Response to Reviewer 3 Comments

Dear Editors and Reviewers,

Thank you for your letter and the reviewer's comments concerning our manuscript entitled "*Lycium barbarum* polysaccharide-iron(III) chelate as peroxidase mimics for total antioxidant capacity assay". The comments are valuable and helpful for us to improve the quality and reliability of our paper, as well as having important guiding significance for our further work.

In the revised manuscript, the following improvements have been made to further enrich and upgrade our work:

Point 1: The title should be modified respecting the content of the manuscript

Response 1: Thanks so much for your comment. Now the title is modified as "***Lycium barbarum* polysaccharide-iron (III) chelate as peroxidase mimics for total antioxidant capacity assay of fruit and vegetable food**" respecting the content of the manuscript.

Point 2: This works has a variety of data that are not apparent by just reading the abstract.

Response 2: Thanks so much for your comment. More content about the data of this work is now presented in the abstract. The corresponding content was added as followed: "**The results of steady-state kinetics study showed that the K_m values of LBPIC toward H_2O_2 and TMB were 5.54 mM and 0.16 mM respectively**".

Point 3: In the introduction, author would have benefited from a better understanding of the existing literature.

Response 3: Thanks so much for your comment. The existing literatures in the introduction were reread carefully. Some modifications are now displayed in the introduction. For example: In line 28-29, "Thus, oxidative stress mediated by excessive ROS is a noteworthy inducer of chronic dis-eases such as presenility, **cancer, cardiovascular** and neurodegenerative diseases."

In line 44-45, the order of oxygen radical absorbance capacity (ORAC) assay and Folin–Ciocalteu (FC) assay was changed to correspond to the respective literatures.

In line 51-53, "Inspired by the **active site** composition and **possible** catalytic mechanism of horseradish peroxidase (HRP)".

In line 55, the order of Fe_3O_4 and Fe_2O_3 was changed to correspond to the respective literatures.

In line 71-72, "(3) control agents for the growth of some nanoparticles, (4) molds for specific oxide structures" was added.

Point 4: Please move figure 1 after the paragraph L255-259

Response 4: Thanks so much for your comment. The figure was moved after the paragraph L255-269, but it is figure 2 instead of figure 1. If there is any mistake in my understanding, please do not hesitate to point out immediately.

Point 5: L218-L221: please reformulate the sentence

Response 5: Thanks so much for your comment. Now the sentence in L226-L227 is reformulated as: "two peaks at 529.9 eV and 531.3 eV were showed in the O 1s XPS spectrum, which were due to Fe—O—Fe and Fe—O—H, respectively. This result, together with the phenomenon of enhancement of peak absorption in the FT-IR spectra fingerprint region of LBPIC, is corroborative evidence of the existence of iron oxides in LBPIC".

Point 6: In the discussion, the author would have benefited from a better understanding of the existing literature.

Response 6: Thanks so much for your comment. The existing literatures in the discussion part were reread carefully. Some modifications are now displayed in the discussion part. For example:

In line 201-203, "The peaks of LBP at 1626.0 and 1072.4 cm^{-1} related to carboxyl groups shifted to 1618.3 and 1066.6 cm^{-1} in LBPIC, respectively, suggesting the involvement of carboxyl groups in the chelation."

In line 207-210, "In addition, a broad shoulder occurred at 553.6—474.5 cm^{-1} in the fingerprint region of LBPIC compared to LBP, which might be a result of the significant enhancement of absorption peaks associated with iron oxides".

In line 210-213, "The information above indicated that the added iron ions tended to form iron oxides and that the coordination reaction between iron oxides and polysaccharides mainly occurred on the **carboxyl groups,** carbonyl groups and hydroxyl groups of LBP".

A reference ([47]) was cited in the paper to confirm the conclusion that the antioxidant capacity of compound fruit and vegetable beverages of the cloudy type were generally greater.

Point 7: In some sentences, English appears not to be adequate.

Response 7: Thanks so much for your comment. Some sentences were modified to be adequate in English, for example: In line 355-356, "The chromogenic results of test groups were not visibly affected, even though the concentrations of interference factors were 20 times that of AA". Additionally, the English language of this thesis has been edited by Elsevier Language Editing Service and the certificate is provided at the end.

Point 8: To use a space between the number and the unit, as 20 ℃; and not to use a space between number and percentage, as 10%, for example.

Response 8: Thanks so much for your comment. The mistakes related to the spaces between the numbers and the units are now corrected. Specific as follows: "70 ℃" in line 106, line 265 and line 278.

Point 9: References must be revised.

Response 9: Thanks so much for your comment. Now the references are all revised according to **the Reference List and Citations Style Guide for MDPI Journals**.

Point 10: Please include a list of abbreviation

Response 10: Thanks so much for your comment. A list of abbreviations is now added in the article. Specific as follows：

Abbreviations

LBP	*Lycium barbarum* polysaccharide
LBPIC	*Lycium barbarum* polysaccharide-iron (III) chelate
TAC	total antioxidant capacity
POD	peroxidase
TMB	3,3′,5,5′-tetramethyl-benzidine
H_2O_2	hydrogen peroxide
AA	ascorbic acid
LOD	limit of detection
HRP	horseradish peroxidase
ROS	reactive oxygen species
OS	oxidative stress
EPR	electron paramagnetic resonance
ATR-IR	attenuated total reflectance infrared spectroscopy
DPPH	2,2′-diphenyl-1-picrylhydrazyl
ABTS	2,2-azinobis-(3-ethylbenzothiazoline-6-sulfonate)
ORAC	oxygen radical absorbance capacity
FC	Folin–Ciocalteu
MOFs	metal-organic frameworks
NH_2-rGO	aminated reduced graphene oxide
CA	citric acid

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The following article was edited by Elsevier Language Editing Services:

"Lycium barbarum polysaccharide-iron(□) chealte as peroxidase mimics for total antioxidant capacity assay"

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