

May 22, 2015

Harris Ranch Beef Company
16277 S. McCall
Selma, CA 93662

Background

Food Safety Net Services, Ltd. (FSNS) received a package from Harris Ranch Beef Company (Harris Ranch) that contained two small fragments of an unknown crystalline material (Fig. 1). A customer had allegedly discovered the fragments in a Harris Ranch ground beef product, and claimed that the fragments were pieces of glass. Consequently, Harris Ranch requested that FSNS perform foreign material identification on the two fragments. Upon initial examination, it was hypothesized that the fragments might be derivatives of a salt product rather than pieces of glass. To test this hypothesis FSNS proceeded to compare the physical and chemical properties of the two fragments with those of Morton® Ice Cream Salt, a salt product that was deemed to be a suitable control sample (Fig 2.).

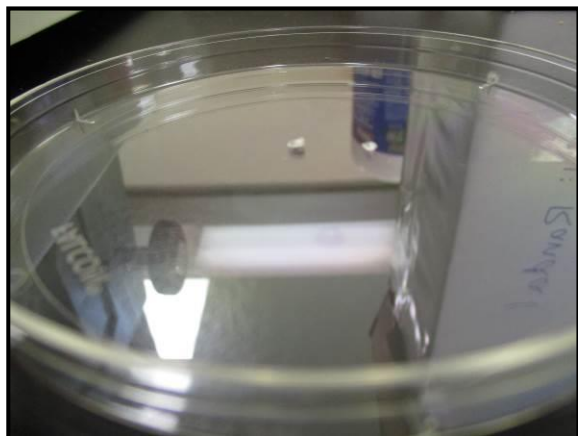


Fig 1: Fragments of Unknown Crystalline Material Received for Foreign Material Identification

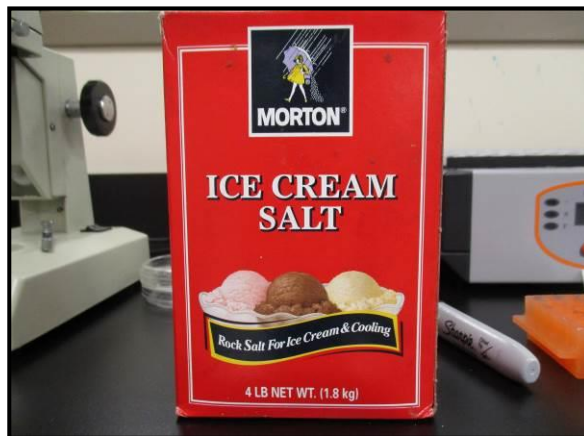


Fig 2: Ice Cream Salt Used as the Control Sample for Foreign Material Identification

Visual Analysis

The fragments of unknown crystalline material were observed via unaided eye and via a stereoscope. When viewed, the fragments were slightly opaque and appeared to be crystalline solids with jagged edges and rough textures. Figs. 3 and 4 show the fragments as observed via unaided eye and via stereoscope at 10X and 30X magnification, respectively. The fragments were measured (Fig. 3) and were approximately 1-2 mm in height, length, and thickness. In preparation for chemical analysis, one of the fragments was crushed into finer particles; this was easily accomplished by applying minimal pressure. The Ice Cream Salt control sample was also prepared for chemical analysis in this manner, and broke down into finer particles in a fashion similar to that of the unknown crystalline material fragments (Fig. 5 and 6.).



Fig. 3: Fragments of Unknown Crystalline Material Viewed Via Unaided Eye

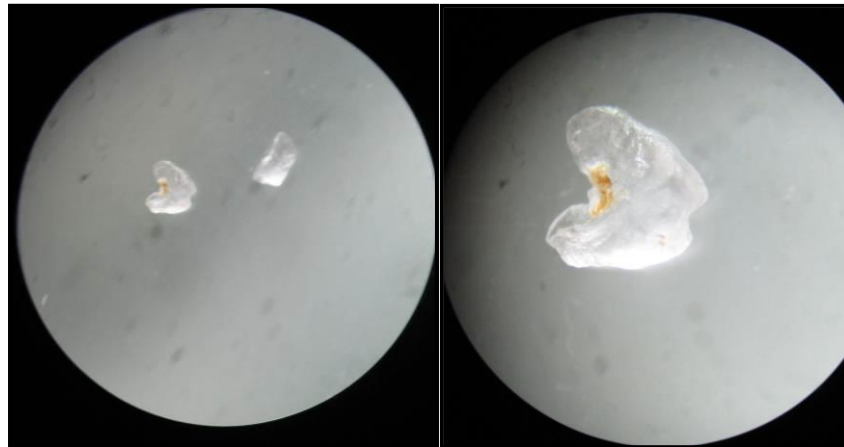


Fig. 4: Fragments of Unknown Crystalline Material Viewed Under a Stereoscope at 10X and 30X Magnification

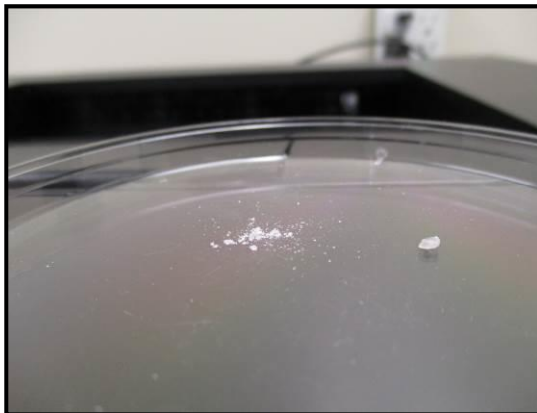


Fig. 5: Fragments of Unknown Crystalline Material After Crushing



Fig. 6: Ice Cream Salt Control Sample After Crushing

Chemical Analysis

The fragments of unknown crystalline material and the Ice Cream Salt control sample were chemically analyzed via Fourier Transform Infrared Spectroscopy (FTIR). In this type of infrared spectroscopy, infrared radiation is passed through a sample and is partially measured in absorbance, while the rest is measured in transmittance. The resulting spectrum represents the molecular absorption and transmission for the sample, which creates a molecular fingerprint for the material with peaks that correspond to the frequencies of vibrations between the bonds of the atoms in the material. The intensities or sizes of the peaks are directly related to the amount of material present. Fourier Transform refers to the mathematical technique used to transform the interferogram signal produced by the instrument into a numeric calculation from the spectra. The Ice Cream Salt control sample was scanned and the resulting FTIR spectrum was compared to that of the fragments of unknown crystalline material. The spectra were overlapped and were examined over a purity index. The purity index of the Ice Cream Salt control sample as compared to the unknown crystalline material was 0.925473, which means that the two FTIR spectra had a 92.5% correlation (Fig. 7).

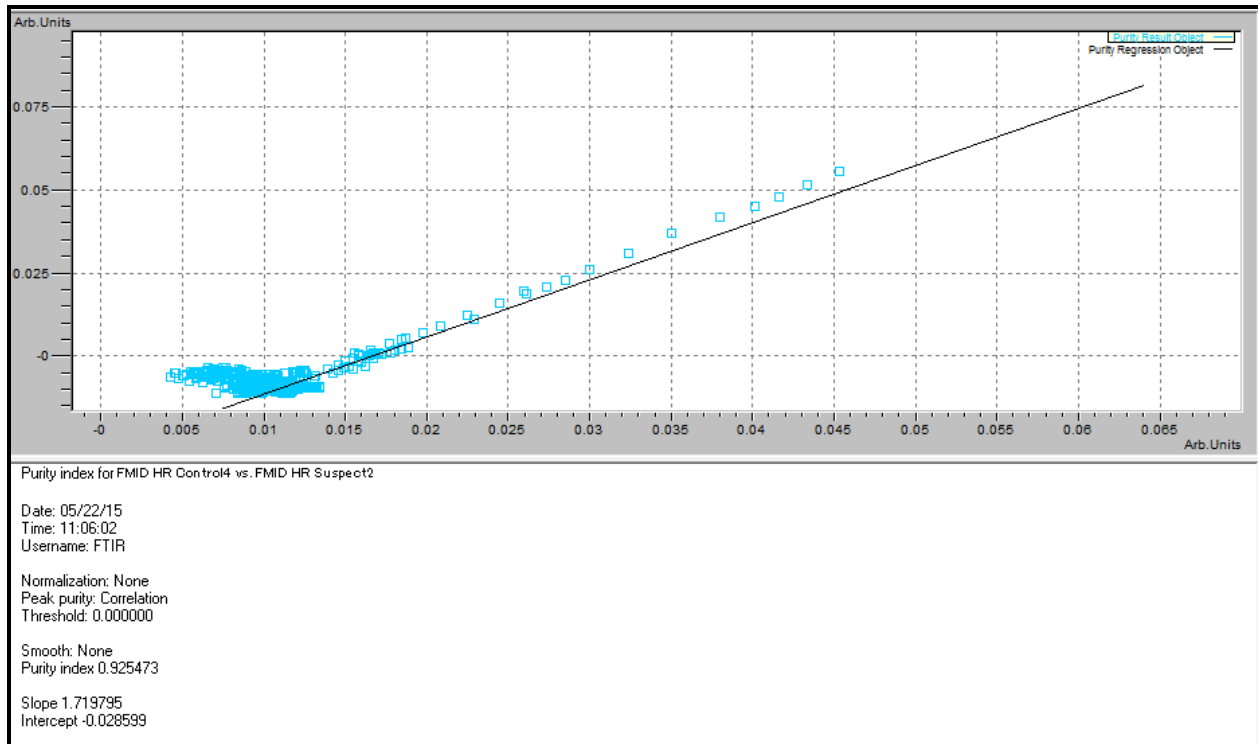
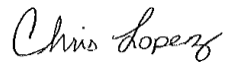


Fig. 7. Graph of the Purity Index Correlation of the FTIR Spectra for the Ice Cream Salt Control Sample and the Fragments of Unknown Crystalline Material

Conclusion

The visual analysis of the unknown crystalline material fragments revealed that their overall appearance and physical properties resembled those of an Ice Cream Salt that was used as a control sample. Furthermore, the purity index correlation obtained from FTIR spectroscopy performed on the unknown crystalline material fragments and the Ice Cream Salt control sample revealed a high degree of correlation between the two substances. Based on this evidence, it was concluded that the unknown crystalline material fragments were salt product derivatives.

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