P124

Storage condition that induce black heart of potato (*Solanum tuberosom* L.)

Yong-Ik Jin [1)]*, Dong-Chil Chang[1)], Ji-Hong Cho[1)], Dong-Lim Yu[1)], Jeong-Hwan Nam[1)], Hong-Seob Yu[1)], Bon-Choel Koo[1)], Jong-Kun Choi[1)] and Soon-Ae Lee[1)]

[1]*Highland Agriculture Research Institute, National Institute of Crop Science, RDA, Pyeongchang 232-955, Korea*

Abstract

The black heart in potato is a physiological disorder that occurs when potatoes suffer from breathing problems. When storing potatoes at a low temperature around 0℃, there is a high possibility that the respiration rate of potato will rise and black heart will occur. Also, respiration can occur easily and briefly in a state where high temperature and ventilation is insufficient. Recently, as black heart has been occurred continuously and severely in South Korea, here we tried to identify the causes of black heart in potato and to develop the control strategy of this disorder. Firstly, we analyzed the influence on the black heart on the basis of preservation containers (breathable plastic box, burlap bag, paper box, sealed plastic box). After harvesting the potato which is cv. Superior, it preserved for 6 months under conditions of temperature 3.5°C±0.2 and humidity 85%, after then we surveyed the incidence of emergence rate, rate of weight loss and occurrence rate of black heart. Secondly, in order to investigate the time point of black heart initiation under the oxygen concentration condition of 1% or less, The potatoes were used for this experiment stored for 6 months in a aerated plastic box under conditions of temperature 3.5°C±0.2 and humidity 85% under sufficient oxygen condition. After stored for 6 month, those were stored at 15°C and below 1% of oxygen for 25 days, and then the incidence of black heart was surveyed. Thirdly, to investigate the effects of the number of days after harvest on the occurrence of black heart, it was examined the occurrence of black heart stored on 40 days and 100 days after harvesting under sealed condition and vacuum condition. The temperature condition of potato storage was stored was at 4°C and 25°C in humidity 85%. As a result of investigating the occurrence of black heart depending on the storage containers, all of the potatoes stored in the sealed plastic box had been occurred black heart. However, black heart of the potatoes in the other treatments did not. Potato preserved under the condition of below 1% of oxygen was found to occur 32% black heart after 25 days of storage. The potatoes corresponding to the required number of days after harvesting were stored for 31 days and the black heart was examined on the occurred. As a result, the potatoes which were 40 days after the harvest did not have black heart under sealed condition and vacuum condition. But potatoes harvested 100 days after harvesting had a black heart incidence of 95.7% under sealed condition at 4°C. The potato placed in the vacuum condition and a sealed state at 25°C was transformed into anaerobic respiration, the inner tissue of tuber collapsed. Therefore, it is considered that black heart is caused by the breathing trouble in the central part when the oxygen is almost consumed after the aerobic respiration which gradually consumes the oxygen. We conclude that the black heart occurred in the central part where exchange of oxygen and carbon dioxide is the slowest is sensitive to respiration disorder. It is thought that research to investigate black heart generation time according to storage conditions and post-harvest state of potatoes is further necessary.

Keywords: Potato, Black heart, Storage

Corresponding author*:
Yong-Ik Jin,
Address: 5481 Gyeonggang-ro, Daegwallyeong, Pyeongchang-Gun, Gangwon-do, Republic of Korea
Tel: +82-33-330-1519
Fax: +82-33-330-1680
E-mail: pyoddae@korea.kr