

## Recrystallization of honey - reasons, prevention and prediction



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In general, honey tends to crystallize. This effect is often undesirable except in the case of honey varieties that are normally crystalline, such as rapeseed or sunflower honey. Crystallization leads to an impairment of the technological further processing and to a clouding of the honey, which results in a lower customer acceptance. In addition, the separation into a crystalline and a liquid layer reduces the microbiological stability due to water enrichment in the upper phase.

Due to its physical properties, honey initially tends towards natural crystallization, as honey is a supersaturated sugar solution. When the crystallization of honey begins is depending on various factors. Decisive parameters are the fructose/glucose ratio (F/G) and the glucose/water ratio (G/W). The lower the F/G and the higher the G/W, the faster the honey will crystallize. Furthermore, the storing conditions contribute significantly to the formation of crystals. At higher temperatures the solubility of the glucose is increased, at very low temperatures the mobility of the crystals is reduced. Under these conditions, crystallization is delayed.

### Fructose/glucose ratio crucial

Another factor that accelerates crystallization is the presence of non-sugar starter crystals. These can be of different origin, e.g. parts of plants and bees, pollen, yeasts and starch grains and even air bubbles. During the honey processing the removal of all crystallization germs should be aimed at. There are various process options available which need to be specifically adjusted. A too high heat input must be avoided in order to prevent the formation of HMF and not to melt the existing beeswax so that it can be removed more easily later. Furthermore, air bubbles must be removed or their formation must be avoided.

### The role of packaging

In addition to the honey's own properties and the process-related influencing factors, the packaging also plays a role. The surface roughness and the resulting possibility of accumulating air bubbles in the packaging may accelerate crystallization. Before each product launch, the original containers should be tested for suitability.

With sufficient purification, the avoidance of air ingress, slow production and suitable packaging, together with the corresponding honey-specific conditions, the natural physical crystallization processes can be slowed down and the honey can be kept in a liquid state for a longer period.

In addition to the analytical assessment of the honey with regard to water and sugar content, there are also technical possibilities to make an early forecast about the crystallization behavior. With the right applications, even the smallest crystals can be made visible, which is not visually perceptible under normal light conditions. This makes it possible to predict the quality of the honey or the processing as well as a preselection of whether the raw material can be used as a liquid or creamy product.

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