

## 5-氨基乙酰丙酸(ALA)对冬小麦花后干物质生产和旗叶衰老的影响

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Effects of 5-aminolevulinic acid on winter wheat dry matter accumulation after anthesis and flag leaf senescence.

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## 摘要

以百农矮抗58小麦为材料,采用大田试验的方法,研究了始穗期喷施不同浓度(0、10、30、50 mg·L<sup>-1</sup>)的5-氨基乙酰丙酸(ALA)对冬小麦花后干物质生产和旗叶衰老的影响。结果表明:10~50 mg·L<sup>-1</sup> ALA处理有利于植株对干物质的积累,至成熟期其干物质总量明显高于对照(0 mg·L<sup>-1</sup>);10~50 mg·L<sup>-1</sup> ALA处理各器官干物质的分配率与对照没有显著性差异,但其花后生产的干物质对产量的贡献率显著高于对照;在开花期,10~50 mg·L<sup>-1</sup> ALA处理的叶面积指数与对照没有显著性差异,但在乳熟期和腊熟期,叶面积指数显著高于对照。从开花期至蜡熟期,10~50 mg·L<sup>-1</sup> ALA处理的旗叶SPAD值和净光合速率均高于对照;在灌浆后期,ALA处理降低了旗叶丙二醛(MDA)含量和相对电导率。与对照相比,10~50 mg·L<sup>-1</sup> ALA处理冬小麦的穗粒数、千粒重和产量显著增加,其中以30 mg·L<sup>-1</sup> ALA处理增产效果最大。

**关键词:** ALA 冬小麦 干物质积累 叶面积指数 生理特性 籽粒产量

## Abstract:

Taking wheat cultivar Bainong AK58 as test material, a field experiment was conducted to study the effects of different concentration 5-aminolevulinic acid (ALA) (0, 10, 30 and 50 mg·L<sup>-1</sup>) applied at initial heading stage on the post-anthesis dry matter accumulation and flag leaf senescence of the cultivar. Applying 10-50 mg·L<sup>-1</sup> of ALA benefited the dry matter accumulation, with its total amount at maturing stage being significantly higher than that of the control (0 mg·L<sup>-1</sup> ALA). 10-50 mg·L<sup>-1</sup> of ALA had no significant effects on the distribution of accumulated dry matter in leaf, stem and sheath, and grain, but increased the contribution of the dry matter to grain yield. 10-50 mg·L<sup>-1</sup> of ALA increased the leaf area index at milky and dough stages, but had no effects on it at flowering stage. After treated with 10-50 mg·L<sup>-1</sup> ALA, the leaf SPAD value and net photosynthetic rate from anthesis to milky stage were significantly higher, and the MDA content and relative electric conductivity at later grain-filling stage were lower, compared with those of the control. Applying 10-50 mg·L<sup>-1</sup> of ALA increased the grain number per spike, 1000-grain mass, and grain yield significantly, with the best effect when applying 30 mg·L<sup>-1</sup> ALA.

**Key words:** 5-aminolevulinic acid winter wheat dry matter accumulation leaf area index physiological characteristics grain yield

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