Reviewer #1:

Table. List of issues that need to be revised

Number	Line/§/section/	Errors	Corrections/suggestions (in italic)
1	Title	*Lactiplantibacillus plantarum NML21*	*Lactiplantibacillus plantarum* NML21
2	Line 30	Resists browning	Browning ? or anti-browning ?
3	Line 35	Mushrooms[1]	Mushrooms [1]
4	Line 35-39	However, it lacks protective structures and highly susceptible to mechanical damage and pathogen infection after harvesting, which results in the autolysis of tissue cells and the destruction of the original cellular compartments. Thus initiating the enzymatic browning from the interaction of phenolic com- 38 pounds and polyphenol oxidase (PPO) in the cell contents[2].	Re-write for example: However, it lacks protective structures and is highly susceptible to mechanical damage and pathogen infection after harvesting. These results in the autolysis of tissue cells and the destruction of the original cellular compartments, which initiate the enzymatic browning from the interaction of phenolic com- 38 pounds and polyphenol oxidase (PPO) in the cell contents [2].
5	Line 48	FDA	Food Drug Administration (FDA)
6	Line56-58	Microbes have enzyme systems that break down and convert phenolic substances, in which Lp. plantarum can break down and convert pro tocatechuic acid[13	Microbes have enzyme systems that break down and convert phenolic substances. For example, *Lp. plantarum* can break down and convert protocatechuic acid [13 *Suggestion:* *Explain the role of phenolic substances, PPO in browning. It is not clearly announced.*
7	Line 63-70		Please put space before and after all brackets
8	Line 66	(2)evaluated of the ability of LAB to convert phenolics	(2) evaluated the ability of LAB to convert phenolics
9	Line 77	35±5 g	35 ± 5 g
10	Line 78	(4℃ and 90 RH)	What is RH? Relative humidity? RH 90%?
11	Line 79	LAB sensitivity to phenolic compounds was evaluated	LAB sensitivity to phenolic compounds
12	Line 80	Reference to the interaction of phenolic compounds of *A.*	The interaction of phenolic compounds of *A. bisporus* with PPO is determined

		bisporus with PPO (Michaelis-Menten equation)[16].	according to (Michaelis-Menten equation)??
13	Line 86	600 after every 2h	600 nm every 2h
14	Line 96	0.05 ul	0.05 µL ?
15	Line 101	Screening of optimal strains	Screening of optimal strains by sensory evaluation
16	Line 102	Screening of optimal strains by sensory evaluation	*Delete this*
17	Line 110 table 1		*Uniformize the spelling of "odor" or "odour"*
18	Line 114	*Concentration of Lp. plantarum NML21 used and packaging scheme for A. bisporus samples*	*Concentration of* Lp. plantarum *NML21 used and packaging scheme for* A. bisporus *samples*
19	Line 137	BI calculated the following	BI was calculated as follow:
20	Line 145	*Counting method of Pseudomonas spp*	*Counting method of* Pseudomonas *spp*
21	Line 192	inliquid	in liquid
22	Line 197	Sample was calculated…	The MDA content of sample…
23	Line 200	Statistical analysis	*Not clear. Rewrite*
24	Line 202	*Lactiplantibacillus plantarum* NML21 (*Lp. plantarum* NML21)	*Lp. plantarum* NML21
25	Line 219	Footnote of the Table 2 * refers to what? Control corresponds to t=0?	*Please explain*
26	Line 224	had a remarkable ability to conversion of the polyphenols.	had a remarkable ability to the conversion of the polyphenols.
27	Line 242	Table 3	*Interpretation: If score less than 60 is unacceptable, the control is still acceptable after 9 days? Application of LAB interesting if storage superior to 9 days?*
28	Line 258	As shown Figure. 3A	As shown in the Figure 3A
29	Line 278	The first respiration peak respiration rate	The first respiration rate peak
30	Line 279-280	Treatment M5 should more reduction in the respiration rate?	*Revise*
31	Line 281	*Effects of NML21 treatment on the number of Pseudomonas spp. in A. bisporus*	*Effects of NML21 treatment on the number of* Pseudomonas *spp. in* A. bisporus
32	Line 284	were little changed during the 0-3 d period	were slightly changed during the 0-3 d period
33	Line 303	groups(p	groups (p

34	Line 293	Figure. 5	Figure 5 *Please correct in the manuscript (Delete point after Figure)*
35	Line 293-294	Based on Figure. 5, we found that the MDA content and cell conductivity both showed increasing trend.	Based on Figure 5, we found that the MDA content and cell conductivity both showed increasing trend during the storage.
36	Line 295	The treatment M5 was significantly lower than the rest of the groups from 9-15 d ($p<0.05$)	The MDA values for the treatment M5 were significantly lower than the rest of the groups from 9-15 d (*$p<0.05$*)
37	Line 304	*Effects of NML21 treatment on the O2.- production rate and H2O2 content of A. bisporus*	*Effects of NML21 treatment on the O2.- production rate and H2O2 content of* A. bisporus
38	Line 318	PPO is a rate-limiting enzyme for the browning reaction of A. bisporus	*Explain rate-limiting enzyme?*
39	Line 320	to the control($p<0.05$)	to the control (*$p<0.05$*)
40	Line 323	Figure. 7B	Figure 7B *Please delete points after the word Figure in the manuscript.*
41	Line 331	A. bisporus	*A. bisporus*
42	Line 334-342	3.10 Correlation analysis section…	*Introduce briefly the correlation analysis method before announcing the results.*
43	Line 354	Lactobacillus rhamnosus, Lp. plantarum, and Lactobacillus acidophilus	*Lactobacillus rhamnosus*, *Lp. plantarum*, and *Lactobacillus acidophilus*
44	Line 360	(Figure. 2)	Figure 1???
45	Line 360	Previous research on LAB has a system of enzymes that break down phenolic compounds	Previous research on LAB has shown a system of enzymes that breaks down phenolic compounds
46	Line 374	We infer that organic acids and hydrogen peroxide produced by LAB were toxic to mushroom fruiting body at high concentrations	Why BI is higher, although hydrogen peroxide also inhibits PPO and limits browning? Is there any explanation?
47	Line 379-380	In the present study, the growth of Pseudomonas was inhibited in treatment M5 and M9	Is there other mechanism of inhibition of Pseudomonas? Production of ROS?
48	Line 398	*Lactococcus slactis*	*Lactococcus lactis*

Response to comment:

Thank you so much for taking the time to review our manuscript and providing valuable feedback. We appreciate your comments and suggestions and have carefully considered them. We have addressed the issues you have raised and made the following changes to the manuscript:

1.We have changed the italicized formatting of all strain numbers in the title and subsequent articles to the normal format."

2. Thank you for your comment. We have changed resist browning to anti-browning as suggested

3. We thank the reviewer's for their suggestions on manuscript citations, and we have standardized the citation format.

4. Yes. We thank the reviewer's suggestion. We made the necessary changes to the sentences, replacing more appropriate connectives.

5. We have changed initialism and added complete vocabulary. The full spelling of FDA (Food Drug Administration) has been added to the manuscripts

6. We agree with the reviewer's point of view. In order to provide a fuller explanation of the relationship between enzymes, substrates and browning, we have made additions and marked the contents in red (line 60-62). The additions are: These phenolics combine and interact with the polyphenol oxidase contained in the tissues of the fruiting bodies and eventually oxidize to melanin. The melanin was deposited on the surface of the mushroom and browning occurred.

7. Your suggestion to make the published article will be more standardized, we have added spaces both before and after the brackets

8. We accept your suggestion and have removed the "of".

9. Yes, we've taken your advice and added spaces before and after "±".

10. We have changed initialism and added complete vocabulary. The full spelling of RH (Relative humidity) has been added to the manuscripts.

11. We have taken your suggestion and made the change, replacing "LAB sensitivity to phenolic compounds was evaluated" with "LAB sensitivity to phenolic compounds".

12. We apologize for the ambiguity in the content of the manuscript due to our language problems. We have reorganized the language and revised it as follows: The Michaels-Menton constant (Km) reflects the affinity of the enzyme for the substrate, with reference to the value of Km for the enzymatic reaction of polyphenol oxidase with polyphenolic substances in *A. bisporus*.

Thank you for your meticulous attention to detail and valuable feedback!

13. Yes, we've taken your suggestion and added "nm" and removed "after".

14. We have changed "ul" to "μL".

15. We have taken your suggestion and made the change, replacing " Screening of optimal strains" with " Screening of optimal strains by sensory evaluation".

16. We deleted "Screening for optimal strains by sensory evaluation".

17. We have uniformly used the word "odor".

18. We have returned the italics of "lp. plantarum" to normal.

19. We have taken your suggestion and made the change, replacing " BI calculated the following" with "BI was calculated as follow: ".

20. We have taken your suggestion and made the change, replacing " *Counting method of Pseudomonas spp*" with " *Counting method of* Pseudomonas *spp*".

21. We have changed "inliquid" to "in liquid".

22. We have added "The MDA content of" before "sample".

23. We rewrote section 2.10 with the following modifications.

Sensory evaluation experiments lasted for 12 d. The optimal strain *Lp. plantarum* NML21 was screened and further storage experiments lasted for 18 d. During the storage period, samples were evaluated every three days with three replications for each treatment. Correlation analysis used Pearson's correlation for parametric analysis. Average and standard error (± SE) of data were calculated using Microsoft Excel 2016 ($n>3$). Significance analysis of Duncan's multiple differences were calculated by using SPSS 26, Values of $p < 0.05$ were considered statistically significant. Figures were created using Origin 2021.

24. We have changed "*Lactiplantibacillus plantarum* NML21 (*Lp. plantarum* NML21)" to "*Lp. plantarum* NML21".

25. We have corrected it according to the editor's suggestion. We explained the footnotes of Table 2, especially the control group. When the same strain was evaluated for growth, the control and experimental groups had the same basal liquid medium, the only difference being the type and concentration of added polyphenols.

The revised content is as follows: Footnote* Twenty strains of LAB were grown in high or low (0.4 g L^{-1}, 0.8 g L^{-1}) concentrations of gallic acid, catechin and protocatechuic acid, respectively. Independent experiments were performed for each strain. Control group: basal medium only was used for the same strain. Experimental group: the concentration and type of polyphenols were controlled under the premise of using basic medium. The maxOD_{600}.

26. We have changed "to conversion" to "to the conversion".

27. Thanking the reviewer for their attention and consideration of the practical issues, we explain

your questions as follows. First, based on the storage conditions in the manuscript, the control group had sensory scores below 60 after 9 days, and we considered that the *Agaricus bisporus* had lost its market value (as measured by consumers not making purchases of the commercial mushrooms) and was considered unacceptable. Secondly, the use of LAB was also necessary for the storage time of more than 9 days. Consumers judge the color and flatness of the fruiting bodies when purchasing white mushrooms (consumers prefer fresher mushrooms), so whiter mushrooms mean higher prices and shorter sales cycles for the sales staff. The field survey found that the price difference between mushrooms with a sensory score of 100 and mushrooms with a sensory score of 60 was 20%. After using LAB, the mushrooms were whiter than the control group three days after harvest, and the mushrooms corresponded to a higher selling price and higher consumer acceptance. In detail, on the third day the treated mushrooms were sold at a higher price than the control group. The sensory score is only a quantitative criterion to determine the overall mushroom color and freshness quantitatively.

28. We have changed "As shown Figure. 3A" to "As shown in the Figure 3A".

29. We have changed " The first respiration peak respiration rate" to " The first respiration rate peak".

30 Sorry, we revised the question you posed. The new revision was "Treatment group M5 had a lower respiration rate."

31. According to your revisions, we've made the italics into a normal font.

32. Thank you to the reviewer for revising the word "little", the sentence was more accurate with the use of the word "slight".

33. We added a space after "groups".

34. We have deleted all the points after "Figure" in the manuscript.

35. We agree with the reviewer's comment to replace "Based on Figure. 5, we found that the MDA content and cell conductivity both showed increasing trend." with the following "Based on Figure 5, we found that the MDA content and cell conductivity both showed increasing trend during the storage."

36. Thanks to the reviewers for their precise description of the results, we have replaced the statements.

37. We changed " *A. bisporus* " to " A. bisporus ".

38. We are very sorry, due to our inaccurate language, there was a mistake in the meaning of the expression, and we have changed the term "rate-limiting enzyme" to "key enzyme" here.

39. We added a space after "control".

40. We have deleted all the points after "Figure" in the manuscript.

41. We have revised "A. bisporus" to "*A. bisporus*".

42. We agree with the reviewer's comments, and in the results section, we have provided a brief description of the Pearson correlation analysis. The new addition is as follows: Pearson correlation analysis was used to measure the strength of the linear relationship between two variables

43. We have amended "Lactobacillus rhamnosus, Lp. plantarum, and Lactobacillus acidophilus" to "*Lactobacillus rhamnosus*, *Lp. plantarum*, and *Lactobacillus acidophilus*".

44. We have revised "Figure 2" to "Figure 1".

45. We've revised "Previous research on LAB has a system of enzymes that break down phenolic compounds" to "Previous research on LAB has shown a system of enzymes that breaks down phenolic compounds".

46. Although hydrogen peroxide is able to inhibit polyphenol oxidase activity, previous studies have shown that excessive concentrations of hydrogen peroxide can have an effect on cell membranes, causing leakage of cell contents, and this in turn accelerated the aging of mushroom substrates, so we hypothesized that the excessive use of lactic acid bacteria in the treatment group M9 led to excessive concentrations of organic acids and hydrogen peroxide, which in turn caused a bad effect, and the treatment group M9 showed higher BI values on 0-6 d.

47. In our experience, reactive oxygen species produced by aging of *A. bisporus* mushrooms cannot be used to inhibit Pseudomonas. However, whether the concentration of reactive oxygen species produced by *A. bisporus* has an effect on Pseudomonas is currently unknown, and we thank the reviewers for their attention to the inhibitory ability, and we will continue to explore this issue at a later stage.

48. We've revised " *Lactococcus slactis* " to " *Lactococcus lactis* ".

49. We polished up the language again.

Special thanks to you for your good comments.