

CHEMOMETRIC ANALYSIS OF MINERALS, SIALIC ACID AND PROTEIN IN RAW UNCLEAN EDIBLE BIRD NEST FROM PENINSULAR MALAYSIA

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ABSTRACT

There were many studies using chemometric analysis to classify samples according to their geographical origin. This preliminary study was carried out to determine if selected composition in EBN can be used to classify samples according to their geographical origin.

Keywords : Chemometric analysis, raw unclean Edible Bird Nest.

INTRODUCTION

In recent years, very high demand for Edible Bird Nest (EBN) has led to the establishment of house farming swiftlet. There were more than 50,000 swiftlet premises throughout Malaysia in year 2012 and the number has increased tremendously every year. Nowadays, there are swiftlet houses in all states of Malaysia and this make it important for regulatory agencies to have a method to traceback the samples or consignment to their sources. Current studies show the use of amino acid composition combined with Principle Component Analysis (PCA) to differentiate house and cave bird nest.

In this study, concentrations of protein, sialic acid, nitrite, nitrate and minerals (23 elements: Pb, Cd, As, Hg, Sn, Sb, Na, Ca, K, P, Fe, Al, Mg, Mn, Cr, Co, Ni, Cu, Zn, Se, Sr, Ba and V) were determined in 47 samples of EBN from Johor, Penang and Terengganu.

MATERIALS AND METHODS

Raw unclean EBN samples were taken from various locations in the state of Johor (20 samples), Penang (15 samples) and Terengganu (12 samples), representing the region of south, north and east of Peninsular Malaysia.

TEST PARAMETER	SAMPLE PREPARATION	INSTRUMENTION
MINERALS	MICROWAVE DIGESTION	ICP-MS
SIALIC ACID	WATER EXTRACTION	LC-MS/MS
PROTEIN	KJELDAHL METHOD	KJELDAHL APPARATUS
NITRITE & NITRATE	WATER EXTRACTION	ION CHROMATOGRAPHY

The data were autoscaled before performing Principle component analysis (PCA), in order to achieve independence on the different scale factors of the variable concentration.

RESULTS AND DISCUSSION

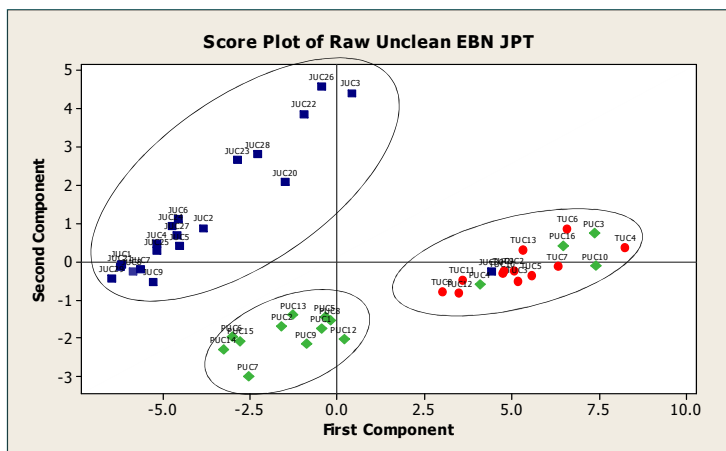


Figure 1: Score plot for all 27 variables analysed by PCA

The score plot for first (PC1) and the second (PC2) principle components when all 27 variables were analysed by the PCA. They represent 87% of the variance (PC1 corresponds to 77% and PC2 corresponds to 10% of the variance). In the score plot, it is possible to identify groupings of samples

Generally, all score plots showed three main groups according to their origin where J represent samples from Johor, T represent samples from Terengganu and P represent samples from Penang.

CONCLUSION

The evaluation of EBN sample composition using PCA showed that it is possible to identify grouping of samples according to their origin.

More samples from different states and countries are needed to have more conclusive result if this approach is to be used to group EBNs according to each states in Malaysia and other countries.

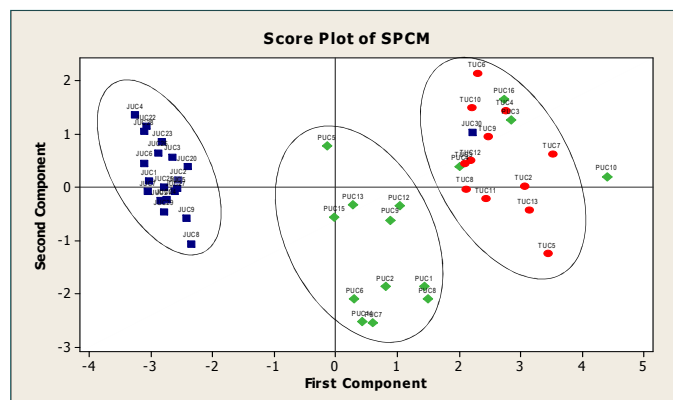


Figure 2: Score plot for 8 selected variables variables (protein, sialic acid, Na, Al, P, K, Ca and Fe)

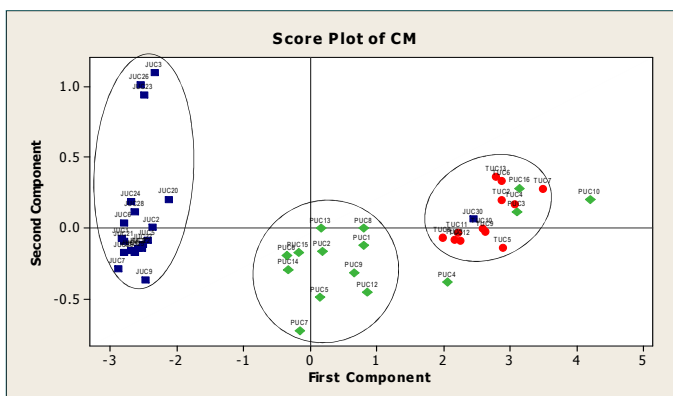


Figure 3: Score plot for 6 variables of common minerals (Na, Al, P, K, Ca and Fe)

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