

Unveiling the Crystal Clear Truth Behind Impurities

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Introduction

Deposits and impurities such as crystals and/or amorphous haze are occasionally found in spirits. Whether naturally formed or from foreign origins, the occurrence can raise consumer concerns thus damaging the brand image. Therefore, investigating and preventing these impurities are necessary for quality control purposes.

Investigation flow

Separation/
Isolation

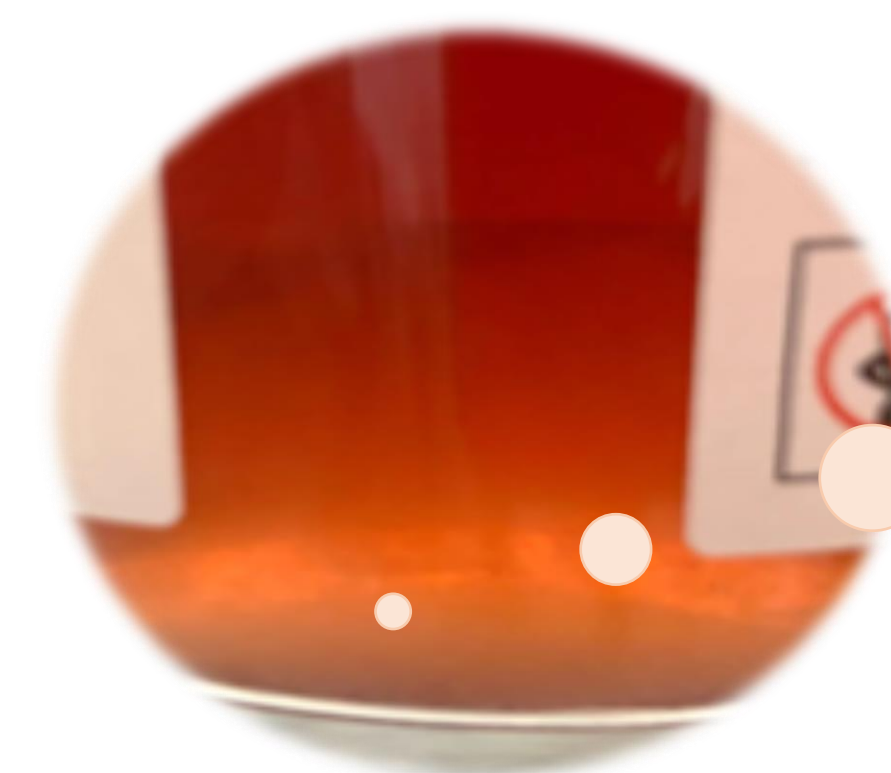
Separate crystal deposits using: Filtration to trap visible crystals, Centrifugation to isolate finer particles by spinning, or Oven Drying to evaporate liquid and retain solids. These techniques ensure clarity, stability, and quality in spirits while enabling further analysis of the deposits.

Microscope
examination

Collect isolates and, if needed, suspend them in distilled water or ethanol. Use a polarised light or high-magnification microscope to examine shape, size, and reflectivity. Compare with reference structures to distinguish natural precipitation, like potassium bitartrate, from potential contaminants, ensuring clarity and quality control in spirits.

FT-IR
characterisation

Measure infrared absorption to identify functional groups and molecular composition. Compare with Reference Spectra – Match results with known compounds to confirm isolate identity.



I am a Flavoured Gin:
Hazy deposits found at the bottom were identified as Saccharine origin – crystals and amorphous crystals

Still unidentifiable?

Isolate soluble: ICP-MS

Dissolve the sample in solvent or acid to isolate components, then detect and quantify trace elements for contaminant analysis.

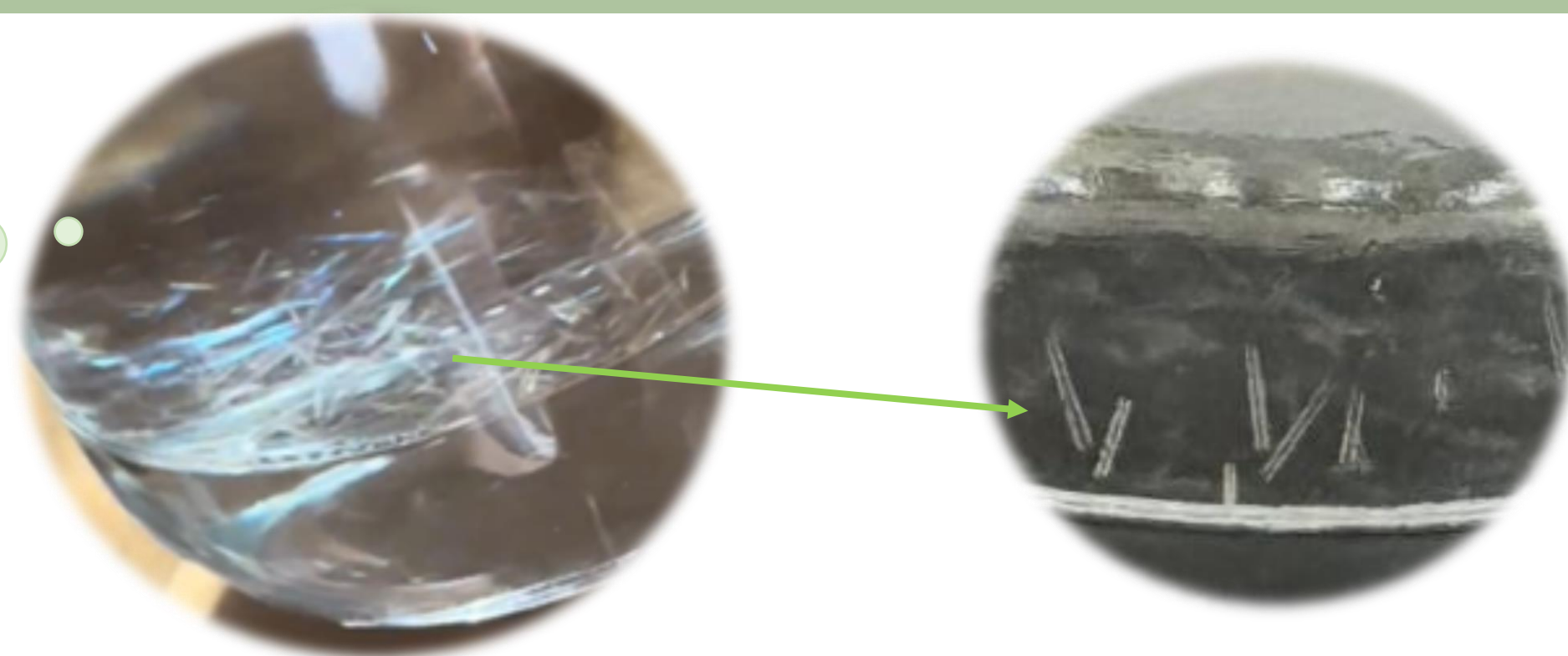
Test for weathering of glass

Examine the glass for etching, haze, or deposits, then use copper or methylene blue to stain and identify weathered areas.

Scanning electron microscope (SEM) with EDX

Scan the surface to observe morphology and structure, then use EDX to analyse elemental composition via X-ray emissions, comparing data to identify the substance or contaminants.

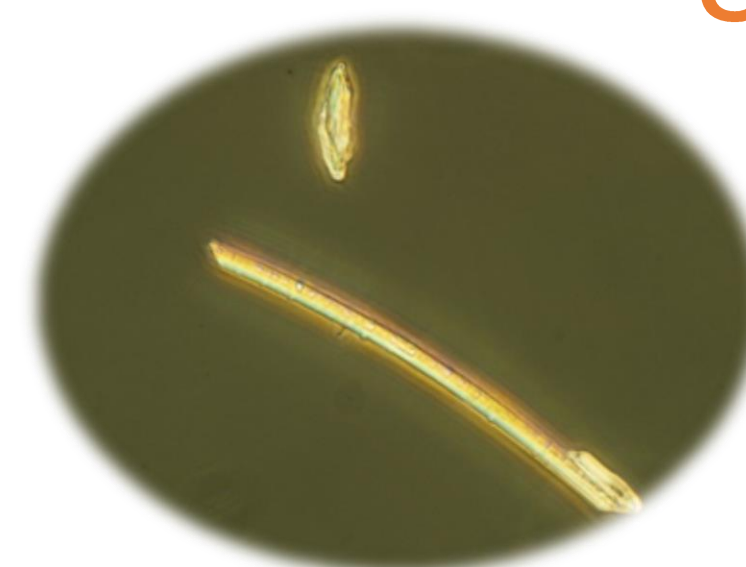
I am a normal Gin:
Crystals sparkles found at the bottom were identified as amorphous silica



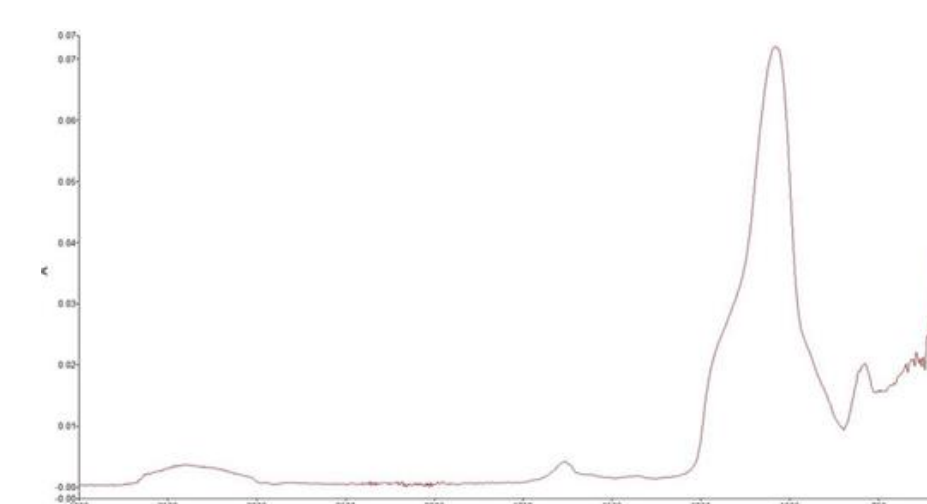
Case Study: Investigation of Floating Substance in Gin



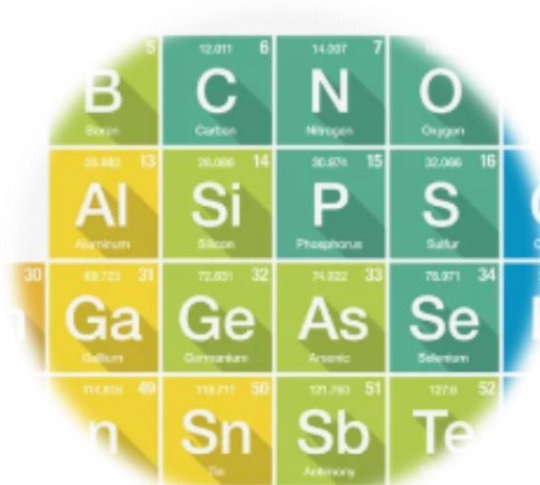
1. Transparent deposits were observed in a batch of gin, raising concerns about its origin and composition.



2. Initial investigations revealed no crystalline structures under a microscope with a polarizing filter



3. Further FT-IR analysis showed no matching spectra against the library, ruling out common organic compounds.



4. ICP-MS Analysis:

The deposits did not fully dissolve in strong acid. ICP-MS testing detected no unusual elements, further eliminating the possibility of contamination from metals or other trace substances.



5. Bottle Weathering Test:

A bottle weathering test was performed, which returned positive results, indicating degradation of the glass surface.

Conclusion: The investigation suggests that the floating substance in the gin is likely amorphous silica, a byproduct of weathered glass bottles. This silica is not a contaminant but rather an outcome of the interaction between the spirit and the bottle's surface over time. The presence of silica does not pose any health risk but may impact the appearance and texture of the gin.