

Free Full Text from Publisher

Look Up Full Text

Full Text from Publisher

Find PDF

Export...

Add to Marked List

1 of 1

Food forensics on gelatine source via ultra-high-performance liquid chromatography diode-array detector and principal component analysis

By: **Ismail, AM** (Ismail, Azilawati Mohd)^[1]; **Sani, MSA** (Sani, Muhamad Shirwan Abdullah)^[2,3]; **Azid, A** (Azid, Azman)^[4]; **Zaki, NNM** (Zaki, Nor Nadiha Mohd)^[3,5]; **Arshad, S** (Arshad, Syariena)^[3,5]; **Tukiran, NA** (Tukiran, Nur Azira)^[2,3]; **Abidin, SASZ** (Abidin, Siti Aimi Sarah Zainal)^[6,7]; **Samsudin, MS** (Samsudin, Mohd Saiful)^[8]; **Ismail, A** (Ismail, Amin)^[5,9]

[View Web of Science ResearcherID and ORCID](#)

SN APPLIED SCIENCES

Volume: 3 Issue: 1

Article Number: 79

DOI: 10.1007/s42452-020-04061-7

Published: JAN 11 2021

Document Type: Article

Abstract

This study provided a step-by-step procedure to investigate the distribution of 17 amino acids (AAs) in 50 fish, 50 bovine and 54 porcine gelatines using Ultra-High-Performance Liquid Chromatography Diode-Array Detector (UHPLC-DAD) with the incorporation of principal component analysis (PCA). Dataset pre-processing step, including outlier removal, analysis of variance (ANOVA), dataset adequacy test, dataset transformation and correlation test was performed before the PCA. The method rendered linearity range of 37.5-1000 pmol/ μ L and accuracy of 85-111% recovery. The bovine and porcine gelatines showed a similar ranking while the L-Alanine (Ala), L-Arginine (Arg) and L-Glutamic acid (Glu) concentrations had differed the fish gelatine from the bovine and porcine gelatines. The PCA, which explained 77.013% cumulative variability at eigenvalue of 5.436, showed AAs with strong FL in PC1 had polar and nonpolar side chains while AAs with strong FL in PC2 had polar side chain. The AAs with moderate and weak FL in PC1 had a nonpolar side chain. The AAs with strong FL of in PC1 were also the same AAs with 7, 6 and 5 strong CMs as determined in the correlation test. The second PCA showed that the L-Serine (Ser), Arg, Glycine (Gly), L-Threonine (Thr), L-Methionine (Met), L-Histidine (His) and L-Hydroxyproline (Hyp) were significant in fish gelatine; Hyp, Met, Thr, Ser, His, Gly, and Arg in bovine gelatine; and L-Proline (Pro), L-Tyrosine (Tyr), L-Valine (Val), L-Leucine (Leu), and L-Phenylalanine (Phe) in porcine gelatine. The 100% fish, bovine and porcine gelatines accommodated grouping 1, 2 and 3, respectively, which proved that AAs with strong FL (Hyp, His, Ser, Arg, Gly, Thr, Pro, Tyr, Met, Val, Leu and Phe) were the significant AAs and becomes the biomarkers to identify the gelatine source. From this study, the PCA was a useful tool to analyse a multivariate dataset that could provide an in-depth understanding of AA distributions as compared to ANOVA and correlation test.

Keywords

Author Keywords: Amino acids; Gelatine; UHPLC-DAD; Principal component analysis; Food forensics

Author Information

Reprint Address:

International Islamic University Malaysia Int Islamic Univ Malaysia, Int Inst Halal Res & Training, Level 3, KICT Bldg, Jalan Gombak, Kuala Lumpur 53100, Malaysia.

Fed Govt Adm Ctr, Konsortium Inst Halal IPT Malaysia, Minist Higher Educ, Block E8, Complex E, Putrajaya 62604, Malaysia.

Corresponding Address: Sani, MSA (corresponding author)

+ Int Islamic Univ Malaysia, Int Inst Halal Res & Training, Level 3, KICT Bldg, Jalan Gombak, Kuala Lumpur 53100, Malaysia.

Corresponding Address: Sani, MSA (corresponding author)

Fed Govt Adm Ctr, Konsortium Inst Halal IPT Malaysia, Minist Higher Educ, Block E8, Complex E, Putrajaya 62604, Malaysia.

Addresses:

[1] Malaysia Halal Anal Ctr MyHAC, 1 Persiaran Teknol 1 Lebuhr Enstek, Bandar Baru Enstek 71760, Negeri Sembilan, Malaysia

+ [2] Int Islamic Univ Malaysia, Int Inst Halal Res & Training, Level 3, KICT Bldg, Jalan Gombak, Kuala Lumpur 53100, Malaysia

[3] Fed Govt Adm Ctr, Konsortium Inst Halal IPT Malaysia, Minist Higher Educ, Block E8, Complex E, Putrajaya 62604, Malaysia

+ [4] Univ Sultan Zainal Abidin UniSA, Fac Bioresources & Food Ind, Terengganu 22200, Malaysia

Citation Network

In Web of Science Core Collection

0

Times Cited

Create Citation Alert

54

Cited References

[View Related Records](#)

New! You may also like ... BETA

HEAT-CAPACITIES OF SOLID POLY(AMINO ACID)S .2. THE REMAINING POLYMERS. BIOPOLYMERS (1993)

Deuterium isotope effect on C-13 chemical shifts of tetrabutylammonium salts of Schiff bases amino acids. MAGNETIC RESONANCE IN CHEMISTRY (2006)

Are the amino acids thermodynamic inhibitors or kinetic promoters for carbon dioxide hydrates?. JOURNAL OF NATURAL GAS SCIENCE AND ENGINEERING (2018)

Synthesis and structural characterization of novel biologically active and thermally stable poly(ester-imide)s containing different natural amino acids linkages. JOURNAL OF POLYMER RESEARCH (2011)

Cytotoxic activity and structural features of Ru(II)/phosphine/amino acid complexes. JOURNAL OF INORGANIC BIOCHEMISTRY (2018)

[View all suggestions](#)

Use in Web of Science

Web of Science Usage Count

4

Last 180 Days

4

Since 2013

[Learn more](#)

This record is from:

Web of Science Core Collection

- Emerging Sources Citation Index

[Suggest a correction](#)

If you would like to improve the quality of the data in this record, please [suggest a correction](#).