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Translucent Tissue Defect (Transparency) in Potato Chips, by definition, takes place when starch granules break down and reducing sugars (glucose and fructose) increase. What is being observed is a form of senescence taking place randomly in the central pith-parenchymal cells. A process brought on by environmental stress factors, be it during the growing season or storage season, that have negatively impacted the physiological age of the tuber by rendering it physiologically older. It is important to note that some cultivars are more susceptible than others to this phenomenon and some even resistant.

Stress factors can include:

- Dry hot summers or conversely wet hot summers
- Extreme pest pressures (both insect and disease)
- Harvesting the crop for storage while pulp temperatures are above 60°F or below 45°F
- Lack of cooling capacity to remove excess field heat brought in from harvest
- Extended periods of ventilation early in the holding season due to water rot issues

Essentially, if a disruption of the natural biochemical pathways occurs during the growing or storage season, for a period of time, a risk to develop transparency issues is present.

These physiologically older tubers begin showing symptoms of senescence at an earlier than usual stage in storage and the internal stressed areas begin to experience an accelerated physiological aging process. Once senescence is induced the condition is irreversible and generally becomes worse when storage temperatures rise.

This aging process can however be slowed down. Suggestions provided by Dr. Joseph Sowokinos are:

1. If possible, keep temperatures down to approximately 45/46°F (7-8°C). The aim is to slow down the physiological aging process without losing colour. Cold temperatures will slow down the aging process.
2. Provide fresh air frequently to maintain a good oxygen level.

And last but not least...

3. **Move the crop as quickly as possible to market!**

The sooner physiological aging problems are discovered the sooner management techniques can be implemented and the possibility of seeing your crop successfully meet its delivery date can be realized.

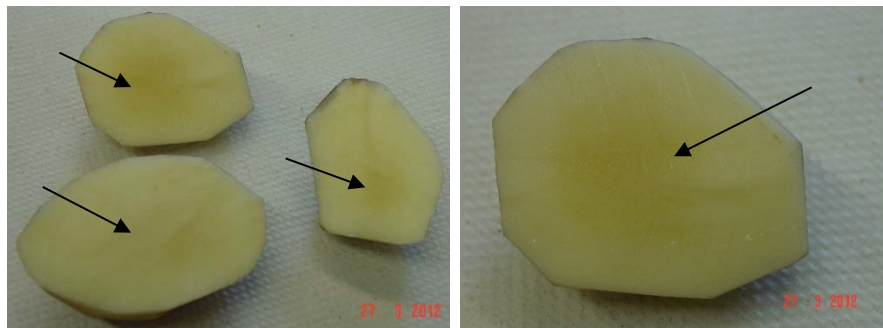
It is important to note this physiological/biochemical disorder does not manifest itself until after a period of time in storage. At an advanced stage translucent defect is easily visible after the raw tuber is cut in half, but while in its earlier stages is only best detected when fried.

When cooked in oil, the translucent area produces a very dark discoloration by excess tuber sugars reacting with amino acids in a browning reaction. The non-translucent area of the same tissue slice remains a light color typical of a normal non-defective tuber with low sugar levels.

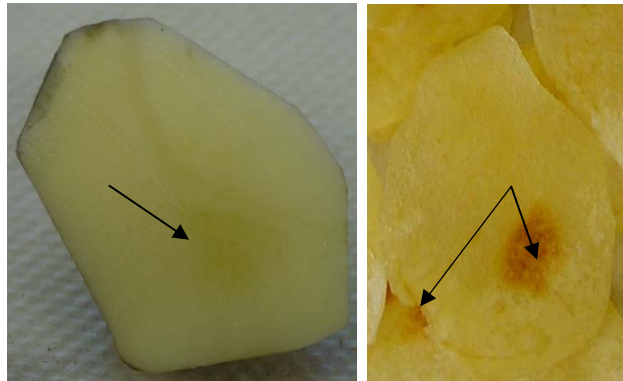
To ensure early detection, it is suggested that chip samples be submitted on a regular basis for sugar and fry tests at a Quality Testing Lab. This will aid in identifying the onset of this aging process quickly and help prevent a massive impact on chipping quality.

If the issue is not addressed quickly enough, a last resort can be to strip off the larger sized tubers (>3") in an attempt to salvage at least part of the crop. The larger tubers are already physiologically older than smaller tubers even before the onset of the transparency process so adopting this procedure may render your crop marketable. **A word of caution:** submit a random sample for frying before beginning the stripping process; this will help determine if it is a feasible option.

Translucent tissue defects observed in the chipping variety Monticello



Starch granules have broken down and reducing sugars (glucose and fructose) have increased



End result of a crop faced with environmental stress factors if gone undetected

