

# 铅胁迫对小麦幼苗生理特性的影响

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**摘要:**为了阐明铅胁迫对小麦幼苗生理特性的影响,以中国春小麦品种为材料,对其生理指标进行了初步研究。结果表明:低浓度铅胁迫,小麦叶绿素含量增加;随着铅浓度升高,叶绿素含量和 CAT 活性明显下降,而 MDA 含量和 POD 活性明显升高,证明高浓度铅对叶绿素含量和 CAT 活性显著的抑制作用,对 MDA 含量和 POD 活性有明显的促进作用。

**关键词:**铅胁迫;小麦;幼苗;生理特性

**中图分类号:**S512 **文献标识码:**A **文章编号:**1002-2767(2015)06-0026-03 DOI:10.11942/j.issn1002-2767.2015.06.0026

随着现代工农业生产的高速发展,重金属造成的污染尤其是铅(Pb)污染已成为不容忽视的环境问题。Pb 是植物的非必需元素,但植物在铅胁迫下,即使很低的浓度下,也能产生明显的毒害作用,如膜透性的改变、酶活性的扰乱、有丝分裂受阻、DNA 损伤以及其它生理过程的改变等<sup>[1]</sup>。植物可食用部分的 Pb 残留还可危害人体健康。本试验旨在研究重金属铅对小麦幼苗生理特性的影响,

为重金属污染的环境监测及土壤修复提供理论参考。

## 1 材料与方法

### 1.1 材料

供试材料为中国春小麦种子。

### 1.2 方法

1.2.1 试验设计 将中国春小麦种子经  $0.1 \text{ mol} \cdot \text{L}^{-1}$  升汞消毒 15~20 min,用去离子水冲洗数次,然后选取大小均匀、饱满健康的种子放入培养皿内,分别加入浓度 5、50、200、300、400、500 和  $600 \text{ mg} \cdot \text{L}^{-1}$  的 Pb 溶液,每个处理设 3 个重复,每个重复 20 粒种子,在  $25^\circ\text{C}$  光照培养箱内进行幼苗培养。

1.2.2 测定项目及方法 当种子幼苗长出 3~5 片真叶时,进行生理指标测定。叶绿素含量采用乙醇丙酮混合液法测定<sup>[2]</sup>;MDA 含量采用硫代巴比

收稿日期:2015-01-02

基金项目:河南省教育厅自然科学研究计划项目(2011 A180011)

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**Abstract:** In order to define the difference of the drought resistance ability between dense planting resistance soybean and conventional soybean, taking dense planting resistance soybean Kenfeng 16 and conventional soybean variety Hefeng 35 as test materials, set up three water treatments in  $R_2$  and  $R_6$  stages as normal water management, mild drought stress and severe drought stress, its photosynthetic physiological indexes were measured. The results showed that the leaf area per plant and net photosynthetic rate were on a declining trend with the strengthening of drought stress, and reached significant or extremely significant difference compared with CK; leaf color values was on a declining trend too, and its differences of dense planting resistant varieties Kenfeng 16 and CK were not significant in drought condition in two stages, the differences between conventional variety Hefeng 35 and CK were not significant in the mild drought condition, and reached extremely significant level in severe drought condition; the grain weight per plant was on a declining trend too. Only in the  $R_2$  stage, the difference between dense planting resistant variety Kenfeng 16 and CK was not significant in mild drought condition, and other treatments reached extremely significant difference compared with CK in the two stages. Leaf area per plant, leaf color value, net photosynthetic rate and grain weight per plant of dense planting resistant variety Kenfeng 16 declined less with the strengthening of drought stress, and conventional variety Hefeng 35 declined more. It could be seen that the drought-resistant ability of dense planting resistant variety Kenfeng 16 was stronger than the ordinary variety Hefeng 35.

**Keywords:** dense planting resistant; drought stress; photosynthetic characteristics; drought resistant ability