Effect of Mechanical Vibration on Storage Quality of Fragrant Pear During Transportation

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Abstract: Transportation vibration in the process of fruit transportation will cause fruit transportation problems and its own quality damage, and then affect the sales price of fruit, which is not conducive to the stable development of related industries. In this paper, we will focus on the transportation vibration of fragrant pear and the development of solutions, and then we can pay attention to and research in the future fruit transportation, reduce the impact of transportation vibration on fruit quality, and improve the economic benefits of fruit sales.

1. Introduction

In the process of picking and transportation, the demand for transportation environment of characteristic fruit is high. If it can not be properly kept, it will affect the quality and quality of fruit, resulting in the decline of market price. However, at present, there are many ways for local farmers to use offline sales, and the sales channels are relatively blocked, which hinders the sound development of fruit planting and sales. Moreover, the online sales platform has not been established, and the cooperation process with express companies also needs further consideration. Only relying on local residents and tourism consumption, the "delicate" high-quality characteristic fruit is "trapped" in the mountains, which restricts the scale and sales growth of high-quality characteristic fresh fruit.

2. Effects of Transportation Vibration on Postharvest Physiological Characteristics of Fruits

2.1. Respiration

After picking, fragrant pear will maintain its own breathing effect, and then can carry out its own metabolism in the process of transportation. The vibration phenomenon in the process of transportation will directly lead to the increase of the breathing speed of fragrant pear. With the acceleration of breathing speed, the peak of self breathing is also in advance. This situation can be seen not only in the transportation of fragrant pears, but also in the transportation research of kiwifruit, peach, apple and other fruits. The main reason for this phenomenon is that during transportation, fruit will improve its ability to resist adversity through its own breathing rhythm. With the increase of fruit's breathing frequency, its active oxygen free radicals will continue to increase, which will cause the oxidation of cell membrane in fruit, accelerate the consumption of nutrients in fruit, thus reducing the quality of fruit and improving the aging time [1].

2.2. Ethylene

With the vibration phenomenon in the process of constant speed, the fruit will produce ethylene in response to the vibration stress. Ethylene in fruit, the continuous increase of quantity can effectively prevent the accelerated aging of fruits in a certain period of time. However, with the continuous extension of fruit transportation time, the ethylene content in fruits keeps increasing, and the aging speed of fruits will also increase. In the early stage, the factors that inhibit the aging of fruits are difficult to play their own effective functions, leading to the gradual loss of the degree of

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aging of fruits System factors. According to the relevant research, the aging rate will also change during the transportation of fragrant pear. Because the amount of ethanol is small, it can reduce the frequency of fruit aging, and when the ethanol in the fruit continues to increase, the aging rate will also change in direct proportion.

2.3. Cell Membrane of Fragrant Pear

The cell membrane of fruit is affected by the relative conductivity and the plasma membrane of malondialdehyde, which will cause serious quality damage of fruit itself. Relative conductivity can show the cell infiltration in fruit. In the process of transportation, there is a continuous penetration phenomenon, and the relative conductivity value will continue to increase, which will lead to the cell penetration phenomenon of the fruit itself. The intuitive performance is that the fruit has obvious ulceration and skin damage. Under the influence of transportation vibration, there will be a large relative conductivity in the process of storage and transportation of fruits. In the research of relevant experts and scholars, such situation will occur in the transportation of nectarine, apple, pear and other fruits. There is a positive correlation between the relative conductivity of fruit and the content change of malondialdehyde in fruit.

2.4. Plant Enzyme System

There is an obvious relationship between the plant enzyme system and the loss and aging rate of fruit nutrition factors in plant cells. This situation can be seen not only in the transportation of fragrant pears, but also in the transportation research of kiwifruit, peach, apple and other fruits. The main reason for this phenomenon is that fruits will improve their ability to resist adversity through their own breathing rhythm during transportation, and the continuous movement of plant enzyme system will realize the preservation of fruits. With the increase of fruit respiratory rate, the active oxygen free radicals will also continue to increase, which will cause the oxidation of cell membrane in fruit, accelerate the consumption of nutrients in fruit, reduce the quality of fruit, and improve the aging time. Due to the continuous vibration in the process of transportation, the cell membrane in fruits accelerates the oxidation, accelerating the aging process of fruits. With the continuous extension of fruit transportation time, the plant enzyme system in fruit is constantly decreasing, and the aging speed of fruit itself will also be enhanced. In the early stage, the factors that inhibit fruit aging are difficult to play their own effective functions, resulting in the degree of fruit aging gradually lost the containment factors. At this time, the appearance of fragrant pears will change, such as browning, oxidation, spots, etc.

3. Effect of Transportation Vibration on Fruit Quality

3.1. Hardness

The hardness of fruit after picking is an important standard to measure the fruit items. In the process of transportation, affected by the vibration, almost all fruits' own hardness will be significantly reduced. For apple, pear, apricot and other fruit transportation process research data are the same. The decrease of fruit hardness has a strong blocking effect on the storage capacity of fruit itself. The main reason is that the enzyme activity of degradation cell wall increased after fruit transportation, resulting in improper reduction of fruit hardness. In addition, a large amount of ethylene generated after vibration is also an important inducement for softening phenomenon [3].

Figure 1 Fruit

3.2. Soluble Solids and Total Acids

One of the most important substances in fruit is soluble solids. The content of this substance has an important influence on the determination of nutritional components of fruit. The total acid is an important factor affecting the taste and taste of fruit. The continuous increase of the amount of soluble solids in fruits can effectively prevent the accelerated aging of fruits in a certain period of time. However, with the continuous extension of fruit transportation time, the content of soluble solids in fruits will continue to increase, and the aging speed of fruits will also increase. In the early stage, the factors that inhibit the aging of fruits are difficult to play their own effective functions The degree of fruit aging gradually lost the containment factor.

Figure 2 Rotten fruit

In addition to the influence on the quality and taste of fruit itself, the influence of different degrees of transportation vibration on the quality of fruit is also different. When the vibration intensity is low during transportation, the amount of soluble solids is small, which can promote the degradation of macromolecular carbohydrate in fruit. With the continuous extension of fruit transportation time, the plant enzyme system in fruit is constantly decreasing, and the aging speed of fruit itself will also be enhanced. In the early stage, the factors that inhibit fruit aging are difficult to play their own effective functions, resulting in the degree of fruit aging gradually lost the containment factors. Similar to the situation that fruits are affected by vibration to produce ethylene, when fruits are affected by vibration for a long time and with a large intensity, the amount of soluble solids in fruits will continue to decrease, while the content of total acid will continue to decrease, and the improvement of acid substances will affect the taste and taste of fruits, and then reduce the overall flavor and quality of fruits.

3.3. Vitamin C

As we all know, vitamin C is an important vitamin in fruits, and also one of the nutrients in fruits. According to the relevant research, during the transportation process of fragrant pear, with the

increase of transportation vibration, the quantity of vitamin in fragrant pear has changed obviously, and the proportion of vitamin C decreasing is the most obvious. Vitamin C also has antioxidant function in fruit. When vitamin C in fragrant pear is lost with the transportation time, spots and wrinkles will appear on the surface of fragrant pear, which will affect the appearance and quality of fragrant pear.

Figure 3 Appearance quality of fragrant pear

3.4. Total Phenol

The content of phenols in fruit can directly affect the quality and quality of fruit, the most important of which is to control the antioxidant capacity of fruit. During transportation, fruits vibrate, which will reduce the content of phenols in fruits. With the extension of vibration time, the antioxidant capacity of fruits will also decline improperly. This result can be seen from the research on the quality change of many fruits during transportation. In the process of transportation, it can be seen that the quality of fragrant pear itself will be affected by the continuous extension of transportation time, which is directly reflected in the appearance of some gray brown spots on the surface of fragrant pear. The main reason is that the Antioxidative Factors in the peel of fragrant pear are decreasing, which leads to different oxidation on the surface of fragrant pear.

4. Conclusion

According to the above research content, it can be seen that the vibration phenomenon in the process of fruit transportation will affect the quality and nutritional value of fruit, and the most intuitive impact is the sales price of fruit, which will affect the improvement of the industrial chain management quality of fruit planting and sales. In the process of transportation of characteristic fruit planting, it can not be limited to the traditional mode of transportation, but should be combined with the social background of the rapid development of the Internet, with the help of Internet, mobile terminal, blog, wechat, microblog client and other new media advantages, to realize the resource information sharing of characteristic fruit planting. Expand the scope of the audience and consciously cultivate the public's protection psychology for the planting of characteristic fruits. And for the special fruit planting has a good understanding and attitude of the audience groups. Carry out targeted services and exchanges. Encourage the cultivation of characteristic fruits to go out to the world. According to the research content of transportation vibration for fruit quality in the above, it can be seen that the vibration in the transportation process can be reduced and avoided. Therefore, it is necessary to innovate and optimize the environmental conditions and levels in fruit transportation, to provide more perfect system protection for fruit transportation, and to effectively improve the quality of fruit sales.

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