

BUKTI KORESPONSENSI
ARTIKEL JURNAL INTERNASIONAL BEREPUTASI

Judul : Halal authentication: Fourier transform infrared spectroscopy and multivariate calibration application for pork gelatin analysis in gummy candy
Jurnal : Food Research 8(5) : 44 - 48 (October 2024)
Penulis : Supandi, S., Septiana, A.D., Kusumadewi, N. and Fatmawati, S.

No.	Perihal	Tanggal
1	Bukti submit artikel	10 November 2022
2	Bukti pre-review artikel	19 November 2022
3	Bukti review artikel dan rekomendasi publikasi	24 Desember 2022
4	Bukti LoA	31 Desember 2023
5	Bukti revisi akhir sebelum publikasi	5 Agustus 2024
6	Bukti artikel sudah terpublikasi	5 September 2024

**1. Bukti submit artikel
(10 November 2022)**



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Thu, Nov 10, 2022 at 5:36 PM

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This manuscript has not been published and is not under consideration for publication elsewhere. Thank you for your consideration


Sincerely,

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Fakultas Farmasi dan Sains
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Authors	Supandi, S., Septiana, A. D., Kusumadewi, N. and Fatmawati, S.		
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Halal Authentication: FTIR Spectroscopy and Multivariate Calibration Application for Pork Gelatin Analysis on Gummy Candy

Fatmawati¹, Supandi¹, S., Septiana, A. D.², Kusumadewi, N.², and Supandi¹, Fatmawati, S.¹

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Abstract

Gelatin is a substance obtained from the partial hydrolysis of collagen, which is derived from connective tissue, animal bones, and the skin of vertebrate animals, especially pork and cows. Therefore, this study aims to find out whether the gelatin contained in *gummy* candy products in the Pasar Baru Bekasi is halal and not from pork. FTIR (*Fourier Transform Infrared*) spectrophotometer was combined with PCA (*Principal Component Analysis*) and PLS (*Partial Least Square*). The results of the *score plot* showed that the gelatin of porks and cows was found in different quadrants. Samples 3 and 4 were in quadrant 3, indicating similarities with bovine, while 1 and 2 were in their own quadrants, which shows that they were not obtained from pork or beef. The multivariate regression curve showed that the pattern of linear absorbance changes along with gelatin concentrations of porks and cows.

Keywords: Gelatin, Infrared Spectroscopy, Chemometric, Principle Component Analysis, Partial Least Square

1. Introduction

Indonesia is a country where 85% of its population are UK Muslims, namely 207.2 million out of 237 million people. Previous studies revealed that there are halal and haram foods as well as drinks in the teachings of Islam. Therefore, food safety factors, such as halal authentication is a major concern for the Muslim community (Citrasari, 2015). Most of the non-halal or illegal goods in the market are pork derivatives, such as lard, gelatin, and pork-based products. A previous study also revealed that these products include dead flesh, blood, and meat slaughtered without mentioning the name of Allah (Mursyidi, 2013). Allah SWT said in the Qur'an Surat Al-Baqarah: 173, about the prohibition of the use of the element of porks, which means: "Surely Allah only forbids you from eating carrion, blood, porks, and

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animals that are slaughtered with other names than Allah". However, there is no sin for anyone who is in a forced state, does not want it, and does not exceed the limits. Surely Allah is merciful and merciful" (Q.S. AlBaqarah:173)

Pork or its derivatives, such as lard and gelatin are produced from pig bones or skin, and they are often compared to products derived from cows. Therefore, they are used as counterfeiting ingredients in food. Pork is often mixed with beef to obtain a bigger profit, while lard can be processed into higher-priced oils, such as cod liver oil (Rohman and Che Man, 2008; Riza *et al.*, 2022). In 2007, the world's gelatin production came from pork skin, cowhide, a mixture of pork and cow bones, and other sources, namely 44%, 28%, 27%, and 1%, respectively. A previous study revealed that those derived from porks and cows are more in demand due to their higher quality (Shyni *et al.*, 2014)

Gelatin is one of the most common biopolymers obtained from the partial hydrolysis of animal collagen tissue. It also has unique properties and is widely used in pharmaceuticals, food, and cosmetics (Zilhadia *et al.*, 2018). Gelatin can act as a *gelling*, *thickening*, *emulsifying*, and stabilizing agents. Therefore, it is often used in food products, such as gummy candy, marshmallows, ice cream, and processed meats. Gelatin is also used in pharmaceutical fields as an ingredient for making hard and soft capsules, tablets, ointments for oral membrane mucosa, and *gummy* supplements (Nhari *et al.*, 2012).

Gummy candy is a soft-structured food, which was processed by the addition of hydrocolloid components, such as pectin, caragene, yeast, agar, gum, and gelatin used for texture modification to produce chewy and processed products (SNI, 2008). The candy has a soft and chewy texture, and it can be eaten by chewing. It is made from a mixture of sucrose crystals, glucose syrup, and water, followed by the addition of a *gelling agent* that can form a soft gel and melt when chewed in the mouth. Gummy candy also consists of additional ingredients, such as *flavor* and color substances (Sandra *et al.*, 2015). Several studies have been carried out on the properties, applications, and structure of gelatin due to its wide usage, but those from different sources can be very similar in terms of their physical and chemical properties. This makes it difficult to distinguish the halal and haram types (Nemati *et al.*, 2004). Various analytical methods have been used to distinguish pork and cow gelatin, including realtime-PCR, *Liquid Chromatography Mass spectrometry (LCMS)*, *Enzyme-Linked Immunosorbent Assay (ELISA)*, chemical precipitation techniques, modified gold sensors NiO nanoparticles, and FTIR (Zilhadia *et al.*, 2018). Therefore, this study aims to find out whether the gelatin in *gummy* candy products on the new Bekasi market is halal and was not obtained from pork.

2. Materials and methods

2.1 Materials

The tools used in this study include FTIR ATR spectrophotometer (Agilent-USA), analytical balance (Ohaus-UK), gummy candy obtained from one of the traditional markets in Bekasi, beef gelatin (Sigma Aldrich-Germany) and pork gelatin (Sigma Aldrich-Germany).

2.2 Sample

Inclusion criteria were gummy *candy* that does not have a label/homemade, purchased at Pasar Baru Bekasi, and yellow in color. Meanwhile, those with a label, sweets, and not purchased at Pasar Baru Bekasi were excluded.

2.3 Making *gummy* candy containing beef and pork gelatin

A total of 3 g of pork and beef gelatin were weighed. Furthermore, the pork gelatin was prepared with concentrations of 0%, 10%, 20%, 30%, 50%, 70%, 90%, and 100% (Table 1). It was then moistened with distilled water and stirred over a waterbath at 60°C. Furthermore, 17.5 g sucrose and 17.5 g glucose syrup were moistened with distilled water in separate places. A total of 1 ml of citric acid and moistened gelatin were added slowly to a container containing glucose syrup and sucrose. The mixture was stirred and food coloring was added with stirring until

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homogeneous, as shown in Table 1. The mixture was poured into a molded container and allowed to stand for 1 hour until it became *gummy* (Schrieber & Gareis, 2007)

2.4 Sample Testing with FTIR ATR Spectroscopy

The product obtained from the production process was cut thinly and evenly placed on the ATR diamond. Furthermore, the samples were scanned using FTIR ATR spectroscopy at wave numbers 4000-700 cm^{-1} with a resolution rate of 4 nm (Hashim *et al.*, 2010)

2.5 Statistic Analysis

PCA and PLS analysis was carried out by entering each of the absorbant data of beef, pork, and mixed gelatin as well as commercial *gummy* on gelatin-specific area wave numbers in *Microsoft excel*. It was then changed to *plot scores* and graphs using the minitab 17 software.

3. Results and discussion

The samples used include pure beef gummy gelatin candy, pure pork gummy gelatin candy, mixed *gummy* candy with concentration variations of 10%, 20%, 30%, 50%, 70% and 90%, and commercial *gummy* candy sold in Pasar Baru Bekasi. The formulation of *gummy* candy used was 17.5g sucrose and 17.5g glucose syrup as a sweetener, gelatin as a *gummy* base, 1 ml of citric acid as a salting agent, and food coloring (Schrieber & Gareis, 2007).

Analysis of FTIR ATR (*Fourier Transform Infrared*) of all samples was carried out to determine the spectrum produced on each of them using the number of waves and ~~absorbants~~absorbents produced, as shown in Figures 1 and 2. The IR spectra result show some Characteristics in peptide chains (Table 2).

Results of PCA analysis shows that when infrared light at a certain wavelength is absorbed by a molecule, it caused changes in vibration. Furthermore, vibration in a molecule is affected by the energy transition that occurs in the infrared (Inayah, 2018). The value of the spectral peak was read and the results of wave numbers and absorbant values in the FTIR test was obtained. The value was read in the form of an image *score plot* to make it easier to distinguish between beef and pork gelatin. The PCA value can show the points of the sample along with FTIR wavelength variable that characterizes it in the graph. This shows that the Minitab can be used to differentiate both samples (Princess, 2013). Although the shape of the gelatin spectrum of cows and porks was very similar, the analysis through PCA clearly revealed the difference. PCA can differentiate both samples based on their absorption intensity in the FTIR test. The method can also be used as a variable input for regression and discriminant analysis.

The PCA results are presented in the form of a *plot score* that can be seen in Figure 3. Furthermore, the image shows the existence of 4 quadrants of separators that can distinguish between pork and beef gelatin, as well as samples and mixtures. Samples 3 and 4 were in quadrant 3 with 0% *gummy* and mixed *gummy* of 10%, 20% and 70%. It is suspected that they have same similar chemical and physical properties with cow gelatin. The 100% *gummy* pork gelatin and mixtures of 90%, 50%, and 30% were in quadrant 1. Samples 1 and 2 are in their own quadrants, namely 4 and 2, respectively. It was suspected that they were not pork or beef gelatin.

The results of the PCA analysis showed that each sample was grouped into different distances from each other. Furthermore, the gap indicates the degree of similarity, where the wider the gap, the less the similarity. In the *score plot*, pork and beef gelatin are in different quadrants, which shows that they can be distinguished in groups. The larger the presentation of pork gelatin, the higher the similarity of *gummy*. This can be seen from the 90% *gummy*, which was adjacent. The 30% sample was located in the pork gelatin quadrant due because the number of waves in the FTIR were similar to the number of pork gelatin waves. The 70% *gummy* found in the cow quadrant where the number of waves obtained is similar to the number of cow gelatin waves.

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Gummy is not a scientific term

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Multivariate calibration uses many variables to make predictions (Rohman & Che Man, 2008). Furthermore, the variables used in this study include absorbance on several FTIR wave numbers obtained from raw gelatin porks, cows and simulation samples. The multivariate calibration method was PLS (Partial Least Square), which uses predictor combinations rather than using the original variant. Variables that show a high correlation with variable response were given an overburden because they are more effective for prediction (Rohman, *et al.*, 2021). The leave-one-out validation was used to evaluate the results of linear regression calculations with PLS. The relationship between the actual values of pork gelatin concentration (Figure 4) and the concentration of bovine gelatin (Figure 5) with the predictable values of the PLS model shows that they are close to each other. The coefficient plot graph (Figures 6 and 7) reveals predictors 7 and 14, namely absorbance on wave numbers 1181.57 and 2940.87 cm^{-1} , which have the highest weight in the regression equation either for pork and beef sample.

4. Conclusion

Based on the results, FTIR spectrum in pork and cow gelatin are very similar, but both samples can be distinguished by combining FTIR analysis with PCA and PLS. The results of the *score plot* showed that the gelatin of porks and cows was found in different quadrants. Samples 3 and 4 were in quadrant 3, which shows that they have similarities with bovine gelatin. Meanwhile, 1 and 2 were in their own quadrants indicating that they were not included in pork or cow gelatin. The four samples obtained from the new market did not contain pork gelatin.

Conflict of interest

The authors declare no conflict of interest

Acknowledgments

The authors are grateful to Universitas Muhammadiyah Prof Dr HAMKA, Indonesia for providing the grant batch 1 2021/2022.

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177 Nhari, R.M.H.R., Ismail, A. and Che Man, Y.B. (2012). Analytical methods for gelatin differentiation from
178 bovine and porcine origins and food products. *Journal of Food Science*, 71(1), R42–R46.
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193 characterization of gelatin from the skins of skipjack tuna (*Katsuwonus pelamis*), dog shark
194 (*Scoliodon sorrakowah*), and rohu (*Labeo rohita*). *Food Hydrocolloids*, 39(8), 68–76.
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198 Pork Gelatin in Gummy Vitamin C Using The Fourier Transform Infrared (FTIR) Spectroscopy
199 Combination Method and Principal Component Analysis (PCA). *Pharmaceutical Sciences and*
200 *Research (PSR)*, 5(2), 90–96. <https://doi.org/10.7454/psr.v5i2.4013>
201

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203 **Tables and Figures**

204 Table 1. Gummy concentration

Gummy Candy Making		
Concentration (%)	Pork gelatin (g)	Cow Gelatin (g)
0	0	3
10	0.3	2.7
20	0.6	2.4
30	0.9	2.1
50	1.5	1.5
70	2.1	0.9
90	2.7	0.3
100	3	0

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205 Table 2. Characteristics of IR uptake in peptide chains

Peptide chain	Wave number (cm ⁻¹)	Information
Amida A	3300	NH stretching
Amida B	3100	NH stretching
Measure I	1600-2690	C=O stretching
Amida II	1480-1575	CN stretching, NH bending

Amida III	1229-1301	CN <i>stretching</i> , NH <i>bending</i>
Amida IV	625-767	OCN <i>bending</i>
Amida V	640-800	Out-of-plane NH <i>Bending</i>
Amida VI	537-606	Out-of-plane C=O <i>bending</i>
Amida VII	200	<i>Skeletal torsion</i>

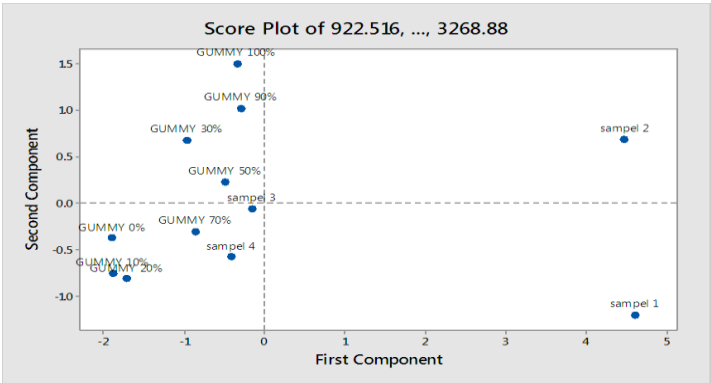


Figure 3. Score plot PCA pork gelatin, beef gelatin, mixture and sample

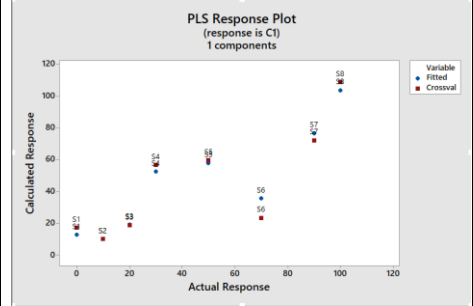


Figure 4. Linearity Graphic of The concentration of pork gelatin to absorbance

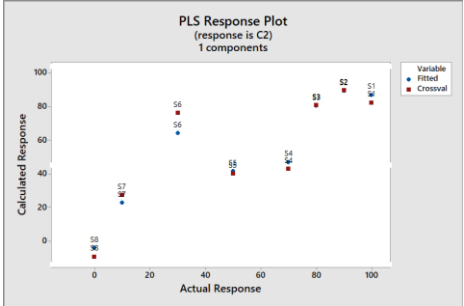


Figure 5. Linearity Graphic of The concentration of bovine gelatin against absorbance

Commented [Editor16]: Where are figures 1 and 2?? Why are there figures 6 and 7 but not cited??

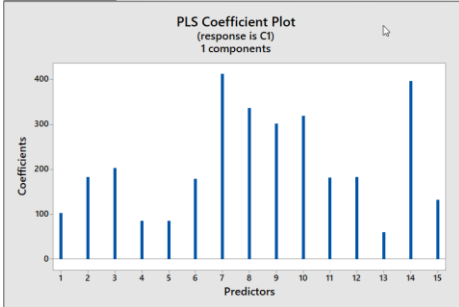


Figure 6. Absorbance Plot of Coefficient on Pork gelatin concentration

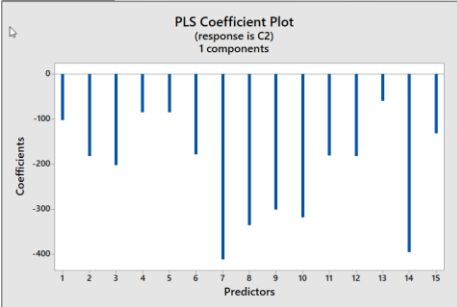


Figure 7. Absorbance Plot of Coefficient on The Concentration of bovine gelatin

224 Noted: Description: quadrant 1: pork gelatin, quadrant 3: beef gelatin, quadrants 2 and 4: not pork and
225 beef gelatin
226

4. Bukti LoA
(31 Desember 2023)



Supandi <supandi@uhamka.ac.id>

LoA and APC for FR-2022-573

3 messages

Food Research <foodresearch.my@outlook.com>
To: "supandi@uhamka.ac.id" <supandi@uhamka.ac.id>

Sun, Dec 31, 2023 at 7:25 AM

Dear Supandi,

It is a pleasure to accept your manuscript for publication in Food Research journal. Please refer to the attachment for your Letter of Acceptance for your manuscript FR-2022-573.

For the APC Form, please fill the details for INVOICE RECIPIENT section and return the APC form to us within 2 days of this email message.

Failure to return the APC form as required will cause delays in processing your manuscript as we will be unable to proceed in sending you the Galley Proof of your manuscript FR-2022-573.

Kind regards,

Professor Dr. Son Radu

Chief Editor

2 attachments

FR-2022-573 Acceptance Letter.pdf
107K



FR Article Processing Fee Form FR-2022-573.docx
331K

Supandi <supandi@uhamka.ac.id>
To: Food Research <foodresearch.my@outlook.com>

Sun, Dec 31, 2023 at 10:20 PM

Dear Professor Dr. Son Radu
Chief Editor of Food Research

Thank you very much for accepting our manuscript FR-2022-573. Here we send the APC Form as required by you to proceed the manuscript to the next step of publication to the journal.

Best regards

[Quoted text hidden]

--

Dr. **apt. Supandi, M.Si.**
Fakultas Farmasi dan Sains
Universitas Muhammadiyah Prof Dr Hamka Jakarta



FR Article Processing Fee Form FR-2022-573.pdf

129K

Food Research <foodresearch.my@outlook.com>

Sun, Dec 31, 2023 at 11:57 PM

To: Supandi <supandi@uhamka.ac.id>

Dear Supandi,
Noted with thanks.
Happy New Year 2024.
Kinde regards,
Son Radu

From: Supandi <supandi@uhamka.ac.id>

Sent: Sunday, 31 December, 2023 11:20 PM

To: Food Research <foodresearch.my@outlook.com>

Subject: Re: LoA and APC for FR-2022-573

[Quoted text hidden]

**5. Bukti revisi akhir sebelum publikasi dan
artikel publikasi
(5 Agustus - 5 September 2024)**



Supandi <supandi@uhamka.ac.id>

FR-2022-573 - Article Production

11 messages

Food Research Production <fr.production@outlook.com>

Mon, Aug 5, 2024 at 4:16 PM

To: Supandi <supandi@uhamka.ac.id>

Dear Supandi,

Manuscript ID: FR-2022-573

Manuscript Title: Halal authentication: Fourier transform infrared spectroscopy and multivariate calibration application for pork gelatin analysis in gummy candy

Before we can proceed with the article production, I would like to clarify a few points that I have commented in the manuscript. Please refer to the attachment. Please address the issues raised in the comments.

Please use the attached copy to make your revisions as it has been corrected to the Journal's format. Do not delete the comments. Once you have done so, kindly revert the copy to me as soon as possible. Please note that the faster you respond, the quicker we will process your manuscript.

Thanks & Regards

Dr Vivian New, PhD

Editor

Food Research | www.myfoodresearch.com

From: Food Research Production <fr.production@outlook.com>**Sent:** Friday, 26 July, 2024 3:35 PM**To:** Supandi <supandi@uhamka.ac.id>**Subject:** Re: Article publication status FR-2022-573

Dear Supandi

I will send the invoice with the galley proof when it is ready for viewing.

Thanks & Regards

Dr Vivian New, PhD

Editor

Food Research | www.myfoodresearch.com

From: Supandi <supandi@uhamka.ac.id>**Sent:** Friday, 26 July, 2024 3:34 PM

To: Food Research Production <fr.production@outlook.com>

Subject: Re: Article publication status FR-2022-573

Dear Dr Vivian New
Editor of Food Research

According to your previous email, our manuscript ID: FR-2022-573 entitle "Halal-authentication : FTIR Spectroscopy and Multivariate Calibration Application for Pork Gelatine Analysis on Gummy Candy" will be scheduled to publish on August edition. Would you mind to give the information of how do we process the payment?

Thank you very much for your attention.

On Wed, Jun 5, 2024 at 4:10 PM Food Research Production <fr.production@outlook.com> wrote:

Dear Supandi

It will be published in August 2024 issue.

Thanks & Regards

Dr Vivian New, PhD

Editor

Food Research | www.myfoodresearch.com

From: Supandi <supandi@uhamka.ac.id>

Sent: Wednesday, 5 June, 2024 4:53 PM

To: fr.production@outlook.com <fr.production@outlook.com>

Subject: Article publication status FR-2022-573

Dear Prof Son Radu
Chief Editor of Food Research

Based on the Food Research last email (6 March 2024), our manuscript ID: FR-2022-573 entitle "Halal-authentication : FTIR Spectroscopy and Multivariate Calibration Application for Pork Gelatine Analysis on Gummy Candy" is in the "proofread status". Would you mind to give us the schedule time of publication and how do we process the payment?


Thank you very much for your attention.

Best regards

Dr. **apt. Supandi, M.Si.**
Fakultas Farmasi dan Sains
Universitas Muhammadiyah Prof Dr Hamka Jakarta

--

Dr. **apt. Supandi, M.Si.**
Fakultas Farmasi dan Sains
Universitas Muhammadiyah Prof Dr Hamka Jakarta

 **FR-2022-573 checked.docx**
265K

Supandi <supandi@uhamka.ac.id>
To: Food Research Production <fr.production@outlook.com>

Mon, Aug 5, 2024 at 8:35 PM

Dear Dr Vivian

Thank you very much for the comments on the article. I've done the revision according to your comment and also please allow me to change the order and corresponding author (I've revised this in the attached file).

I hope this file version is suitable for further processing and published.

Best Regards

Supandi
[Quoted text hidden]

 **FR-2022-573 checked_rev 05082024.docx**
271K

Food Research Production <fr.production@outlook.com>
To: Supandi <supandi@uhamka.ac.id>

Tue, Aug 6, 2024 at 6:31 AM

Dear Supandi

Received with thanks.

Thanks & Regards

Dr Vivian New, PhD

Editor

Food Research | www.myfoodresearch.com

From: Supandi <supandi@uhamka.ac.id>

Sent: Monday, 5 August, 2024 9:35 PM

To: Food Research Production <fr.production@outlook.com>

Subject: Re: FR-2022-573 - Article Production

[Quoted text hidden]

Food Research Production <fr.production@outlook.com>
To: Supandi <supandi@uhamka.ac.id>

Thu, Aug 29, 2024 at 7:19 PM

Dear Supandi,

Please refer to the attachment for the galley proof of your manuscript FR-2022-573 entitled 'Halal authentication: Fourier transform infrared spectroscopy and multivariate calibration application for pork gelatin analysis in gummy candy'. Please check the content of the galley proof. If there are any mistakes on the typesetting, please comment and highlight them in the PDF itself and revert to us within five (5) days of receipt. Change or addition of data/results is strictly prohibited. Please note that you are allowed one (1) revision of the galley proof. If the galley proof is fine, please approve the galley proof.

Please see the attachment for invoice INV24207. We hope that you can make the payment before 20 September 2024 for us to complete the publication of your manuscript. The manuscript information e.g., volume, issue, page numbers, and DOI, will be provided once we have received the payment.

Thanks & Regards

Dr Vivian New, PhD

Editor

Food Research | www.myfoodresearch.com

From: Food Research Production <fr.production@outlook.com>

Sent: Tuesday, 6 August, 2024 7:31 AM

To: Supandi <supandi@uhamka.ac.id>

[Quoted text hidden]

[Quoted text hidden]

2 attachments



INV24207.pdf
78K



FR-2022-573.pdf
488K

Supandi <supandi@uhamka.ac.id>

To: Food Research Production <fr.production@outlook.com>

Fri, Aug 30, 2024 at 10:50 AM

Dear Dr Vivian New, PhD
Editor of Food Research

Firstly, Thank you very much for sending the proofread and invoice file.
With this email, I send the galley proof of our articles, there is only one comment about the typing of our affiliation.
About the invoice, I will process the payment as soon as possible.

Best Regards

Supandi

[Quoted text hidden]



FR-2022-573_galley proof 30082024.pdf
473K

Food Research Production <fr.production@outlook.com>
To: Supandi <supandi@uhamka.ac.id>

Fri, Aug 30, 2024 at 2:54 PM

Dear Dr Supandi,

Enclosed, please find the revised galley proof for your checking. If the galley proof is fine, please approve the galley proof.

Thanks & Regards

Dr Vivian New, PhD

Editor

Food Research | www.myfoodresearch.com

From: Supandi <supandi@uhamka.ac.id>

Sent: Friday, 30 August, 2024 11:50 AM

[Quoted text hidden]

[Quoted text hidden]

 **FR-2022-573.pdf**
488K

Supandi <supandi@uhamka.ac.id>
To: Food Research Production <fr.production@outlook.com>

Fri, Aug 30, 2024 at 9:02 PM

Dear Dr Vivian New, PhD

Yes I approve the galley, please proceed to publication. I also send the payment proof in this email. Hope it will publish soon.

Thank you

Best Regards

Supandi

[Quoted text hidden]

 **Payment Invoice Supandi.pdf**
227K

Food Research Production <fr.production@outlook.com>
To: Supandi <supandi@uhamka.ac.id>

Sat, Aug 31, 2024 at 8:36 AM

Dear Dr Supandi,

Thank you very much for the payment. I'll notify you of the article's publication soon.

Thanks & Regards

Dr Vivian New, PhD

Editor
Food Research | www.myfoodresearch.com

From: Supandi <supandi@uhamka.ac.id>**Sent:** Friday, 30 August, 2024 10:02 PM

[Quoted text hidden]

[Quoted text hidden]

Food Research Production <fr.production@outlook.com>
To: Supandi <supandi@uhamka.ac.id>

Thu, Sep 5, 2024 at 1:51 PM

Dear Dr. Supandi

Kindly be informed that your manuscript has been published and assigned to Food Research 2024, Vol. 8, Issue 5 (October). Your manuscript is currently available online and in press on our website <https://www.myfoodresearch.com>. Alternatively, you can download a copy of the manuscript by clicking on the following link:
[https://doi.org/10.26656/fr.2017.8\(5\).573](https://doi.org/10.26656/fr.2017.8(5).573)

We encourage you to share your published work with your colleagues. Thank you for your fine contribution. We hope that you continue to submit other articles to the Journal.

Thanks & Regards

Dr Vivian New, PhD

Editor
Food Research | www.myfoodresearch.com

From: Food Research Production <fr.production@outlook.com>

Sent: Saturday, 31 August, 2024 9:36 AM

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