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OPTIMIZATION AND VALIDATION OF AN ANALYTICAL METHOD BY HPLC-UV-DIODE ARRAY DETECTION FOR THE SIMULTANEOUS DETERMINATION OF 12 DYES IN MEAT PRODUCTS

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Control of the presence of food additives in meat products is important to ensure their quality and safety. However, the attention of the official control plans is usually more focused on identifying/quantifying some food preservatives (i.e. nitrites/nitrate and sulphites) with respect to food dyes. The use of food dyes in meat is regulated by the actual normative due to several food safety concerns. Only three food dyes (cochineal, carminic acid, carmines (E120), Ponceau 4R, cochineal Red A (E124) and Allura Red AC (E129)) are admitted in some types of meat products, and maximum admissible levels were established in the Regulation No. 1129/2011/EC. Furthermore, the presence of different red dyes, including some carcinogens, was found in some types of spices used in the production of meat products (European Commission decision 2004/92/EC). For these reasons, an accurate method combining high performance liquid chromatography with UV-diode array detection was developed in this study, for the simultaneous determination of 12 food dyes (Amaranth, Ponceau 4R, Carmine, Ponceau SX, Ponceau 3R, Allura Red AC, Carmoisine, Erythrosine, Sudan I, Sudan II, Sudan III and Sudan IV) in meat products. The chromatographic separation was accomplished by a Hypersil Gold column (Thermo Fisher Scientific, 150 x 4.6 mm, i.d. 5 µm), eluted with an optimized step-change gradient, based on a mobile phase consisting of a acetate buffer and acetonitrile. These conditions guaranteed a very good selectivity towards endogenous interfering substances. The extraction of analytes from the matrix was accomplished using acetonitrile, methanol, water, ammonia, 50:40:9:1 (v/v/v/v) as solvent, and ultrasonic bath. Good analytical performances were obtained, in terms of selectivity, sensitivity, accuracy and ruggedness. Both method precision (CV% range: 6.2% - 18.0%) and recovery percentages (range: 86.4% - 105.0%) resulted in compliance with Decision 657/2002/EC, demonstrating that the procedure can be applied successfully for confirmation analyses.

Biography

Marco Iammarino is a Food Technologist and Chemical Surveyor. Since 2002, he is a Researcher at Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata (IZS-PB) of Foggia (Italy). Currently, he is employed as Principal Investigator at National Reference Centre for Detection of Radioactivity in Feed and Foodstuff of IZS-PB. He deals about food quality and safety, analytical chemistry applied to food analysis, research & development and analytical methods validation. In particular, he has developed several analytical methods (HPLC, HPIC, CE, LSC, TLC, ELISA) for the determinations of food additives (nitrites, nitrates, sulphites, polyphosphates, organic acids, etc.), radionuclides, mycotoxins, pesticides and drug residues in foods and feed materials. He has published more than 100 articles in peer-reviewed and academic journals, congress proceedings and books. The H index has reached 10 and citation exceeded 235 (source: Scopus). He was a reviewer for 49 international journals.

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