Lintonizing: New Discovery, Plant Cell Metamorphosis

Ohio food development company, Viands Concerted™ LLC, has discovered a process that makes a fully cooked vegetable appear as though it were freshly cut by literally changing the cellular plant structure within the vegetable. The patent pending process called Lintonizing™, restores turgor to the cellular plant structure not by increasing osmotic pressure within the cell membrane as conventionally understood, but rather by shrinking the cell wall around the cell membrane. This reverse turgor is accomplished by removing water molecules from the cellulose structure in the cell wall while leaving the cell membrane fully intact. Conventional methods of processing cause cell damage and a significant loss of turgor while converting the vegetable from raw to cooked. Viands' process involves converting the raw vegetable to cooked at low pressure. Low pressure-cooking allows moisture to escape from the vegetable through the plants natural vascular channels with no damage to the cell membrane.

Further of importance is the vacuoles within the cytoplasm are not ruptured during this process. This was evidenced through microscopic examination of the progress of starch gelatinization through the Lintonizing™ of potatoes. Specimen samples were collected every 30 seconds during the process and stained with an iodine solution. Lintonizing™ not only kept the vacuoles containing the starch crystals intact, the process increased the % of total starch gelatinized by approximately 10%. This fact contributes to increased potato flavor in the finished product (i.e., chips and fries).

The cell wall reduction may also be evidenced by microscopic examination. A simple comparison of the number of cells visible in the field from the same specimen at the same focal distance consistently verified a 3% to 5% increase in that count compared before and after processing. Additionally impressive is the apparent recapture of the free sugar monomers by the polysaccharide starch structure during the processing of potatoes. Testing for free sugar in the cooked potato product is consistently negative. Additional evidence of the absence of free sugar monomers is the lack of Maillard browning (virtually eliminating acrylamide formation) in potatoes that were Lintonized™ prior to frying. French Fries and Potato Chips both consistently grade near the bottom of the national color chart for browning*.

In addition to being gentle on the plant cell structure the Lintonizing™ Process provides an additional benefit to processing; cooking a vegetable by bringing atmospheric pressure to the boiling point temperature rather than vice versa eliminates the physical requirement to add large amounts of energy to the product to achieve that last 1^{o} increase from 211^{o} F. to boiling. Reducing the pressure to preheated product boiling point rather removes energy from the product thusly reducing the product temperature proportionately.

Macroscopic examination of the finished vegetables is also quite phenomenal. The metamorphosis becomes clearly evident: Lintonized™ cooked fries (ready for frying) that can be looped into a knot without breaking; cooked potato chip slices (ready for frying) that can be doubled over without breaking; fully cooked bell pepper slices that have the crunch of fresh; and corn with the starch concentrated in the kernel -- not allowed to escape to the cob. The concentration of starch within the center of the Lintonized™ kernel was evidenced by microscopic examination of stained specimens that were collected at 15 second intervals and then compared to conventionally processed corn on the cob.

Another big advantage to Lintonized™ vegetables is their shelf life. Even though Lintonized™ vegetables appear "Fresh Cut", they are fully converted from raw to cooked allowing for a refrigerated shelf life from 45 to 60 days. "Fresh Cut" is the fastest growing segment in vegetables nationally and the Lintonized™ process could make "Fresh Cut" obsolete as soon as production can support customer demand.