

第三届生物物理研论会论文集

MeV能量离子辐照拟南芥干种子和含水种子存活曲线对比

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摘要

离子束辐照植物种子所产生的水自由基对植物种子存活率会有影响, 实验中为了观察这种辐射效应, 采用6.5 MeV能量的质子分别辐照拟南芥干种子和含水种子。这个能量点的质子无论对干种子还是含水种子都可以完全穿透, 减少了因损伤部位不同带来的差异。实验中采用的质子注量从 4×10^9 ions/cm²到 1×10^{14} ions/cm²。实验结果显示干种子和含水种子存活曲线均成肩形下降趋势, 而且含水种子下降注量点明显低于干种子。这是自由基作用结果。同时在辐射生物学靶学说的基础上, 建立了模型, 通过参数的合理设置, 很好地拟合了实验数据。

The dry and water saturated seeds of Arabidopsis thaliana were irradiated by H⁺ ions with 6.5 MeV in atmosphere. The ion fluence used in this experiment was in the range of $4 \times 10^9 - 1 \times 10^{14}$ ions/cm². According to the structure of the seed and TRIM simulation, the ions with the energy of 6.5 MeV can penetrate the whole seed. The experiment shows that the fluence response curves for the dry seeds and water saturated seeds had distinct shoulders and reduced rapidly. The experimental results show that the water imbibed seeds were more sensitive than the dry seeds and the reason is from free radicals reaction. A model has been constructed, and primely simulates the experiment data.

关键词 [存活曲线](#) [含水种子](#) [靶学说](#) [自由基](#) [拟南芥](#)

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