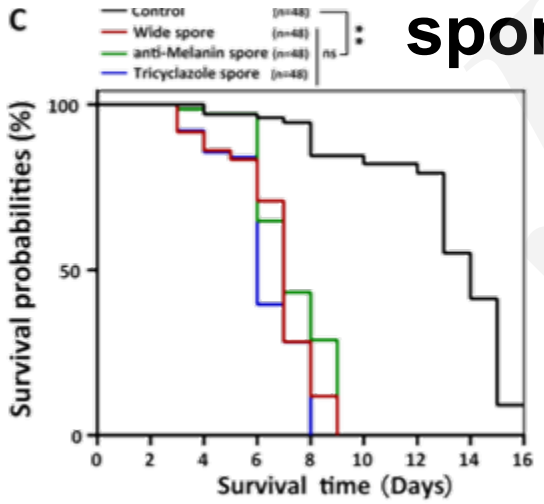
# Research Summary

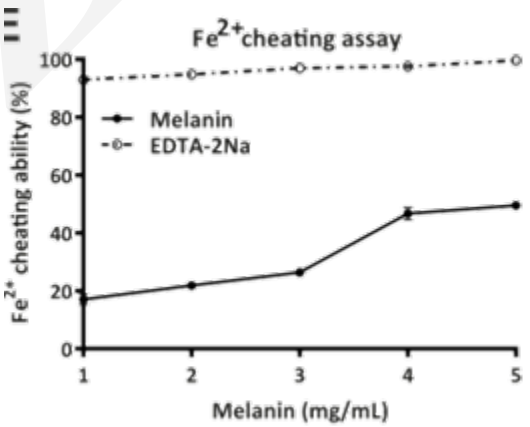
**This paper mainly focused on isolate and identify melanin from the pathogenic fungus *Ascosphaera apis*, and summarized its physicochemical properties, molecular structure, antioxidant activity, and biological function.**

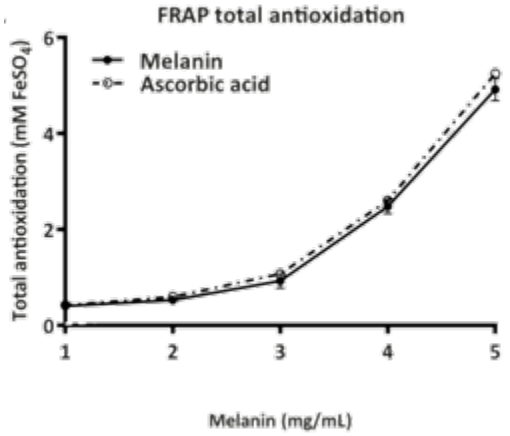



- **A eumelanin with a typical indole structure.**
- **Located on the spore wall**
- **Strong antioxidant activity**
- **Chelate to metal ions**
- **Can not enhance the virulence of spores**



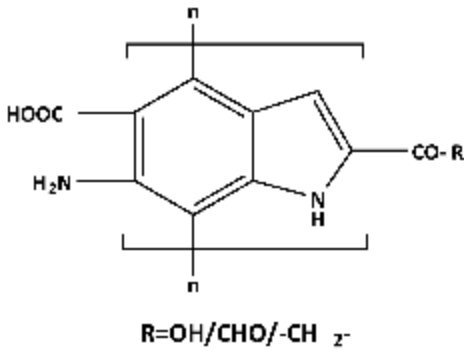


# *Innovation points*

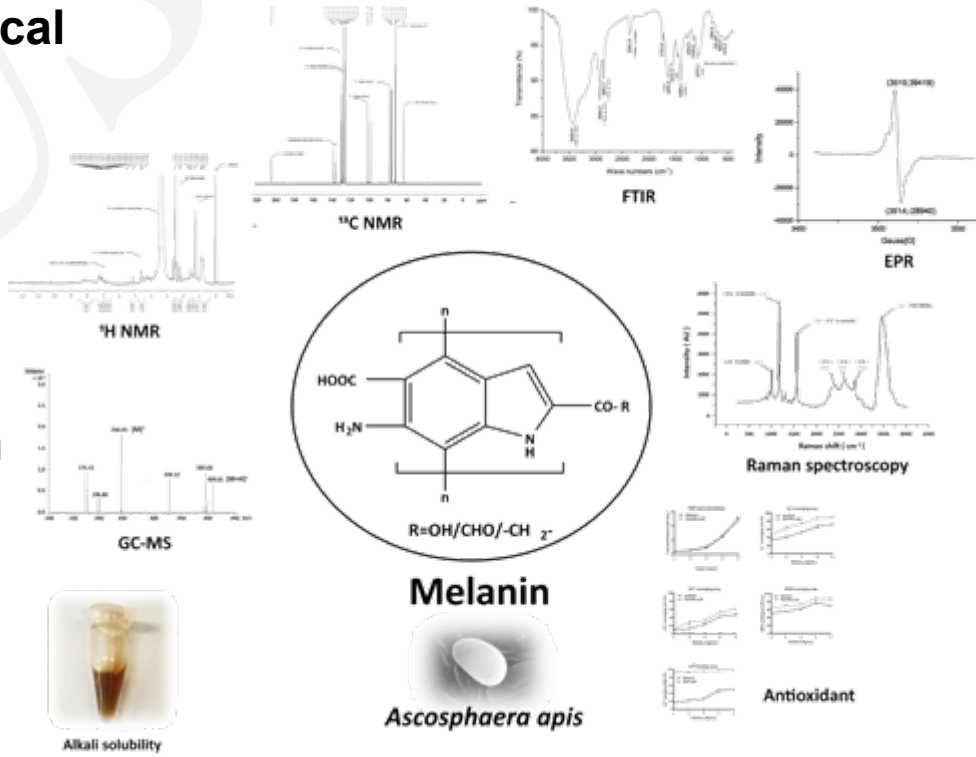





- **First time** to isolate and identify melanin produced by the pathogenic fungus *Ascosphaera apis*.

- **Summary** of the physicochemical properties, molecular structure, antioxidant activity, and biological function of melanin.

- **Established** a procedural method for systematic identification of fungal melanin.



# *Innovation points*

**A series of comprehensive figures were generated to summarize the latest knowledge about *Ascosphaera apis* melanin.**

**Figure 1 | Electron paramagnetic resonance spectroscopy analysis of melanin.**

**Figure 2 | Raman spectrum of melanin.**

**Figure 3 | $^{1}H$ and $^{13}C$ NMR spectra of melanin.**

**Figure 4 | Antioxidant activities of melanin.**

**Figure 5 | Subcellular localization of melanin.**

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