

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. The shapes are primarily triangles and polygons, creating a dynamic, layered effect. The central text is positioned in the white space between these green elements.

Granulation, Fermentation and Storage of Honey



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Honey Granulation

- ▶ It is a natural process of crystallization of the glucose content in honey.
- ▶ There is a miss conception among consumers that granulated honey is an adulterated honey, having common sugars. This is not correct.



Process

- ▶ Honey is a supersaturated solution of glucose, fructose, sucrose and other sugars.
- ▶ Among these sugars, glucose is the most liable to granulate or crystalize under stress condition like low temperature and high moisture content and evenly precipitates out of supersaturated honey solution.
- ▶ The glucose loses water and takes the form of crystals.
- ▶ The crystals form a lattice which immobilizes other components of honey in a suspension thus creating the immense liquid state.
- ▶ Raw honey has the tendency to granulate faster than highly processed honey.

Why does honey granulate?

- ▶ As it is a supersaturated solution, this state occurs because glucose tends to precipitate out of the solution and the solution changes to more stable state.

Clarification

- ▶ Honey is a highly concentrated sugar solution having over 70% sugars and about 20% water. It is natural for honey to crystallize since it is an over-saturated sugar solution.
- ▶ The two principle sugars in honey are fructose (30-44%) and glucose (25-40%).
- ▶ Crystallization occurs due to the balancing of these two sugars and the rate depends on the percentage of these sugars.

Factors affecting the speed of granulation

Different types of honey will crystallize at different rates. Some honey granulates rapidly within weeks while others take months or up to a year.

- ▶ The nectar source collected by the bees.
- ▶ The method in which honey is handled
- ▶ The temperature in preservation.

Factors ?

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- ▶ High glucose content honey with a low fructose percentage will granulate more rapidly.

Example : Nectar collected from alfalfa, cotton, dandelion, mesquite, mustard and rape.

- ▶ Honey high in fructose to glucose ratio crystallizes quite slowly and can stay liquid for several years without special treatments.

Example : Food sources like robinia, sage, longan, tupelo and jujube.



How to convert granulated honey into liquid form with retaining its original eminence?

- ▶ Heat a saucepan filled with enough water in the jar at 35-40°C then remove it from the heat.
- ▶ Immerse the honey bottle into water and let it stand for about 20-30 minutes.
- ▶ The heat will slowly dissolve the glucose crystals. Replace the hot water if needed.
- ▶ Remove the honey jar from the water bath when honey becomes liquid again.

Fermentation of honey

- ▶ Fermentation is the process of shifting of carbohydrates to ethanol and carbon dioxide.

How do you know if honey is fermented?

- ▶ You can **tell fermented honey** because the top of the jar of **honey** will get bubbly. The taste will get a tang to it, can't describe it exactly, but it's slightly alcoholic in taste,



Process of fermentation

- ▶ Bees gather nectar from flowering plants and return it to their hive where they add enzymes.
- ▶ They place the honey mixture in the honeycombs and fan the mixture with their wings.
- ▶ **If the moisture content is over 18.6%, fermentation is more likely to occur.**
- ▶ If moisture content of honey is too high or much cold weather sets in, bees will not cap the honeycomb cells. The cells will sit open and will likely start to ferment.

Restraining honey from fermentation

- ▶ Producing a high-quality honey crop requires that bee-keepers protect it from fermentation.
- ▶ They can reduce the moisture of honey by placing it in a “hot room” or with a dehydrator to decrease the water content.



Pros and cons of honey fermentation

- ▶ Honey fermentation in a controlled manner can be used to produce products such as bread, yogurt and biofuels like ethanol and alcoholic drinks.
- ▶ Uncontrolled fermentation can add unwanted by-products to the honey ruining its flavor and making it inedible.
- ▶ The honeycomb cells can be filled with bubbles and an odor of yeast can be smelled.
- ▶ Fermented honey is not valuable for humans as a food source for culinary use.
- ▶ It can also be detrimental to the health of bees. As bees store honey in summer to use it in winter, fermented honey can be poisonous to them.

Storage of Honey-key factors

There are several factors such as microorganisms, acidity, heat or sunlight which results in deterioration of honey, but fermentation remains the major threat to unprocessed honey, whether it is crystallized or liquid.

- ▶ Storage conditions must prevent fermentation through, either low temperature storage or by preventing further adsorption of moisture.
- ▶ Change in pH. cause faster deterioration.
- ▶ Heat and sunlight can destroy the quality of honey.
- ▶ Only cold storage below 5° C is suited to simultaneously prevent crystallization, melting of crystallized honey and fermentation.
- ▶ The storage room should have temperature of near 20° C relative humidity of less than 65%.

Honey storing

- ▶ Simply keep it in a cool location away from direct sunlight and in a tightly sealed container.
- ▶ It's recommended that you use the original container the **honey** came in, though any glass jar or food-safe plastic container will work. **Avoid storing honey in metal** because it can oxidize.
- ▶ Well, quick marketing and consumption will reduce the need for preservation.



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