3 - 37 Inhibitors of *Aspergillus niger* Melanin Biosynthesis

Liu Jing, Song Yuan, Chen Jihong, Hu Wei and Wang Shuyang

Aspergillus. niger is a common fungus with strong UV tolerance, primarily due to the melanin layer adhering to the conidial cell wall[1]. Melanins are dark-brown to black pigments found in animals, plants, and microorganisms. Their functions of enhancing the survival and competitive abilities of species in certain environments attracts researchers. Efficient inhibitors of melanin synthesis are important for melanin biosynthetic pathway study. It is believed that melanin in Apergillus niger is synthesized via 1,8-dihydroxynaphtalene (1,8-DHN) pathway[2]. However, tricyclazole, the specific inhibitor of DHN melanin, cannot inhibit *Aspergillus niger* melanin synthesis[3]. It is important for us to find effective inhibitors of *Aspergillus niger* melanin synthesis. This study aimed to investigate the inhibitors reported of melanin synthesis, and find the most effective one for *Aspergillus niger* melanin.

The stain of *Aspergillus niger* used in this experiment was obtained from the China Center of Industrial Culture Collection (number 40539). Seven compounds were used in this experiment: arbutin, acetic acid, coumarin, tricyclazole, EDTA, DMSO, and fenoxanil. All of these compounds were reported that can inhibit melanin synthesis in various organisms, respectively[1]. Several were even reported that can inhibit *Aspergillus niger* melanin synthesis[1]. Concentration of each compound was decided by related references and practice.

Results showed that only DMSO can inhibit Aspergillus niger melanin synthesis absolutely when the concentration is more than 0.8% (Table 1). EDTA inhibited melanin synthesis slightly at the concentration of 100 μg/mL, when the concentration was more than 100 μg/mL, conidial production was also inhibited. Other compounds have no this function. Effective inhibitor for melanin synthesis cannot inhibit conidial production, for melanin adhering to the conidial cell wall in *Aspergillus niger*. For this reason, DMSO is the most effective inhibitor of *Aspergillus niger* melanin.

Table 1 Compounds and their inhibitory effect on melanin.

Compounds	Inhibitory effect on melanin	Inhibitory effect on conidial production
Arbutin	-	-
Acetic acid	-	Inhibit (0.01%-0.1%)
Coumarin	-	Inhibit(100-1 000 μg/mL)
Tricyclazole	-	inhibit(>25 μg/mL)
EDTA	Slightly inhibit (100 μg/mL)	Inhibit(>100 μg/mL)
DMSO	Effective inhibit(0.8%-2%)	-
Fenoxanil	-	Inhibit(>100 μg/mL)

"-": Means no effect.

References

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[3] D. E. N. Rangel, M. J. Butler, J. Torabinejad, et al., J. Invertebr. Pathol, 93(2006)170.