

Classification of Geographical Growing Origin of Food Commodities

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1. Introduction

Determination of food authenticity is one of the most crucial issues in food control and safety, especially the classification of geographical growing origin. The determination of the geographic origin is important for enforcement options for the food industry, protection of the consumer from overpayment and deception, and manufacturers using raw material that is variable. Although Geographical Identification (GI) of certain food commodities has been established, sound analytical methods for classifying geographical growing origin of consumer products, such as pepper products, are of paramount importance.

Through advancement in analytical method development for the purpose of classifying geographical growing origin of certain commodities, it is recognized that the mineral and trace metal compositions of fruits and vegetables serve as a fingerprint of the trace mineral composition of the soil and environment in which the plant grows. In addition, the environmental conditions in different growing origins would give rise to certain degree of isotopic variations in environments and likewise in agricultural commodities such as pepper. Natural isotopic variations can also arise from numerous common chemical and physical processes or the metabolic activity of organisms.

2. Current Methodology

Classification of geographical growing origin of food commodities can be performed using elemental and statistical analysis. The elemental analytical methods include destructive and non-destructive ones. Destructive methods include numerous methods such as mass spectrometry, head space solid-phase micro extraction and matrix-assisted laser desorption / ionization mass spectrometry, to name a few. Although the results are more accurate, they are time consuming. Non-destructive methods include Near Infrared (FTNIR), Infrared (FTIR) Spectroscopy and RAMAN. When coupled with multivariate pattern recognition, the analyses are fast and can be used as a replacement for the time consuming and destructive chemical method (Sahay and Singh 1994). These ensure rapid screening and declaration of all pepper consignments exported from the country of origin. Discriminant analyses are then employed to analyse the data resulted from either one or both of the method above. These are basic pattern recognition techniques such as principal component analysis (PCA) and linear discriminant analysis (LDA).

Literature

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