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Full Papers

两种希夫碱对大肠杆菌抗菌活性的微量热法研究

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摘要 运用微量热法研究两种新合成希夫碱(H_2L^3和$H_2L^{3'}$)对大肠杆菌的抗菌活性，试图同时获得它们对大肠杆菌生长代谢和非生长代谢两方面的作用情况。通过对代谢热功率－时间曲线进行解析，获得各种热动力学参数，进而建立两种活性筛选方法并对化合物的抗菌活性作出评价。结果表明两种化合物对大肠杆菌的有氧生长代谢具有良好的活性(其半抑制浓度分别为：75.8 和168.8 mg/L)但对其无氧生长代谢则作用不强。将细菌稳定期的代谢总产热作为其非生长代谢的活性指标，考察了化合物对大肠杆菌非生长代谢的作用，获得了它们对稳定期细菌的半抑制浓度(MSC_{50})：118 和187.5 mg/L。可见无论对生长代谢还是非生长代谢的大肠杆菌，化合物$H_2L^{3'}$的活性都要强于H_2L^3，并且它们的活性主要集中于细菌的有氧生长代谢。实验表明微量热法能够同时实现传统的以及基于新策略的抗菌药物活性筛选，它在抗菌药物的研究中将会起到更重要的作用。

关键词 微量热法；希夫碱；抗菌活性；非生长；生长

分类号

Investigation of Antibacterial Activity of Two Kinds of Novel Schiff Bases on *Escherichia coli* by Microcalorimetry

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Abstract The microcalorimetric method was used to study the antibacterial activity of two newly synthesized Schiff base compounds ($H_2L^{3'}$ and H_2L^3) on *Escherichia coli*, trying to obtain the action on both of multiplying bacteria and non-multiplying bacteria at one experiment. The metabolic power-time curves of the bacteria treated with the compounds were obtained, and the thermokinetic parameters were analyzed, from which the antibacterial activities of these compounds were evaluated. The results showed that both of the two compounds have good activity on aerobic multiplying metabolism of *E. coli*, with the value of IC_{50} 75.8 and 168.8 mg/L respectively, but have not effective action on fermentation metabolism of *E. coli*. The action of the compounds on the non-multiplying metabolism was investigated by taking the heat output of *E. coli* in the stationary phase as the guideline of the activity. The value of MSC_{50} (minimum stationary-cidal concentration 50) of them is 118 and 187.5 mg/L, respectively. So, $H_2L^{3'}$ has stronger antibacterial action on *E. coli* than H_2L^3 either for multiplying bacteria or non-multiplying bacteria, and their activity on the aerobic multiplying bacteria of *E. coli* is mainly shown. It does strongly suggest that the calorimetric method should play an important role in the fight against the drug-resistant bacteria.

Key words **Keywords** microcalorimetric method Schiff base antibacterial activity non-multiplying multiplying

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