Shelf Life and Stability of Honey

What is the shelf life of honey?

Honey stored in sealed containers can remain stable for decades and even centuries! However, honey is susceptible to physical and chemical changes during storage; it tends to darken and lose its aroma and flavor. This is a temperature-dependent process, making the shelf life of honey difficult to define. For practical purposes, a shelf life of two years is often stated. Properly processed, packaged and stored honey retains its quality for a long time.

What is the best storage temperature for honey?

Processed honey should be stored between 64–75 °F (18–24 °C).[1] Honey can be exposed to higher temperatures for brief periods; however, heat damage is cumulative so heat exposure should be limited. It is best to minimize temperature fluctuations and avoid storing honey near heat sources.

The recommended storage temperature for unprocessed honey is below 50 °F (10 °C). The ideal temperature for both unprocessed and processed honey is below 32 °F (0 °C). Cooler temperatures best preserve the aroma, flavor and color of unprocessed honey.

What is crystallized honey?

Most honeys are supersaturated with respect to glucose which may cause glucose to crystallize spontaneously at room temperature in the form of glucose monohydrate. The rate at which crystallization occurs depends on the origin of the honey and the methods by which it was processed and handled. Crystallization may be reversed by heating which "melts" the crystals.

It is also possible to induce and control crystallization to produce cremed honeys. This process yields very fine crystals and a smooth product with a peanut butter-like texture. Cremed honeys can be flavored or mixed with other ingredients such as nuts, fruits or dairy products.

Why is uncontrolled crystallization of honey undesirable?

Spontaneous crystallization causes the product to become cloudy and less appealing to the consumer. It results in separation into two phases: a liquid phase on top and a more solid phase at the bottom of the container. The higher moisture content and the fructose content of the liquid phase can allow

naturally occurring osmophilic yeasts to multiply and ferment the honey. Pasteurized honey in sealed containers may crystallize but is generally not liable to ferment.

Is honey's composition related to crystallization?

A number of researchers have attempted to predict the tendency of honey to crystallize using ratios involving the composition of honey with respect to glucose. A honey with a glucose/water ratio < 1.7 tends to remain liquid for a long time, while one with a ratio > 2.1 usually crystallizes quickly.[2] It has been observed that honeys with a high percentage of fructose remain liquid for a long time. Thus other ratios such as fructose/glucose and (glucose *minus* water)/fructose have been proposed.[3] The use of these ratios to predict crystallization is possible only when comparing honeys which differ significantly in sugar composition.

Which physicochemical factors influence crystallization and fermentation?

Crystallization of honey is most rapid at 52–59 °F (11–15 °C). Some preventative measures may be taken, including:

- Storing at temperatures which delay crystallization (<52 °F, 11 °C)
- Preventing absorption of atmospheric moisture by tightly closing containers during storage[4]

The fermentation process is essentially dependent on the initial count of microorganisms in the product, the storage time and temperature, and the moisture content of the honey.[5] The most important cause of fermentation in honey is the increase in its free-water content. Honey with a moisture content below 17.1% does not ferment. The stability of honey with a moisture content > 17.1% depends on its microbial content.[6] Pasteurized honey (available commercially) generally does not ferment because the microbial content has been reduced.

Is honey usually stable?

Honey is highly stable against microbial growth because of its low water activity, low moisture content, low pH, and antimicrobial constituents.

What is done by processors to reduce the risk of unwanted crystallization?

During processing, several steps are taken to prolong the liquid state of honey. Pasteurization delays the process of crystallization by dissolving any crystals that may be present in the crude product. Pasteurization also affects yeast cells which considerably reduces the possibility of fermentation. Recommended pasteurization treatments include flash pasteurization (170 °F for a few seconds) or heating at 145 °F for 30 minutes.

Filtering under pressure enhances the clear brilliant color of honey and removes some potential crystallization nuclei such as undissolved glucose crystals, air bubbles, pollen grains or any other large particles.

The filling temperature of bottles and other honey containers has an impact on crystallization as well. Honey bottled at temperatures of 104 °F (40 °C) or higher (up to 130-140 °F, 55-60 °C) crystallizes significantly more slowly.[7]

Is the container in which honey is stored important?

Some researchers have demonstrated that honey stored in low density polyethylene containers can lose moisture over time.[8] This loss of moisture could contribute to crystallization.

It is important to store honey in air-tight containers. This protects it from external moisture which the honey may absorb. Properly sanitized and sealed stainless steel drums in good condition are perfect for extended storage of large quantities of honey.

References

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