NIRS AS AN ESSENTIAL TOOL IN FOOD SAFETY PROGRAMS: FEED INGREDIENTS PREDICTION IN COMMERCIAL COMPOUND FEEDINGSTUFFS

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Directive 79/373/EEC on the marketing of compound feedingstuffs, provided for a flexible declaration arrangement confined to the indication of the feed materials without stating their quantity and the possibility was retained to declare categories of feed materials instead of declaring the feed materials themselves. However, the BSE (Bovine Spongiform Encephalopathy) and the dioxin crisis have demostrated the inadequacy of the current provisions and the need of detailed qualitative and quantitative information. On 10 January 2000 the Commission submitted to the Council a proposal for a Directive related to the marketing of compound feedingstuffs and the Council adopted a Common Position (EC N° /2001) published at the the Official Journal of the European Communities of 2.2.2001. According to the EC (EC N° 6/2001) the feeds material contained in compound feedingstufs intended for animals other than pets mut be declared according to their percentahge by weight, by descending order of weight and within the following brackets (I :< 30%; II :> 15 to 30%; III :> 5 to 15%; IV: 2% to 5%; V: < 2%). For practical reasons, it shall be allowed that the declarations of feed materials included in the compound feedingstuffs are provided on an ad hoc label or accompanying document. However, documemts alone will not be sufficient to restore public confidence on the animal feed industry.

The objective of the present work is to obtain calibration equations for the instanteneous and simultaneous prediction of the chemical composition and the percentage of ingredients of unground compound feedingstuffs. A total of 287 samples of unground compound feeds marketed in Spain were scanned in a FOSS-NIRSystems 6500 monochromator using a rectangular cup with a quartz window (16 x 3.5 cm). Calibration equations were obtained for the prediction of moisture (R^2 = 0.84, SECV = 0.54), crude protein (R^2 = 0.96, SECV = 0.75), fat (R2 = 0.86, SECV = 0.54), crude fiber (R^2 = 0.97, SECV = 0.63) and ashes (R^2 = 0.86, SECV = 0.83). The same set of spectroscopic data was used to predict the ingredient composition of the compound feeds. The preliminary results show that NIRS has an excellent ability ($r^2 \geq 0,9$; RPD≥ 3) for the prediction of the percentage of inclusion of alfalfa, sunflower meal, gluten meal, sugar beet pulp, palm meal, poultry meal, total meat meal (meat and bone meal and poultry meal) and whey. Other equations with a good predictive performance ($R^2 \geq 0,7$; $2 \leq$ RPD ≤ 3) were the obtained for the prediction of soya bean meal, corn, molasses, animal fat and lupin meal. The equations obtained for the prediction of other constituents (barley, bran, rice, manioc, meat and bone meal, fish meal, calcium carbonate, ammonium clorure and salt have an accuracy enough to fulfill the requirements layed down by the Common Position (EC Nº 6/2001).

NIRS technology should be considered as an essential tool in Food Safety Programs.