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1-MCP结合不同保鲜袋对半地下通风库贮藏酥梨品质的影响

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摘 要:【目的】了解半地下通风库的温湿度变化,明确'金顶谢花'酥梨适合的保鲜处理方式。**【方法】**以不同保鲜袋包装结合1-MCP处理,在半地下通风库贮藏条件下,探讨'金顶谢花'酥梨果实品质的变化规律。**【结果】**(1)保鲜袋包装有利于维持酥梨果实的原有色泽。贮藏期间果实的L^*值均高于对照,a^*值上升幅度也明显小于对照,结合1-MCP处理,效果更明显,其中以微孔袋+1-MCP处理效果最好。(2)保鲜袋包装显著降低了果实失重率。贮藏200 d时对照失重率高达11.1%,微孔袋包装失重率在0~1%,打孔袋包装在2%~3%,差异比较显著。(3)保鲜袋包装可有效地抑制果实硬度、可溶性固形物含量的下降,保持良好的果实风味;1-MCP处理对果实硬度、可溶性固形物含量有明显影响,同种保鲜袋包装,经过1-MCP处理的变化幅度均小于未处理的,微孔袋+1-MCP处理效果最好。(4)1-MCP结合保鲜袋处理保持了贮藏过程中梨果实抗氧化活性,保持了POD活性,降低了PPO活性以及MDA含量等,同时推迟了POD、PPO活性高峰出现的时间。(5)综合各项生理指标,在微孔袋+1-MCP处理下,宁陵酥梨最佳贮藏期限在135 d以内,最多不超过170 d。**【结论】**'金顶谢花'酥梨不宜裸果贮藏。保鲜袋结合小包装1-MCP既操作方便,又有良好的保鲜效果,其中以微孔袋+1-MCP处理效果最好。在此条件下,9月底开始贮藏的酥梨最佳贮藏期限在135 d以内。

关键词: 酥梨;1-MCP;保鲜袋;半地下通风库;品质

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Effect of 1-MCP combined with bagging with different film materials on quality of 'Suli' pear (*Pyrus bretschneideri*) in semi-underground ventilated storeroom

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Abstract:【Objective】'Suli' pear is the most important pear cultivar with the largest cultivated areas and highest production in China. In Henan province, it is mainly distributed in Ningling county, which has a history of about 200 years of cultivation. 'Suli' pear has many good characters such as high yield, good taste, and good postharvest performance, and serves as the pillar industry in local areas. 50%-60% pear production is stored in the semi-underground ventilated storeroom. Local farmers usually pack the fruit in wood boxes. The semi-underground ventilated storeroom is convenient and economical. During storage, pear fruit become wrinkled, and the fruit taste and quality decline quickly. 1-MCP improves postharvest performance in many fruits. Packing fruit with various bags reduces O_2 concentration and increases CO_2 concentration in the bags, reducing fruit respiration. In this paper, 1-MCP combined with fruit packing with different types of bags were evaluated for elongating storage life of 'Suli' pear.【Methods】Tempera-

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ture and humidity were measured using a Testo 174 temperature and humidity recording instrument in a semi-underground ventilated storeroom and outdoor. The experiment was conducted from October 2014 to April 2015. Fruit with uniform shape, color and weight were used as experimental material. Treatments included: Treatment 1, packing with PE film bag; Treatment 2, packing with PE film bag combined 1-MCP exposure (SMART-FRESH bag, 10-15 kg fruit per bag); Treatment 3, packing with perforated PE film bag; Treatment 4, packing with perforated PE film bag combined 1-MCP exposure; Treatment 5, control. Quality indicators of pear fruit included TSS, fruit firmness, water loss and skin color were measured every month. Samples were frozen with liquid nitrogen, stored under -40 ℃ for measuring PPO and POD activities and MDA content.【Results】From October 20, 2014 to April 5, 2015, the highest outdoor temperature was 28 ℃, the lowest was -2.8 ℃, and the average was 7.53 ℃. In October and November, the outdoor temperature declined slowly. The outdoor fluctuated greatly from -2 ℃ to 10 ℃ from December 2014 to February 2015, and the humidity varied from 15.2% to 99.9% with an average humidity of 61% during storage period. From October 20, 2014 to April 5, 2015, the temperature and humidity in the semi- underground ventilated storeroom had the same change pattern as the outdoor temperature and humidity, declining slowly in October and November. However, temperature was less fluctuated from 2 ℃ to 6 ℃. The lowest temperature was 1.5 ℃, the highest 21.5 ℃, and the average 6.95 ℃. Humidity varied from 60.3% to 99.9%, with an average value of 89.88%. Different treatments affected the skin color of pear fruit reflected by L^*, a^* and b^*. After 200 days of storage, the L^* vales in all the treatments were higher than in control and was highest in the treatment of packing with perforated PE film bag combined 1-MCP treatment. The a^* vales in all the treatment were lower than in control, and Treatment 1 had the lowest value, indicating that fruit in all the treatments maintained greener than those in control. The b^* vale in Treatment 2 was the highest. The water loss rate in control was the highest, about 11.1% after two hundred days of storage, and that in Treatment 1 was the lowest, less than 1%. Fruit firmness in control was 3.60 $kg \cdot cm^{-2}$, less than those in all the treatments at 175 days of storage, when the highest was 4.25 $kg \cdot cm^{-2}$ in Treatment 2. TSS of all treatments gradually declined during the storage period. After 75 d of storage, control fruit shrank with an increase in TSS. TSS in Treatment 4 was the highest till 200 d of storage. MDA content in control was higher than in the other treatments during the storage period, and Treatment 2 was the lowest. The result indicated that the treatments delayed membrane breakdown compared with control. PPO activity was low at the early period of storage, rising to peak values at different storage times. For example, in Treatment 1 and control the peak value occurred at day 110; in Treatments 2 and 4, it happened at day 135; and in Treatment 3 at day 170. All the treatments delayed PPO peak occurrence compared with control. POD activity rose initially and declined later. The treatments delayed the peak compared with control. The peak in control occurred at day 35, Treatments 3 and 4 at day 75, Teatments 2 and 1 at day 135 and day 170, respectively.【Conclusion】Fresh-keeping bags could effectively reduce fruit water loss. Packing with fresh-keeping bags combined with 1-MCP treatment could inhibit fruit firmness decline, keeping higher soluble solids and better skin color and taste than the control. Compared with the treatments with packing with fresh-keep bags alone, the combined treatments had a better effect. Among these treatments, packing with PE film bag combined with 1-MCP had the best effect.

Key words: 'Suli' pear; 1-MCP; Film bag; Semi-underground ventilated storeroom; Quality

酥梨是我国栽培面积与产量较大的梨品种，河南省酥梨种植区主要集中在宁陵县[1]。酥梨在宁陵县又称'金顶谢花'酥梨，其成熟期相对比较集中、产量较高、果实品质较好。据相关农业部门统计，宁陵酥梨50%产量采用半地下通风库进行贮藏，一方面缓解了集中上市带来的价格风险，另一方面经过一