

Sulphite's determination in equine meat and its preparations

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ABSTRACTS

Sulphites are antimicrobial and antioxidant substances recognized as additives. Furthermore, these chemicals may reduce the nutritional quality of food by interacting with some vitamins such as nicotinamide, folic acid, thiamine and pyridoxal. An ionic chromatography with conductivity suppressor detector, after rapid distillation method was carried out for the quantitative determination of sulfites in food products. On two hundred samples of equine meat, we revealed that 23% of the analyzed samples are above the limit allowed by law. Sulphites are used illegally with the purpose of obtaining and maintaining the aesthetic and commercial characteristics.

KEY WORDS

Sulphites; meat; chromatography.

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INTRODUCTION

Sulphites are antimicrobial and antioxidant substances recognized as additives by the Commission Regulation 1129/2011.

These compounds are added to different food types in the form of Sulphur dioxide (E220), potassium metabisulphite (E224), sodium bisulphite (E222), potassium bisulphite (E228). The European Parliament and Council Directive 94/34/EC and subsequent amendments, regulates food additives permitted in the preparation and preservation of food.

They are used especially for the improvement of food well-appearance to make it more inviting for buyers because make it look fresher than it is.

In addition to these 'free' sulphite species,

formed in aqueous solutions, 'bound' sulphites are also formed in foods by the reaction of sulfites with carbohydrate, protein and lipid molecules.

These chemicals are harmful compounds which have mutagenic, cytotoxic and allergological effects.

Sulphites were included in the allergens list by the Food and Drug Administration of the European Commission and must be mentioned on the food label if its concentrations are above 10 mg kg⁻¹ (expressed as SO₂). Therefore, for prepacked foods, their presence in a food or beverage must be indicated on the label, by its full name, where the level exceeds 10 mg kg⁻¹ or mg l⁻¹ (expressed as SO₂).

Furthermore, these chemicals may reduce the nutritional quality of food by interacting with some

vitamins such as nicotinamide, folic acid, thiamine and pyridoxal.

A daily tolerable intake of sulphites was defined as 0.7 mg kg⁻¹ body weight by the Food and Agriculture Organization.

MATERIAL AND METHODS

An ionic chromatography with conductivity suppressor detector, after rapid distillation method was carried out for the quantitative determination of sulfites in food products.

The distillation was performed using vapor stream following acidification with HCl and addition of H₂O₂.

The distilled product was purified and injected into an ion chromatograph with Na₂CO₃ as eluent for the sulfites determination (mg SO₂ kg⁻¹).

The linearity ranged from 4.4 to 100 mg SO₂ kg⁻¹ with a correlation coefficient r² = 0.9999.

The LOD and LOQ were 4.2 and 4.4, respectively.

All the parameters of validation were in accordance with the EC Regulation on the analytical parameters used for the method reliability. The method was accredited by the Italian national accreditation body and turned out to be much faster and more accurate than the conventional procedures.



Figure 1. Equine meat.

RESULTS

Of the 200 equine meat samples analysed 46 showed sulphites presence with very high concentrations.

DISCUSSION

Was found by our analysis, that sulphites are used illegally, especially in equine meat preparations for the purpose of obtaining and maintaining the aesthetic and commercial characteristics; as they are most exposed to oxidation reactions. The method used for the analyzes in question was validated by an in-house validation model, according to the UNI CEI ENV 13005:2000, UNI CEI EN ISO/IEC 17025:2005 (see also: Sullivan & Smith, 1985. Anderson et al., 1986; Pizzoferrato et al., 1990; Ravi et al., 1999; Iammarino et al., 2012).

The method has a high recovery (> 98%) and does not interfere with the presence of interfering substances.

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