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Elemental analysis of sea cucumber from five major production sites in China: A chemometric approach<sup>1</sup>

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1 Elemental analysis of sea cucumber from five major production sites in China: A chemometric  
2 approach

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9 **Abstract:** Geographic origin of sea cucumber is topic of interest for both consumers and producers  
10 since the prices of sea cucumber vary largely according to their geographic origins. It is currently  
11 important that a scientific technique should be developed for determining geographic origin as a mean  
12 to detect fraudulent labeling. We have therefore developed a technique to classify the geographic origin  
13 of sea cucumber based on elemental analysis combined with the statistical analysis. In this study, a  
14 total of 39 elements contents of sea cucumber from five major production regions in China were  
15 determined to evaluate their applicability in the origin traceability of sea cucumber. Pattern recognition  
16 techniques including principal component analysis (PCA) and linear discriminate analysis (LDA) were  
17 applied to evaluate their performance in terms of classification or predictive ability. Thirty six elements  
18 in sea cucumber samples of different regions showed significant differences ( $p < 0.05$ ), which proved  
19 that the elemental composition was an effective tool for distinguishing different origins of sea  
20 cucumber. Classification of sea cucumber using PCA did not give satisfactory results. The LDA gave  
21 an overall correct classification rate of 94.1% and cross-validation rate of 88.2%. These results

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