

论文

氡温泉中耐辐照嗜热菌的分离及其特性研究

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摘要:

氡温泉水样经8kGy<sup>60</sup>Co γ射线预处理后,从中分离获得1株耐<sup>60</sup>Co γ射线和UV辐照的嗜热菌株R4-33。经形态观察、生理生化试验、脂肪酸分析、(G+C)mol%含量和16S rDNA序列测定,结果表明,菌株R4-33为杆状,革兰氏阴性菌,无鞭毛,形成末端芽孢;最适生长温度60℃,最适生长pH 7.5;能以葡萄糖、麦芽糖和海藻糖等作为唯一碳源生长,水解酪素和淀粉;过氧化氢酶阳性;对青霉素、新霉素、红霉素、万古霉素、链霉素、庆大霉素、丁胺卡拉和氨苄青霉素敏感;细胞主要脂肪酸为C<sub>14:1</sub>(48.4%)和C<sub>15:1</sub>(15.2%);基因组DNA中(G+C)mol%含量58.2%。经比对菌株R4-33的16S rDNA序列与Anoxybacillus属菌株有较高的同源性,其中与Anoxybacillus gonensis菌株的相似性高达99.5%。经R4-33菌株生理生化试验及16S rDNA序列分析,该菌株归属于Anoxybacillus属,暂命名为Anoxybacillus sp. R4-33。耐辐射细胞存活试验结果显示菌株R4-33对UV的耐辐射能力达396J/m<sup>2</sup>,对<sup>60</sup>Co γ射线耐辐照能力为14kGy,表明其对UV和γ射线辐照具有较高耐受性。

关键词: 耐辐射 嗜热菌 Anoxybacillus属 分类

ISOLATION AND CHARACTERIZATION OF A RADIATION RESISTANT THERMOPHILIC BACTERIUM FROM RADON HOT SPRING

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Abstract:

A radiation resistant and thermophilic bacterium strain R4-33 was isolated from radon hot spring water samples, pretreated with <sup>60</sup>Co γ-rays and UV irradiation. Tests on morphological, physiological and biochemical characters, fatty acid compositions, (G+C) mol% contents, and 16S rDNA sequencing were conducted. The results showed that strain R4-33 was of rod-shape, Gram-negative, atrichous, and endospore-forming. The optimum growth temperature and pH were 60℃ and 7.5, respectively. The strain utilized glucose, maltose and trehalose as carbon sources, and hydrolyzed casein and starch. Its catalase positive. The strain was sensitive to penicillin, neomycin, erythromycin, vancomycin, streptomycin, gentamycin, amikacin and ampicillin. The major cellular fatty acids were C<sub>14:1</sub>(48.4%) and C<sub>15:1</sub>(15.2%). The (G+C)mol% content of DNA was 58.2%. Phylogenetic tree based on 16S rDNA sequence showed R4-33 shared highly similarity to those of species in genus Anoxybacillus, especially to that of Anoxybacillus gonensis (99.5%). Based on the above, the strain R4-33 was proposed to the evolution branch of Anoxybacillus and designated as Anoxybacillus sp. R4-33. The UV and γ-radiation tests showed that the strain R4-33 had an ability of resistance to UV of 396J/m<sup>2</sup> and <sup>60</sup>Co γ-rays irradiation of 14.0kGy, indicating that the strain was a radiation resistant and thermophilic bacterium.

Keywords: radiation resistant thermophilic bacterium Anoxybacillus taxonomy

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