

## Mandarins - aspects of quality assessment

*When assessing the quality of mandarins, we must check the following points:*

### 1) Packaging

Our first move upon opening the container is to get a visual impression of the pallets and of the packaging. Are the pallets standing straight? Have the boxes been damaged inside the container during transportation? Is the humidity normal inside of container? Mandarins are usually packed into 3 types of boxes: wood, cardboard and plastic. Carton boxes may collapse in case of high condensation. Plastic boxes may leave lots of spots and mechanical damage on the fruits surface.



### 2) Temperature

The second step is measuring of temperature. Generally, during transportation, for mandarins, the temperature inside container should ranges from +1 C to +4 C depending on origin and transit time, with relative humidity of air 80 %. If the humidity is too low, fruits will start drying and it may eventually lead to dehydration.



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### 3) Visual inspection

The third step is to get an impression of the fruit look and smell. Fruits should be clean and fresh. The peduncle of mandarins should be evenly cut or absent. The presence of leaves is also allowed, some manufacturers supply mandarins with leaves and twigs, depending on customer requirements.



### 4) Sampling

Sample boxes are taken randomly from the pallets. The quantity of sample boxes and sampling method depend on each supermarket, we usually inspect at least 8 boxes from different pallets and from different calibers.

Some of supermarkets do not divide into the calibers, even if there are several calibers per batch simultaneously. They just pick the random amount of fruits out of the batch and consider it as a single caliber. The main thing is that goods should correspond to calibration according to requirements. Other supermarkets control all calibers separately, for instance, if we have calibers such as: 1 (75 pieces), 1 (90 pieces), 1 (99 pieces), 2 (208 pieces) per batch, they can conduct the inspection for each size.



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## 5) Sizing

The gradation of mandarins' calibers varies from 1XXX (78> mm) to 10 (35-42mm). The most common caliber is 1X-5. Most Russian supermarkets ask for specific calibers.



## 6) Brix

The «brix» measures of the sugar rate in the juice of the fruit; it describes how sweet the mandarins are. Some of the Russian supermarkets control the Brix continuously and have minimum sugar requirements (for example 12+), others supermarket do not measure the level of sugar inside the fruits and don't even mention it in their order specifications.



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## 7) Coloration

The main criteria to control coloration is uniformity. Accepted coloration of mandarins can be from yellow to dark orange. Light green fruit is also allowed, usually up to coloration 7 out of 10.



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## Quality classification

### Class II

The 2<sup>nd</sup> category is defects, which don't impact on the qualities of goods, its shelf-life and implementation, but only slightly worsens its appearance.

We classify into class II the fruits with the follow common defects:

- 1) small scars,
- 2) secretion of essential oil,
- 3) sunburn,
- 4) healed mechanical damage by silver tick.

Typically, supermarkets attribute such defects to the second category, but if the damage is insignificant (<2cm) those defects may be attribute to the first category.



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## **Non – standard**

We classify into non-standard the defects, which significantly worsen the appearance of the fruit or its shelf life, such as:

- 1) Significant defects of peels- rough mechanical damages with penetration of albedo
- 2) Defects of coloration (for example, dark green color of fruits)
- 3) Defects of shape - significant peel separation.
- 4) Signs of aging (dark brown spots, dehydration, partial wilting, dull skin).
- 5) Presence of mold or residual mold on the peel of mandarins.
- 6) The presence of residual traces of processing or dirt.



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### **Waste (decay, mold, total wilting)**

We classify into the “waste” category:

- 1) Dark green fruits (green coloration > 7 out of 10).
- 2) Mold; presence of one moldy fruit may spread the infection on the other fruits, which may occur to the total infection of batch as a result. When the batch is infected by mold spores, sorting is ineffective in this case, because mold spread too fast. So, in this case, these fruits might be attributed to the waste. Shelf life of fruits if minimum.
- 3) Big dark brown or black spots. Spots usually affect the goods very fast, especially when the temperature is above 6 degrees, which makes the storage and implementation of goods are extremely problematic.

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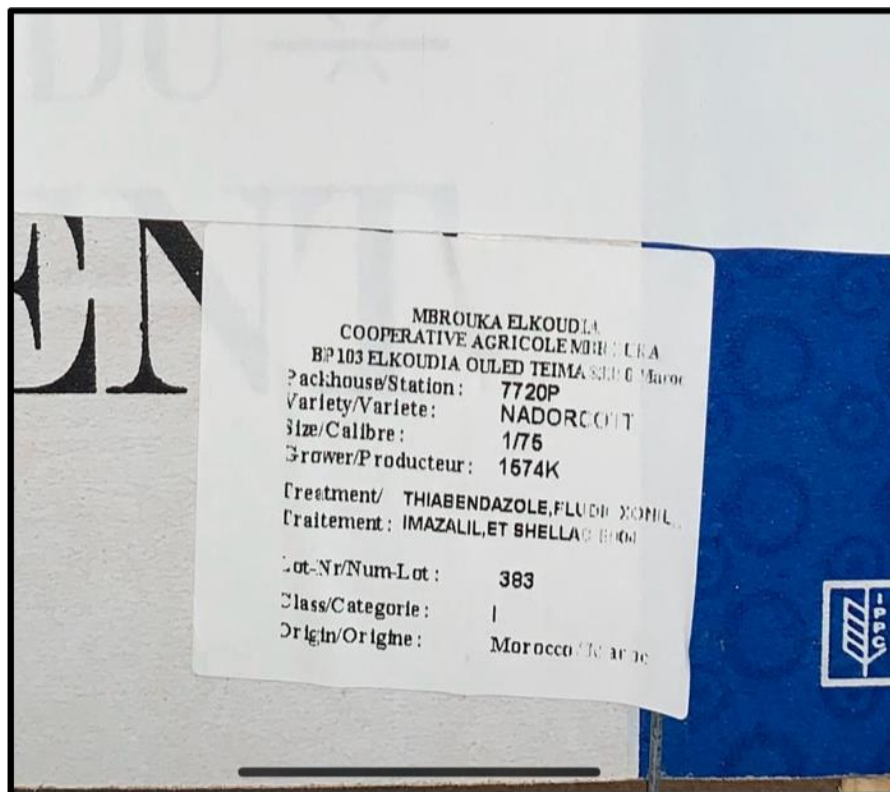
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### Tracking the grower at origin of defects

When noticing significant defects, we write down tracking numbers on boxes labels. This information may help to supplier to track down quality issues and flaws at production stage in the country of origin and to discuss it with the grower from whose farms the damaged fruits come from.



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