

施肥水平对马铃薯块茎发育过程中PAs、GA₃和JAs含量的影响

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The Influence of Fertility on PAs, GA₃ and JAs in the Process of Tuber Development in Potato

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摘要 为探讨肥力水平对马铃薯块茎发育影响的机理,以‘台湾红皮’(Cardinal)马铃薯为试验材料,采用反相高效液相色谱(HPLC)技术,研究了低、中、高肥力水平对块茎发育过程中多胺(PAs)、赤霉素(GA₃)和茉莉酸(JAs)含量的影响。研究表明:(1)腐胺(Put)、精胺(Spm)和亚精胺(Spd)含量在块茎发育过程中呈降低—升高—降低的变化趋势,但对不同肥力水平的响应有差异,中肥力水平下块茎发育中期(播种后60~68 d)PAs含量高于低肥力和高肥力水平含量,高肥力水平使Put含量降低,含量峰值出现时间提前,而使Spd和Spm峰值出现时间延后。Put/Spd呈现随肥力水平的提高,峰值不断降低,峰值出现时间提前的趋势。(2)低肥力水平下GA₃含量在中期高,中肥力水平下在中期含量最低。低肥力水平下JAs含量在块茎发育的各阶段都较低,中肥力水平下在中期含量高于低肥力和高肥力水平。低、高肥力水平下GA₃/JAs有先升高后降低的变化趋势,与中肥力水平变化相反。(3)JAs与PAs的相关性较大,其中与Put为正相关,与Spm、Spd显著负相关,Spm和Spd极显著正相关。合理的肥力水平提高了块茎发育中期PAs、JAs的含量,降低了GA₃的含量,有利于块茎的发育和膨大。

关键词: 马铃薯 施肥水平 块茎发育 多胺 内源激素

Abstract: In order to reveal the mechanism of fertility promoting the tuber development, the potato landrace Cardinal (*Solanum tuberosum* L.) was sampled as material, and the changes of polyamines (PAs), gibberellin (GA₃) and jasmines (JAs) in the process of the tuber development under different fertility levels were analyzed by HPLC. The result of the experiment follows: (1) The contents of three kinds of PAs (Put, Spm, and Spd) had two peak values at primary and middle stage in the tuber development respectively comforting with the trend of decrease-increase-decrease. But the contents had different respondents to different fertility levels. In middle stage of tuberization PAs contents under moderate fertility level were higher than that under low and high fertility levels. High fertility made the Put content decrease, the peak time of Put advance, and the peak time of Spm and Spd postpone. With the increase of fertility the peak value of Put/Spd reduced continuously and the peak time advanced. (2) In the middle stage GA₃ was the highest under low fertility level and lowest under moderate fertility level. Under low fertility level JAs content was low in all stage. And in the middle stage the JAs content under moderate level was higher than that under low and high fertility levels. The GA₃/JAs under low and high fertility levels increased firstly and then decreased. The change trend is reverse to that under the moderate fertility level. (3) JAs content had significant positive correlation with the content of Put, and significant negative correlation with the contents of Spd and Spm. The reasonable fertility level could improve the contents of PAs and JAs, reduce the content of GA₃ in the middle stage of tuberization and favor the tuber development of potato.

Keywords: potato, *Solanum tuberosum* L., fertility, tuber development, polyamine, endogenous hormone

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