International Journal of Food Properties
Volume 20, Issue 11, 2 November 2017, Pages 2559-2568

Structural characteristics of camel-bone gelatin by demineralization and extraction (Article)

Al-Kahtani, H.A.[a], Jaswir, I.[bcd], Ismail, E.A.[a], Ahmed, M.A.[a], Monsur Hammed, A.[b], Olorunnisola, S.[c], Octavianti, F.[de]

[a]Food Science and Nutrition Department, College of Food and Agriculture Sciences, King Saud University, Riyadh, Saudi Arabia
[b]Biotechnology Engineering Department, International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur, Malaysia
[c]International Institute of Halal Research and Training (INHART), International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur, Malaysia

View additional affiliations

Abstract

View references (25)

Camel bone was demineralized through HCl acidulation process at different concentrations (0.0%, 1.5%, 3.0%, and 6.0%) over 1–5 days. The level of demineralization was acid concentration and soaking time dependent. Highest demineralization (62.0%) was recorded in bone sample treated with 6.0% dilute acid for 5 days. Energy dispersive X-ray spectroscopy (EDX) elemental analysis revealed reduction in Ca and increase in N and H, while O remains unaffected. Particulate characteristics by scanning electron microscope showed an increased surface roughness of bone after demineralization. Fourier transform infrared (FT-IR) analysis of ossein depicted the presence of functional group similar to that of bone protein (collagen). Statistical optimization by central composite design (CCD) revealed a significant quadratic model for optimum values of extraction temperature, pH, and extraction time. The highest gelatin yield from camel bone was 23.66% at optimum extraction condition (71.87°C, pH 5.26, and 2.58 h) and the bloom was 205.74 g. Camel bone is suitable for production of gelatin with good potentials in food and nonfood applications. © 2017 Taylor & Francis Group, LLC.

Reaxys Database Information

View Compounds

Author keywords

Acidulation Camel bone Collagen and gelatin Ossein

Indexed keywords

Engineering controlled terms: Collagen Energy dispersive spectroscopy Extraction Scanning electron microscopy Surface roughness X ray spectroscopy

Compendex keywords Acidulation Central composite designs Energy dispersive X ray spectroscopy Fourier transform infrared Optimum extraction conditions Ossein Statistical optimization Structural characteristics

Engineering main heading: Bone

ISSN: 10942912
CODEN: IJFPF
Source Type: Journal
Original language: English
DOI: 10.1080/10942912.2016.1244543
Document Type: Article
Publisher: Taylor and Francis Inc.

References (25)

1 Zhao, Y., Li, Z., Yang, W., Xue, C., Wang, Y., Dong, J., Xue, Y.
Modification of gelatine with galla chinensis extract, a natural crosslinker

(2016) *International Journal of Food Properties*, 19 (4), pp. 731-744. Cited 2 times.
www.tandf.co.uk/journals/titles/10942912.asp
doi: 10.1080/10942912.2015.1013633

View at Publisher

2 Shahiri Tabarestani, H., Sedaghat, N., Jahanshahi, M., Motamedzadegan, A., Mohebbi, M.
Physicochemical and Rheological Properties of White-Cheek Shark (Carcharhinus dussumieri) Skin Gelatin

(2016) *International Journal of Food Properties*, 19 (12), pp. 2788-2804. Cited 3 times.
www.tandf.co.uk/journals/titles/10942912.asp
doi: 10.1080/10942912.2015.1050595

View at Publisher

3 Gómez-Guillén, M.C, Turnay, J., Fernández-Díaz, M.D, Ulmo, N., Lizarbe, M.A, Montero, P.
Structural and physical properties of gelatin extracted from different marine species: A comparative study

(2002) *Food Hydrocolloids*, 16 (1), pp. 25-34. Cited 402 times.
doi: 10.1016/S0268-005X(01)00035-2

View at Publisher

4 Liu, H., Lin, Y., Guo, S.
Structural characteristics of tilapia (Oreochromis mossambicus) bone gelatin: Effects of different liming methods

(2015) *International Journal of Food Properties*, 18 (11), pp. 2360-2373. Cited 2 times.
www.tandf.co.uk/journals/titles/10942912.asp
doi: 10.1080/10942912.2014.960929

View at Publisher

5 Gómez-Guillén, M.C., Pérez-Mateos, M., Gómez-Estaca, J., López-Caballero, E., Giménez, B., Montero, P.
Fish gelatin: a renewable material for developing active biodegradable films

(2009) *Trends in Food Science and Technology*, 20 (1), pp. 3-16. Cited 189 times.
doi: 10.1016/j.tifs.2008.10.002

View at Publisher

6 Abouheil, M., Basmaeil, S., Bakkar, M.
A Standard Method for Jointing Camel Carcasses with Reference to the Effect of Slaughter Age on Carcass Characteristics in Najdi Camels
(1991) *3. Partition and Distribution of Carcass Fat. Animal Science*, 4, pp. 219-225. Cited 2 times.

7 Muyonga, J.H., Cole, C.G.B., Duodu, K.G.

Fourier transform infrared (FTIR) spectroscopic study of acid soluble collagen and gelatin from skins and bones of young and adult Nile perch (Lates niloticus)

(2004) *Food Chemistry*, 86 (3), pp. 325-332. Cited 343 times.
doi: 10.1016/j.foodchem.2003.09.038

View at Publisher

8 Liu, H.Y., Han, J., Guo, S.D.

Characteristics of the gelatin extracted from Channel Catfish (Ictalurus Punctatus) head bones

(2009) *LWT - Food Science and Technology*, 42 (2), pp. 540-544. Cited 26 times.
doi: 10.1016/j.lwt.2008.07.013

View at Publisher

9 Taheri, A., Abedian Kenari, A.M., Gildberg, A., Behnam, S.

Extraction and physicochemical characterization of greater lizardfish (Saurida tumbil) skin and bone gelatin

(2009) *Journal of Food Science*, 74 (3), pp. E160-E165. Cited 29 times.
doi: 10.1111/j.1750-3841.2009.01106.x

View at Publisher

10 Boran, G., Regenstein, J.M.

Fish gelatin

(2010) *Advances in Food and Nutrition Research*, 60, pp. 119-143. Cited 35 times.
http://www.elsevier.com/wps/find/bookdescription.cws_home/704624/description#description
doi: 10.1016/S1043-4526(10)60005-8

View at Publisher

11 Novitskaya, E., Castro-Ceseña, A., Chen, P.-Y., Vasquez, J., Urbaniak, R., Lee, S., Hirata, G., (...), McKittrick, J.

Investigations into demineralized cortical bone

(2011) *Materials Research Society Symposium Proceedings*, 1301, pp. 33-38. Cited 2 times.
ISBN: 978-160511278-7
doi: 10.1557/opl.2011.195

View at Publisher

12 El-Bassyouni, G.T., Guirguis, O.W., Abdel-Fattah, W.I.

Morphological and macrostructural studies of dog cranial bone demineralized with different acids

(2013) *Current Applied Physics*, 13 (5), pp. 864-874.
doi: 10.1016/j.cap.2012.12.026

View at Publisher

13 Horneman, D.A., Ottens, M., Hoorneman, M., Van Der Wielen, L.A.M., Tesson, M.

Reaction and diffusion during demineralization of animal bone

(2004) *AIChE Journal*, 50 (11), pp. 2682-2690. Cited 4 times.
doi: 10.1002/aic.10264

View at Publisher

14 Figueiredo, M., Cunha, S., Martins, G., Freitas, J., Judas, F., Figueiredo, H.
Influence of hydrochloric acid concentration on the demineralization of cortical bone

(2011) *Chemical Engineering Research and Design*, 89 (1), pp. 116-124. Cited 13 times.
doi: 10.1016/j.cherd.2010.04.013

View at Publisher

15 Wang, L., An, X., Yang, F., Xin, Z., Zhao, L., Hu, Q.
Isolation and characterisation of collagens from the skin, scale and bone of deep-sea redfish (Sebastes mentella)

(2008) *Food Chemistry*, 108 (2), pp. 616-623. Cited 99 times.
doi: 10.1016/j.foodchem.2007.11.017

View at Publisher

16 Figueiredo, M., Martins, A., Gamelas, J.
(2012)
Characterization of Bone and Bone-Based Graft Materials using FTIR Spectroscopy; INTECH: Rijeka

17 Chang, M.C., Tanaka, J.
FT-IR study for hydroxyapatite/collagen nanocomposite cross-linked by glutaraldehyde

(2002) *Biomaterials*, 23 (24), pp. 4811-4818. Cited 323 times.
doi: 10.1016/S0142-9612(02)00232-6

View at Publisher

18 Wang, L., An, X., Yang, F., Xin, Z., Zhao, L., Hu, Q.
Isolation and characterisation of collagens from the skin, scale and bone of deep-sea redfish (Sebastes mentella)

(2008) *Food Chemistry*, 108 (2), pp. 616-623. Cited 99 times.
doi: 10.1016/j.foodchem.2007.11.017

View at Publisher

19 Power, R.C., Salazar-García, D.C., Wittig, R.M., Henry, A.G.
Assessing use and suitability of scanning electron microscopy in the analysis of micro remains in dental calculus

(2014) *Journal of Archaeological Science*, 49 (1), pp. 160-169. Cited 14 times.
http://www.elsevier.com/inca/publications/store/6/2/2/8/5/4/index.htt
doi: 10.1016/j.jas.2014.04.016

View at Publisher

20 Charlier, P., Huynh-Charlier, I., Munoz, O., Billard, M., Brun, L., Grandmaison, G.L.d.l.
The microscopic (optical and SEM) examination of dental calculus deposits (DCD). Potential interest in forensic anthropology of a bio-archaeological method

(2010) *Legal Medicine*, 12 (4), pp. 163-171. Cited 22 times.
doi: 10.1016/j.legalmed.2010.03.003

View at Publisher

21 Bogert, L.J., Hastings, A.B.
The Calcium Salts of Bone
(1931) *Journal of Biological Chemistry*, 94, pp. 473-481. Cited 5 times.

22 Salazar-García, D.C., Richards, M.P., Nehlich, O., Henry, A.G.

Dental calculus is not equivalent to bone collagen for isotope analysis: A comparison between carbon and nitrogen stable isotope analysis of bulk dental calculus, bone and dentine collagen from same individuals from the Medieval site of El Raval (Alicante, Spain)

(2014) *Journal of Archaeological Science*, 47 (1), pp. 70-77. Cited 15 times.
http://www.elsevier.com/inca/publications/store/6/2/2/8/5/4/index.htt
doi: 10.1016/j.jas.2014.03.026

View at Publisher

23 Khalil, M.Sh., Beheri, H.H., Abdel Fattah, W.I.

Structural and electrical properties of zirconia/hydroxyapatite porous composites

(2002) *Ceramics International*, 28 (4), pp. 451-458. Cited 24 times.
doi: 10.1016/S0272-8842(01)00118-3

View at Publisher

24 Monsur, H.A., Jaswir, I., Salleh, H.M., Alkahtani, H.A.

Effects of pretreatment on properties of gelatin from perch (Lates Niloticus) skin

(2014) *International Journal of Food Properties*, 17 (6), pp. 1224-1236. Cited 7 times.
www.tandf.co.uk/journals/titles/10942912.asp
doi: 10.1080/10942912.2012.685676

View at Publisher

25 Schrieber, R., Gareis, H.

Gelatine Handbook: Theory and Industrial Practice

(2007) *Gelatine Handbook: Theory and Industrial Practice*, pp. 1-334. Cited 232 times.
http://onlinelibrary.wiley.com/book/10.1002/9783527610969
ISBN: 978-352731548-2
doi: 10.1002/9783527610969

View at Publisher

Jaswir, I.; Biotechnology Engineering Department, International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur, Malaysia; email:irwandi@iium.edu

Back to results | 1 of 1

Top of page

About Scopus
What is Scopus
Content coverage
Scopus blog
Scopus API
Privacy matters

Language
日本語に切り替える
切换到简体中文
切換到繁體中文
Русский язык

Customer Service
Help
Contact us