

ASSESSING THE QUALITY ATTRIBUTES OF FROZEN VEGETABLES AND FRUITS

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ABSTRACT

Freezing is an extremely well developed foods preservation method which creates high quality healthy meals which provide the advantageous asset of a very long storage life. Nevertheless, freezing isn't ideal for most food items, and freezing does cause chemical and physical alterations in a number of food items which are perceived as reducing the quality of the thawed substance. Several revolutionary freezing procedures are presently being explored as well as created around the world to get over these issues. The primary goal of this particular study is actually discussing the chemical and physical alterations in the vitamin worth of the food items at the time of refrigeration by evaluating the freshness as well as acceptability following refrigeration.

Keywords: *Freezing, process, fruits, food, refrigeration, etc.*

I. INTRODUCTION

Refrigeration and freezing of short-lived food items is a significant and entrancing application zone of warmth move and thermodynamics. Refrigeration hinders the chemical and natural processes in foods and the going with disintegration and the loss of value. The capacity life of fresh short-lived foods, for example, meats, fish, fruits, and vegetables can be stretched out by a few days by cooling, and by a little while or months by freezing. There are numerous contemplations in the plan and determination of appropriate refrigeration and warmth move systems, and this section shows the significance of having a wide base and a decent comprehension of the processes included when planning heat move gear. For instance, fruits and vegetables proceed to breathe and create heat during capacity; most foods freeze over a scope of temperatures rather than a solitary temperature; the nature of frozen foods is extraordinarily influenced by the pace of freezing; the speed of refrigerated air influences the pace of dampness misfortune from the items expansion to the pace of warmth move, etc.

We start this part with an outline of microorganisms that are answerable for the Waste of foods since the essential capacity of refrigeration is to impede the development pace of microorganisms. At that point we present the overall contemplations in the refrigeration and freezing of foods and portray the various techniques for freezing. In the accompanying areas we portray the unmistakable highlights and refrigeration needs of fresh fruits and vegetables, meats, and other food items. Next we consider the warmth move components in refrigerated extra spaces; finally, we examine the transportation of refrigerated foods since most refrigerated foods consume part of their time on earth on the way in refrigerated trucks, railroad vehicles, delivers, and even planes.

II. QUALITY ATTRIBUTES IN FRESH-CUT FRUITS AND VEGETABLES

Fresh-cut fruits and vegetables must have an appealing appearance, worthy flavor, fitting texture, and a positive nutritional picture to pull in beginning and proceeded with buys by shoppers. Customers may attempt another item

whenever pulled in by its appearance, yet they are probably not going to repurchase a thing in the event that it neglects to convey on the guarantee of that appearance. Quality can be seen from either an item or a customer direction. A purchaser direction sees the item through the tactile viewpoint of the customer at the purposes of procurement and utilization. Shoppers regularly purchase the first run through dependent on appearance, however rehash buys are driven by expected quality variables dictated by flavor mixes and texture.

- **Color and Appearance**

Color and appearance pull in the customer to an item and can help in motivation buys. At the purpose of procurement the customer utilizes appearance variables to give a sign of freshness and flavor quality. Outside appearance of an entire fruit is utilized as a marker of readiness, despite the fact that it tends to be a deceptive one. Customers have a favored color for a particular thing. Bananas should be yellow with no earthy colored spots, tomatoes red not orange, cherries red not yellow, and kiwifruit green-fleshed not yellow. Except for the outside of a couple of fruits like Bosc pears and kiwifruit, fresh fruits and vegetables ought not to be earthy colored. Shine outwardly of entire fruits will in general be an alluring property for entire fruits. Fresh-cut fruits and vegetables must have all the earmarks of being fresh, by and large showed by the splendor of color and the nonappearance of visual deformities or trickle.

- **Flavor**

Flavor of fresh-cut fruits is a higher priority than for fresh-slice vegetables because of the manner in which the items are burned-through. Fresh-slice vegetables will in general be burned-through as segments of plates of mixed greens or sandwiches. Since fresh-slice fruits are bound to be burned-through without different fixings, they should be sweet without the presence of off-flavors. Since pleasantness increments with maturing and ready fruits break down more quickly, most fruits are gathered before full pleasantness has been accomplished. Pleasantness doesn't increment in covered, cut melon during capacity, and it is far-fetched that critical increments in pleasantness will happen in other fresh-cut fruits subsequent to bundling. Advancement of more serious aroma has been accomplished by taking care of forerunners into the air of strawberry tissue societies and fruit, however this method isn't being utilized financially

- **Texture**

Purchasers have away from for the texture of freshcut vegetables and fruits. Plate of mixed greens vegetables like lettuce, carrot, celery, and radish ought to be fresh. Delicate fruits, for example, melon and peach should respect biting without being soft. Different fruits like apples ought to be fresh and crunchy. While buyers by and large refer to flavor as the most significant quality characteristic for fruits and vegetables, textural surrenders and the collaboration of flavor and texture are bound to cause dismissal of a fresh item. Customer and board testing demonstrates that they are in reality more delicate to little contrasts in texture than flavor. Bothersome textural credits are something contrary to the attractive ones. Shriveled lettuce, limp carrots or celery, and flabby radish are unsuitable as are crunchy or soft melons and peaches. Saturated or coarse apples are additionally liable to be dismissed.

- **Nutritional Value**

Customers anticipate that fresh fruits and vegetables should be acceptable wellsprings of dietary fiber and numerous nutrients and minerals. Tragically they have no chance to get of recognizing singular items that have high versus low groupings of phytonutrients. Numerous variables add to the supplement substance of a fruit or vegetable ready to move including hereditary qualities, developing conditions (light, temperature, and so forth) and creation rehearses (preparation, water system, and so on), development at gather, and postharvest dealing with conditions. During

stockpiling little change happens in dietary fiber and mineral substance, yet the nutrients are lost. Cutting invigorates ethylene creation which thusly builds breath and senescence prompting considerably more fast loss of specific nutrients. Nutrient C is the nutrient that typically debases most quickly and can be utilized as a list of freshness. Nutrient C is shaky in numerous vegetables, for example, asparagus and jalapeno pepper. Slight nutrient C misfortunes in put away fresh-cut melon were likewise announced as of late.

- **Convenience**

The characteristic that drives fresh-cut items is accommodation. Customers buy cut fruits and vegetables for utilization directly out of the bundle. The previous International Fresh-Cut Produce Association characterized fresh-cut produce as managed, stripped, washed, and cut into 100% usable item that is in this way stowed or prepackaged to offer buyers high nutrition, comfort, and value while as yet looking after freshness. These items ought to be spotless with no proof of soil or smell of chlorine or different sanitizers. All pieces in the bundle should be eatable and require no further planning advances other than move from bundle to plate.

III. CONCEPT OF FREEZING PROCESS

Freezing is a broadly utilized technique for food preservation dependent on a few favorable circumstances as far as maintenance of food quality and simplicity of process. Starting with the most punctual history of freezing, the innovation has been profoundly influenced throughout the years by the turns of events and enhancements in freezing techniques. So as to comprehend and deal with the ideas related with freezing of foods, it is important to inspect the principal factors overseeing the freezing process.

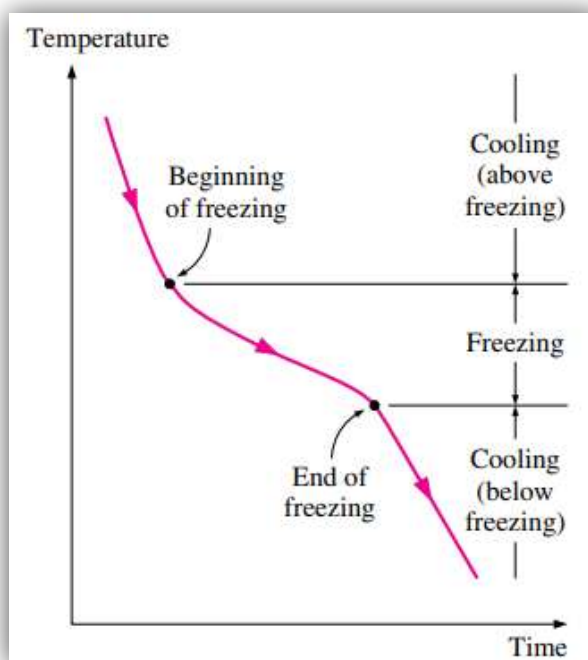


Figure 1: Typical freezing curve of a food item.

- Freezing process

The freezing process fundamentally comprises of thermodynamic and dynamic components, which can overwhelm each other at a specific stage in the freezing process. Significant warm functions are joined by decrease in heat substance of the material during the freezing process. The material to be frozen first chills off to the temperature at which nucleation begins. Before ice can frame, a core, or a seed, is needed whereupon the precious stone can develop; the process of creating this seed is characterized as nucleation. When the primary precious stone shows up in the arrangement, a stage change happens from fluid to strong with additional gem development. Subsequently, nucleation fills in as the underlying process of freezing, and can be considered as the basic advance that outcomes in a total stage change.

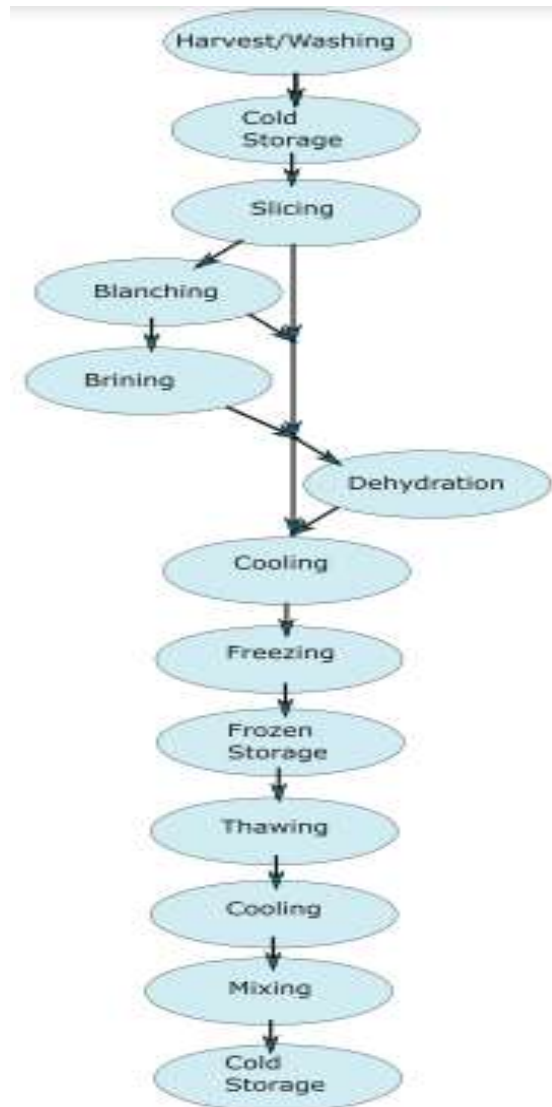


Figure 2: Process flow sheet for frozen vegetables and fruits

- **Freezing point of foods**

Freezing point is characterized as the temperature at which the primary ice gem shows up and the fluid at that temperature is in balance with the strong. In the event that the point of solidification of unadulterated water is thought of, this temperature will compare to 0 °C (273°K). Be that as it may, when food frameworks are frozen, the process turns out to be more perplexing because of the presence of both free and bound water. Bound water doesn't freeze even at extremely low temperatures. Unfreezable water contains solvent solids, which cause a reduction in the point of solidification of water lower than 0 °C. During the freezing process, the grouping of solvent solids increments in the unfrozen water, bringing about a variety in frigid temperature in this manner, the temperature at which the main ice gem shows up is usually viewed as the underlying frigid temperature. There are experimental conditions in writing that can compute the underlying frigid temperature of specific foods as a component of their dampness content.

IV. CONCLUSION

Freshness is actually among the crucial characteristics for food quality assessment. It suggests the amount of different physicochemical, biochemical, and microbiological changes in food. Traditionally, food freshness assessment continues to be based on sensory, chemical, physical, and microbiological procedures. Still, there is an opportunity to improve final quality of frozen food via optimization of the existing production chain, via careful matching the processing times to the time scales of the fundamental physicochemical and biochemical processes. For this optimization the causal network can be a good guiding tool.

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