

Development of glyceroltriheptanoate (GTH) as a chemical marker for animal by-products



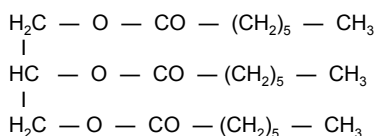
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Category 1 and 2 materials and products derived from it, should be marked according to Regulation (EC) No. 1774/2002. Glyceroltriheptanoate (GTH) has been proposed by the JRC and turned out to be suitable as marker for processed products in rendering plants. Here the results of the implementation study are presented. The samples of this study have been analysed independently by CCL and the JRC.

Structural formula and characteristics of GTH



GTH is artificial: it is not found in nature
GTH is safe: it has applications in the food industry
GTH is stable during processing and storage (at least 2 years)
GTH is not removable from the marked materials

Analysis of intact GTH in MBM and fat

CCL method

GTH is extracted with light petroleum 40 – 70.

The extract is cleaned up with a disposable silica column and afterwards injected in a gas chromatograph coupled with a flame ionisation detector (FID).

Detection limit: 5 mg/kg (on fat basis)

Analytical recovery: 97%

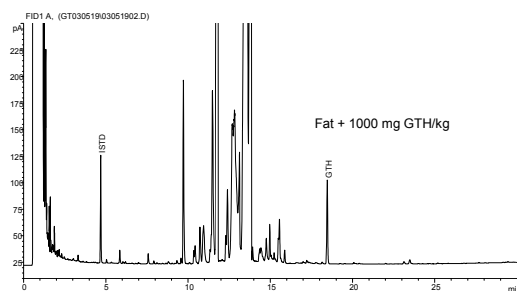


Figure 1. GC-FID chromatogram of a fat sample containing 1000 mg GTH/kg

JRC Method

MBM and fat samples are extracted in n-hexane.

The supernatant is placed on the top of a preconditioned SPE amino bonded cartridge to eliminate free fatty acids.

The eluate is evaporated and redissolved in isooctane.

The sample is injected in a gas chromatograph coupled with a mass spectrometry detector.

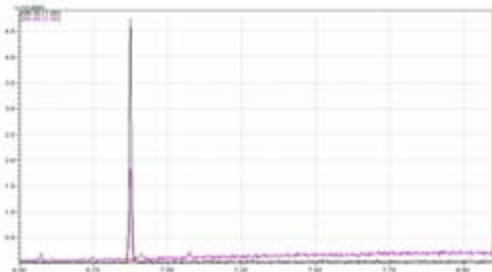


Figure 2. Typical SIM chromatogram for a sample containing GTH at the dosage of 100 mg/kg raw material

Acknowledgements

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Validation experiments on 10 rendering plants in the EU

GTH is homogeneously added to animal slaughter byproducts (100 g/ metric tonne on product basis), after a first heating step of at least 80°C.

During the trial, samples were taken of the final products (MBM and fat) at regular intervals.

Results validation experiments

For example: results of the rendering plant DAKA Bio-Industries - Randers, Denmark:

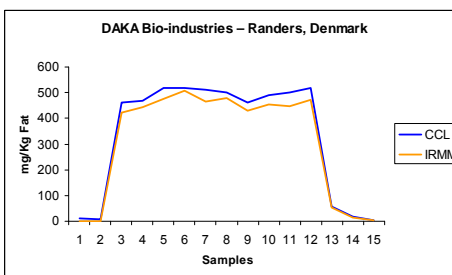


Figure 3. GTH content (mg/kg fat) in rendered fat samples analysed by CCL NutriControl and the JRC-IRMM in different batches of samples

In all products (MBM and fat) from the participating rendering plants, the GTH was clearly detectable throughout the trial period.

Conclusion

In practice a minimum concentration of 250 mg GTH per kg fat is efficient as marker for category 1 and 2 materials.

Recommendation

FID can be used as detector when utilised for the determination of the concentration of GTH in target materials (i.e. material from cat. 1 and 2) containing GTH around the target concentration. Confirmation of the presence or absence of GTH in non-targeted materials, such as those belonging to category 3, require the use of mass spectrometry as detector.