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Nanocoating-konjac application as postharvest handling to extend the shelf life of Siamese oranges

Luh Suriati* and I Gede Pasek Mangku

Original Research, Front. Sustain. Food Syst. - Sustainable Food Processing
Received on: 21 Nov 2022, **Edited by:** Chen Li
Manuscript ID: 1104498
Research Topic: Applications of Biomacromolecules in Emulsion-based Edible Films
Keywords: Konjac (amorphophallus konjac), Nanocoating, quality, shelf-life, orange

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History | Editor Active | Reviewer 3 Finalized | Reviewer 4 Finalized | **Reviewer 5 Finalized** | ▪A▪I▪R▪A▪

Reviewer 5
Independent review report submitted: 16 Jan 2023
Interactive review activated: 19 Jan 2023
Review finalized: 14 Feb 2023

Initial recommendation to the Editor: Substantial revision is required

EVALUATION

Q 1 **Please list your revision requests for the authors and provide your detailed comments, including highlighting limitations and strengths of the study and evaluating the validity of the methods, results, and data interpretation. If you have additional comments based on Q2 and Q3 you can add them as well.**

Reviewer 5 | 16 Jan 2023 | 13:45 #1

General comments
The manuscript describes the preservation effect of konjac nano-coating on Siamese citrus fruits, and the study found that applying 50% nano-coating-konjac soaking for 2 minutes can maintain the shelf life of conjoined oranges up to the 15th day. This research is meaningful and interesting. However, the results and discussion part of the article is relatively weak, and many phenomena are not well explained, which is confusing. Therefore, detailed modifications must be made.

Specific comments
1. Abstract: Some necessary data should be reflected to support relevant conclusions.
2. In my opinion, the writing of “Research tools” in line 2.1 of line 99 is irregular and lacks necessary information such as the place of origin. Also, can these tools be placed directly in the corresponding methods instead of being listed separately?
3. There are many irregularities and insufficient details in the "methods", for example: 2.3, what is the composition of the 15% salt solution? Obvious typos like "Ca(OH)2" and "50mesh". Also, the instrument information is not complete and so on... It needs to be read carefully and revised one by one.
4. "Statistical data analysis" is missing.
5. 3.1, each set of processing data uses 30 Siamese oranges, right? Why does the data table 1 not reflect the significant difference? The lack of significant difference analysis cannot better characterize the significant difference between the coating application and nanocoating application data.

7. 3.3, the same problem, lack of significant difference analysis. Also, how to judge whether the color value is good or bad? Is it better to add pictures of the actual color change of oranges during the storage process? It is worth noting that with the prolongation of storage time, the color value of coating increases the least, while the color value of nanocoating and without coating is 85-89 after 15 days, why is this? This shows that the coating has a better protective effect on the color?
8. Figure 2-Figure 7, data and error bars overlap, resulting in unclear data, it is recommended to revise Figure 2-7.
9. 3.5, the acidity result seems interesting, but obviously lacks the necessary explanation, coating or nanocoating does not seem to be significantly different from the acidity of unprotected oranges with prolonged storage. Why does this phenomenon occur?
10. 3.7, Why does the water content increase significantly after storage for 5 days?
11. 3.8, What is the approximate raw vitamin C level in Siam orange? Why only provide values for vitamin C levels after 15 days of storage? How will it change from 0 days to 10 days?
12. Line 273, week 5? Is the determination of the number of colonies aimed at the skin of the orange? Why does Figure 8 only show one sample under the action of nancoating? Is it picking the best result?
13. Conclusion: According to all the above data, it is not very good to show that nanocoating is the best treatment, because many results show that the difference is not significant, and even some results are not ideal. It is recommended to use correlation analysis to find out which related characteristics nanocoating can improve during the preservation of Siam oranges. Obviously, not all of them.

Corresponding Author: Luh Suriati | 24 Jan 2023 | 11:11 #2

I am already revise the manuscript as the reviewer suggestion in pdf file

Review supporting file - 466479

Corresponding Author: Luh Suriati | 30 Jan 2023 | 13:25 #3

Dear editor

I am already send back the manuscript that already revise as your suggestion.

Thank you

Best regards

Review supporting file - 469580

Q 2 Check List

Reviewer 5 | 16 Jan 2023 | 13:45 #1

a. Is the quality of the figures and tables satisfactory?
- 不

b. Does the reference list cover the relevant literature adequately and in an unbiased manner?
- 是的

c. Are the statistical methods valid and correctly applied? (e.g. sample size, choice of test)
- 是的

d. Is a statistician required to evaluate this study?
- 不

e. Are the methods sufficiently documented to allow replication studies?
- 不

QUALITY ASSESSMENT

Q 5	Overall quality of the content
Q 6	Interest to a general audience

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Handling Editor: Chen Li
Received date: 21 Nov 2022
Editorial assignment start date: 21 Nov 2022
Independent review start date: 24 Nov 2022
Interactive review activated date: 19 Jan 2023
Review finalized date: 14 Feb 2023
Final validation date: 15 Feb 2023

Nanocoating-konjac application as postharvest handling to extend the shelf life of Siamese oranges

Corresponding Author: Luh Suriati | 24 Jan 2023 | 11:16 #1

Dear Editor

I am submit the revision of my manuscript as suggestion of reviewer 3, 4 and 5.

I hope can accepted and publish in your journal soon.

Thank you

Best regards

Luh Suriati

Review supporting file - 15940

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Date	Updates
15 Feb 2023	Article accepted for publication.
14 Feb 2023	Review of Review Editor 5 finalized.
13 Feb 2023	Review of Review Editor 4 finalized.
31 Jan 2023	Corresponding Author Luh Suriati re-submitted manuscript.
30 Jan 2023	Corresponding Author Luh Suriati re-submitted manuscript.
	You posted new comments.
	You posted new comments.
29 Jan 2023	Editorial Office reminded you to respond to reviewer 5 and/or resubmit your manuscript in the discussion forum.
	Editorial Office reminded you to respond to reviewer 4 and/or resubmit your manuscript in the discussion forum.
24 Jan 2023	Corresponding Author Luh Suriati posted new comments in the Editor tab.
19 Jan 2023	Interactive review forum activated.
10 Jan 2023	Review of Reviewer 3 is finalized.
21 Nov 2022	Corresponding Author Luh Suriati submitted manuscript.

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Reviewer 3
Independent review report submitted: 10 Jan 2023

Initial recommendation to the Editor: The manuscript can be accepted

EVALUATION

Q 1 **Please list your revision requests for the authors and provide your detailed comments, including highlighting limitations and strengths of the study and evaluating the validity of the methods, results, and data interpretation. If you have additional comments based on Q2 and Q3 you can add them as well.**

Reviewer 3 | 10 Jan 2023 | 13:34 #1

The article entitled “Nanocoating-konjac application as postharvest handling to extend the shelf life of Siamese oranges”. The authors developed effective coating to extend the shelf life of Siamese oranges. The article is interesting and the experiments are accurately described. I suggest this article can be accepted after minor modifications.
1. Line 48: What is the yield and price of Siam orange? This will help to evaluate the economic losses.
2. Line 55-59: What is the traditional way to keep Siam orange fresh?
3. Line 60-71: Compared with other polysaccharides (such as chitosan and gum), what are the advantages of glucomannan?
4. Line 134: The conditions for sonicate treatment should be provided. Such as power and frequency.
5. Line 161: Are these average values in Table 1? The relative standard deviation should be provided.
6. Line 166: What is the cause of orange damage?
7. Line 190: The similar issue with Table 1.
8. Line 191: Is it hardness?
9. Line 238: It would be better to calculate the weight loss.
10. Fig.6: Why coating treatment decreased the content of Vitamin C, as compared with control.
11. Fig.8: It would be better to provide the photos of oranges without treatment and treated with coating.

Q 2 **Check List**

a. Is the quality of the figures and tables satisfactory?
- Yes

b. Does the reference list cover the relevant literature adequately and in an unbiased manner?
- Yes

c. Are the statistical methods valid and correctly applied? (e.g. sample size, choice of test)
- Yes

d. Is a statistician required to evaluate this study?
- Yes

e. Are the methods sufficiently documented to allow replication studies?
- Yes

QUALITY ASSESSMENT

Q 3	Rigor
Q 4	Quality of the writing
Q 5	Overall quality of the content
Q 6	Interest to a general audience

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History | Editor Active | Reviewer 3 Finalized | **Reviewer 4 Finalized** | Reviewer 5 Finalized | ▪A▪I▪R▪A▪

Reviewer 4
Independent review report submitted: 17 Jan 2023
Interactive review activated: 19 Jan 2023
Review finalized: 13 Feb 2023

Initial recommendation to the Editor: Substantial revision is required

EVALUATION

Q 1 **Please list your revision requests for the authors and provide your detailed comments, including highlighting limitations and strengths of the study and evaluating the validity of the methods, results, and data interpretation. If you have additional comments based on Q2 and Q3 you can add them as well.**

Reviewer 4 | 17 Jan 2023 | 20:55 #1

Authors demonstrated effect of nanocoating-konjac on the shelf life of Siamese oranges. The research began with the preparation of the nanocoating-konjac formula as the main ingredient of the nanocoating and the application of the nanocoating-konjac on the surface of Siamese oranges. The manuscript is understandable. However, this article requires major re-editing before it can be published

Questions that need to be addressed are listed below:

1. The abstract needs to be rewritten, and some specific data changes need to be added. At the same time, the conclusion of this article needs a high-level summary.
2. The first and second natural paragraphs of the introduction should be combined, and the third paragraph should give examples of the current methods of fruit and vegetable preservation. Why did the author choose nano-coating as the research method? At the same time, the reasons for selecting the raw materials for this article are also written,
3. For the equipment involved in the materials and methods, please write in detail the brand, model, place of origin, and country
4. Line 120, section 2.3. Please indicate the references for the preparation of konjac flour
5.Line 139 Please write down the specific storage conditions, such as light, humidity and specific temperature.
6. Line 161 Table1. In the data in the article, please write in the form of mean + standard deviation
7. Line 150 The author stated in 3.1 that there is no difference between storage time and

8. line 5. How is the non-toxic effect of konjac nano-coating on Siam orange? Whether the author has done toxicology experiments before and related research basis or references, the results in Table 1 alone cannot determine that the konjac nano-coating is non-toxic.
9. How to obtain the score of Siamese orange degree in Section 3.3, the author is requested to describe the specific steps of each method in detail in the material method. Did the author use a colorimeter to measure it? Please write the correlation of color change to Siam orange quality
10. Please the authors explain why there is a drop in acidity on the 10th day of storage and an increase in acidity after 5 days.
11. Again, it is strongly recommended that the authors include a two-fold significance analysis in the results. To show the effect of time and type of coating on Siam orange
12. Why did the author only show the content of vitamin C for 15 days, and before that, he showed the changes of Siam oranges for 5, 10, and 15 days.
13. Line 275 How did the authors show that the colony growth was due to the growth of microorganisms already present in the Siam orange and not from the external environment? Did the author separate the total number of colonies between the external environment and the internal environment of Siam orange?
14. Please explain why the number of colonies decreases first and then increases as the storage time increases.
15. Why does Figure 8 only show one sample? In the experiment, the author selected 30 Siam oranges, but only one sample is shown here. Is this the one with the best shelf life?
16. I suggest that the author rewrite the conclusion of this article, and did a lot of experiments related to the shelf life of Siam orange. The experimental results are very satisfactory, but the relevant conclusions are not expressed in the conclusion.
17.

Corresponding Author: Luh Suriati | 24 Jan 2023 | 11:11 #2

REVISION (REVIEWER 4).
1. **The abstract needs to be rewritten, and some specific data changes need to be added. At the same time, the conclusion of this article needs a high-level summary.**
Abstract: Siamese orange fruit is very popular today, driven by the increasing public demand for healthy food. Siamese oranges contain bioactive phenolic compounds, carotenoids, vitamins, minerals, and fiber which are good for health. The weakness of Siamese oranges is their quality declines quickly and their short shelf life. Postharvest handling with the application of coatings from natural ingredients to extend the shelf life of orange fruits is currently needed to reduce the use of synthetic materials. Natural ingredients that have the potential to be used as base materials for coatings are konjac tubers because they contain glucomannan polysaccharides and bioactive compounds that can form coatings. The purpose of this study was to determine the effect of nanocoating-konjac on the shelf life of Siamese oranges. The research began with the preparation of the nanocoating-konjac formula as the main ingredient of the nanocoating and the application of the nanocoating-konjac on the surface of Siamese oranges. This study used a completely randomized two-factor design, namely nanocoating-konjac application (without coating, coating, and nanocoating) and storage time (0, 5, 10, and 15 days), three replications. The conclusion of this research is the application of nanocoating-konjac, coating-konjac and without coating on Siamese oranges to determine the effect of weight loss, number of damaged fruits, color, texture, acidity, total dissolved solids, water content, vitamin C, and total plate count. during storage. This research recommends that the application of nanocoating-konjac as postharvest handling can extend the shelf life of Siamese oranges until the 15th days.

2. The first and second natural paragraphs of the introduction should be combined, and the third paragraph should give examples of the current methods of fruit and vegetable preservation. Why did the author choose nano-coating as the research method? At the same time, the reasons for selecting the raw materials for this article are also written,
The first and second natural paragraphs of the introduction already combined.
The coating application method is needed so that the product reaches the consumer's hands and remains of fresh quality (Rasouli et al., 2019)(Suriati, Utama, Harsojuwono, et al., 2020).
The use of coatings from natural ingredients to replace synthetic preservatives is urgently needed. One of the basic ingredients in the manufacture of nanocoatings

in an increase in solubility, release of active compounds, absorption, and attachment (Maria Leena et al., 2020)(Onyeaka et al., 2022). Nanocoating is a nano-sized thin layer that can be incorporated with active additives such as antioxidants, antisenescence, and antimicrobials (Gago et al., 2020)(Correa-Pacheco et al., 2021).

3. For the equipment involved in the materials and methods, please write in detail the brand, model, place of origin, and country
Research tools: refractometer (950.032 B-ATC, France), spectral colorimeter (CS-280, Zhejiang China), viscometer fluid meter (NDJ8S, China), pH meter (Hanna HI 8424, Romania), oven (Memmert, Germany), sonicate (model Q125 mesonic USA), spectrometer UV Vis (Libra S60, USA), Scanning Electronic Microscope (SEM) (JSM-6510LA, Japan), homogenizer (VWR IKA VMS-C7 USA, texture analyzer (TA. XT plus C, UK).

4. Line 120, section 2.3. Please indicate the references for the preparation of konjac flour
(Septiawan et al., 2021).

5.Line 139 Please write down the specific storage conditions, such as light, humidity and specific temperature.
The physicochemical properties of nanocoating-konjac are strongly influenced by air, light and heat. Nanocoating-konjac should be stored in dark glass containers to avoid light affecting sensitive bioactive agents and stored in (7 ± 1) ◦C.

6. Line 161 Table1. In the data in the article, please write in the form of mean + standard deviation

Table 1. Weight loss of Siamese orange as in pdf file

7. Line 150 The author stated in 3.1 that there is no difference between storage time and treatment interactions, but according to my observations in the results in Table 1, the impact of storage time on the weight loss of Siam oranges is very obvious. In addition, the author please explain what is the treatment interaction?
The results showed that the application of the coating and storage time showed a very significant effect on the weight loss of Siamese oranges, while the interactions were not different.

8. line 5. How is the non-toxic effect of konjac nano-coating on Siam orange? Whether the author has done toxicology experiments before and related research basis or references, the results in Table 1 alone cannot determine that the konjac nano-coating is non-toxic.
Non-toxicity properties and high efficiency to preserve fruit, then nanocoating-konjac can be considered a good candidate for commercial coatings (Behera & Ray, 2016).

9. How to obtain the score of Siamese orange degree in Section 3.3, the author is requested to describe the specific steps of each method in detail in the material method. Did the author use a colorimeter to measure it? Please write the correlation of color change to Siam orange quality
We use a colorimeter to measure it. This indicates that there is a color change from green to yellow due to the ripening process. The quality of Siamese oranges will quickly decline if the whole fruit is yellow.

10. Please the authors explain why there is a drop in acidity on the 10th day of storage and an increase in acidity after 5 days.
This occurs due to organic acids being used as substrates for the respiration process.

11. Again, it is strongly recommended that the authors include a two-fold significance analysis in the results. To show the effect of time and type of coating on Siam orange

Thank you for your suggestion

12. Why did the author only show the content of vitamin C for 15 days, and before that, he showed the changes of Siam oranges for 5, 10, and 15 days.

Fig. 6. Vitamin C (g/100g) of Siamese orange

13. Line 275 How did the authors show that the colony growth was due to the growth of microorganisms already present in the Siam orange and not from the external

and the internal environment of Siam orange.
In general, the number of colonies increased during storage.
Nanocoating functions as a barrier to chemical, physical and biological changes (Ghosh et al., 2021)(Hu et al., 2020). Coating application is only able to suppress microbial growth due to limited O2, but during storage there is still an increase in the number of colonies

data in pdf file

14. Please explain why the number of colonies decreases first and then increases as the storage time increases.
Even though the data number of colonies has decreased, statistically the notation is the same (nonsignificant). In general, the number of colonies increased during storage.

15. Why does Figure 8 only show one sample? In the experiment, the author selected 30 Siam oranges, but only one sample is shown here. Is this the one with the best shelf life?

16. I suggest that the author rewrite the conclusion of this article, and did a lot of experiments related to the shelf life of Siam orange. The experimental results are very satisfactory, but the relevant conclusions are not expressed in the conclusion.

The conclusion of this research is the application of nanocoating-konjac, coating-konjac and without coating on Siamese oranges to determine the effect of weight loss, number of damaged fruits, color, texture, acidity, total dissolved solids, water content, vitamin C, and total plate count during storage (0,5,10,15days). This research recommends that the application of nanocoating-konjac as postharvest handling can extend the shelf life of Siamese oranges until the 15th days.

Review supporting file - 466374

Q 2 **Check List**

Reviewer 4 | 17 Jan 2023 | 20:55 #1

a. Is the quality of the figures and tables satisfactory?
- No

b. Does the reference list cover the relevant literature adequately and in an unbiased manner?
- Yes

c. Are the statistical methods valid and correctly applied? (e.g. sample size, choice of test)
- No

d. Is a statistician required to evaluate this study?
- No

e. Are the methods sufficiently documented to allow replication studies?
- Yes

Corresponding Author: Luh Suriati | 30 Jan 2023 | 13:24 #2

Dear Reviewer

I am already revise the manuscript as your suggestion

Thank you

Best regards

QUALITY ASSESSMENT

Q 3	Rigor
Q 4	Quality of the writing
Q 5	Overall quality of the content
Q 6	Interest to a general audience

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