



Manuscript Checklist

Revised April 2026

The following checklist and template are designed for authors to compose the manuscript to conform to the Meat and Muscle Biology (MMB) policies and style. Authors should consult the latest version of the *MMB Policies, Style Guide, and Instructions for Authors in preparing the manuscript* (<http://www.meatscience.org/publications-resources/mmb/mmb-instructions-to-authors>). Manuscripts should be submitted to the MMB Image Iowa State University Digital Press website at <https://www.iastatedigitalpress.com/mmb/>.

Title Page

- Running head limited to 45 characters, no abbreviations
- Listing of all authors' full names and affiliations in correct order
- Corresponding author name and email address on title page

Abstract

- Maximum of 300 words, abbreviations defined at first use
- Evidence of statistical analysis of data, *e.g.* $P=0.012$.
- 1 or 2 sentences of the important findings or conclusions at end of abstract
- Key words (6 or less) after the abstract

Text sections

- Centering, boldface, capitalized main headings
- Secondary head flush left, boldface, italic, title case, (*abbreviations are not used in headings unless they are commonly used abbreviations*)
- Abbreviations defined at first use except for weights and measurements in SI format
- Manufacturer/supplier name and location for all chemicals and uncommon equipment and instruments
- Citations in text are in chronological order; if 2 or more publications in the same year, then alphabetical order; format of Smith and Jones (2008), (Smith and Jones, 2008), (Smith et al., 2008)
- Commas for numbers greater than 1,000, zeroes before decimal point for numbers less than 1
- Equations are part of sentences, with all equation terms defined

Declaration of Competing Interest

- Author(s) should declare any conflicts of interest. If there are no conflicts of interest, authors should state this explicitly before the acknowledgements.

Acknowledgements

- This section is for grant details, sponsorships, donations, and personal thanks to individuals who contributed significantly to the creation of the work.

Author Contribution

- Author(s) should provide detailed information about individuals contributions to the work by following the [CRediT](#) (Contributor Roles Taxonomy).

Literature Cited

- Author(s). Year. Title. Source vol.:inclusive pages. doi
- Citations in alphabetical order by author last name
- Appropriate journal title abbreviations. Use abbreviations as described here: (https://images.webofknowledge.com/images/help/WOS/A_abrvjt.html)

___ Only citations used in text appear in this section

Tables and Figures

___ Should be self-contained and self-explanatory, with explanations for all abbreviations

___ Always include Table headings, in Title Case

___ Concise figure captions and table titles

___ Tables and figures numbers chronologically in order of appearance in text

___ Include Alt-text in images

Copyrights

___ Check *MMB* Policies, Style Guide, and Instructions for Authors for appropriate procedures and forms

1 Authors should consult with the *Meat and Muscle Biology* (MMB) Style Guide on the American
2 Meat Science Association website (<http://meatscience.org/publications-resources/mmb>). All
3 manuscripts must be in English and submitted in a file format that can be edited, preferably in
4 Microsoft Word. Manuscripts should be double spaced.

5 Line numbering and page numbering are to be used. Use continuous line numbering and
6 continuous page numbering.

7 Please include Tables, Figure Legends and Figures (in that order) in the same file as the
8 manuscript. Insert them (Tables, Figure Legends, and Figures) sequentially immediately after
9 the Literature Cited section. Do NOT insert them into the body of the manuscript.

10

Meat and Muscle Biology Manuscript Template

12 The running head (that will be at the top of each page) is limited to 45 keystrokes

13

Title of paper (12-15 words or less), Heading Style 1, capitalize only the first word and any proper nouns

15

16 **Abner B. Smith², Clyde D. Jones³, Ezra F. Johnson^{3,*} and Research Consortium⁴**

17

18 ²Author research affiliation or institution, city, state, postal code, country (if outside of the
19 United States).

20 ³Research affiliations of authors different than the first or other authors given as research
21 affiliation or institution, city, state, postal code, country (if outside of the United States).

22 ⁴Give website (<http://...>) where the names and affiliations of scientists working with a Research
23 Consortium (or other collaborative affiliation) are listed

24

25 *Corresponding author email should be denoted by the * and given here.

24

25 **ABSTRACT:** It is a brief summary of the reason or objective of the research, experimental units
26 or samples, descriptive results, and a conclusion. The abstract should be 300 words or less.

27 Abbreviations must be defined in the abstract and also defined when they are first used in the
28 manuscript and in each table and each figure.

29

30

31 **Key words:** Give up to 6 key words or phrases that include the animal species, variables, and
32 primary factors measured.

INTRODUCTION

33 The introduction should be as brief as possible while giving an introduction and justification for
34 the research, clear hypotheses that were tested, and the objective(s) of the research. The
35 extensive discussion of literature pertaining to the research should be in the Discussion (or
36 Results and Discussion section, if combined). References in the text should be in the format of
37 Smith and Jones (2008), (Smith and Jones, 2008; Jones, 2010), Smith et al. (2008), (Smith et al.,
38 2008; Jones et al., 2010; Adams et al., 2015). References with the same authors and the same
39 year should be differentiated as (Smith and Jones, 2008a,b) in the text and in the Literature Cited.

MATERIALS AND METHODS

40 The materials and methods section is required. Statements of institutional animal care and use
41 committee approval or institutional review board approvals for human subject use should be
42 given first in this section. These statements of affiliation or institution review and approval of the
43 research should conform with accepted standards. The materials and method section must
44 contain a clear description of the conduct or protocol for the experiment, including the
45 experimental conditions, experimental design, and the method and statistical model by which the
46 data was statistically analyzed.

47 For sensory studies, information on study parameters including source of samples, storage,
48 preparation methods, temperature parameters, serving size, number of samples per session,
49 number of sessions per day, time between samples, number of replications, duplication, palette
50 cleansers, serving order design, use of carriers and other key information on the sensory test
51 should be provided in the methods. For descriptive studies using trained panels, the number of

52 panelists, the type and length of training, definition of scales and attributes, and how the panel
53 was monitored and validated must be given. For consumer studies, the number of consumers,
54 basic demographic information, recruitment/selection pool and criteria are required. Information
55 from AMSA Research Guidelines for Cookery, Sensory Evaluation, and Instrumental
56 Tenderness Measurements of Meat ([http://meatscience.org/publications-resources/printed-
58 publications/sensory-and-tenderness-evaluation-guidelines](http://meatscience.org/publications-resources/printed-
57 publications/sensory-and-tenderness-evaluation-guidelines)) should be used and cited.
59 For color measurements, the AMSA Meat Color Measurement Guidelines
60 ([http://meatscience.org/publications-resources/printed-publications/amsa-meat-color-
62 measurement-guidelines](http://meatscience.org/publications-resources/printed-publications/amsa-meat-color-
61 measurement-guidelines)) should be consulted and cited. For color measurements, the AMSA
63 Meat Color Measurement Guidelines ([http://meatscience.org/publications-resources/printed-
65 publications/amsa-meat-colormeasurement-guidelines](http://meatscience.org/publications-resources/printed-
64 publications/amsa-meat-colormeasurement-guidelines)) should be consulted and cited. The color
66 parameters (*L**, *a**, and *b** values) are based on the 1976 guidelines of the CIE (International
67 Commission on Illumination; abbreviated CIE for its French name Commission internationale de
68 l'éclairage). The italicization and asterisk differentiate the CIE 1976 parameters from a similar
69 set of color parameters known as Hunter L, a, and b values (note that these Hunter parameters do
70 not have italicization or asterisk). A quick rule of thumb is that if the color parameters have
71 asterisk then the letters are to be italicized because they are CIE 1976 values. Therefore, unless
72 the authors specify Hunter L, a, b values, MMB has the policy of italicizing *L**, *a**, and *b**
73 values consistently in our publications.

Subheading

72 Subheading titles should be in bold and italicized lettering, if used, but are not required. The
73 information under each subheading contains specific information about an aspect of the

74 manuscript and may be in the materials and methods, results, discussion (or results and
75 discussion section, if combined).

RESULTS

76 Present results in tables or figures whenever possible. The text in the results section should
77 explain where the results are in the manuscript and generally describe the results obtained, but
78 not repeat the numbers or data given in the tables or figures. The text should provide an
79 indication of the variation associated with the results, preferably as the significance level or *P*
80 value. It is desirable to give the actual significance level ($P=0.013$) rather than $P<0.05$ or $P<0.01$.

DISCUSSION

81 The discussion is the interpretation of the results from a scientific perspective. The biological,
82 physiological, and/or chemical processes to explain the results should be given clearly and
83 concisely. The discussion should include pertinent findings from previous scientific or pertinent
84 literature (see Introduction Section above for examples of citing references in the text to give
85 appropriate attribution to the source of the information) and integrate these sufficiently in the
86 discussion of the results to allow the reader to make independent interpretations and evaluations
87 of the meaning of the research. Conclusions about the interpretation of the research and its use
88 can be in this section or a separate section.

89 Some authors prefer, and some research is best presented, by combining the results and
90 discussion into a single results and discussion section.

CONCLUSIONS

91 The concluding statements on the meaning and use of the research can be in a separate section or
92 included in the discussion section.

CONFLICT OF INTEREST

93 Author(s) should declare any conflicts of interest. If there are no conflicts of interest, authors should
state this explicitly before the acknowledgements.

ACKNOWLEDGEMENTS

94 This section is for grant details, sponsorships, donations, and personal thanks to individuals who
contributed significantly to the creation of the work.

AUTHOR CONTRIBUTION

95 Author(s) should provide detailed information about individuals contributions to the work by
following the [CRediT](#) (Contributor Roles Taxonomy).

LITERATURE CITED

96 All references cited in the text of the manuscript should be listed. All citations must have been
97 published or have been accepted for publication (with a doi number) to be included in this
98 section. Unpublished data or personal communications are not allowed in this section without
99 specific explanations of why the information is not available from a published, preferably peer
100 reviewed, source. Each citation must follow the format for its specific type (refereed journal
101 article, book, book chapter, bulletin, website) according to the *MMB* Style Guide. Citations
102 should be given in alphabetical order by last name of first author. Multiple citations having the
103 same first author are listed in alphabetical order of the last name of the first author, last name of
104 the second author, last name of the third author and so forth. Two or more publications by the
105 same author or the same set of authors in the same year would be distinguished by adding
106 lowercase letters after the year, i.e. 2010a, 2010b. Please include the DOI (Digital Object
107 Identifier) at the end of each reference for which they are available.

108 Adams, J.J. 2015. Title. Journal title vol:pages. <https://doi.org/xx.xxxx/xxx/xxxxxx>.

109 Brown, L .D. 2001. Title. Journal title vol:pages. <https://doi.org/xx.xxxx/xxx/xxxxxx>.

110 Brown, L. D. and G. C. Smith. 2014. Title. Journal title vol:pages. <https://doi.org/xx.xxxx/>
111 [xxx/xxxxxx](https://doi.org/xx.xxxx/).

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113 <https://doi.org/xx.xxxx/> [xxx/xxxxxx](https://doi.org/xx.xxxx/).

114 Brown, L. D., G. C. Smith, and J. D. Tatum. 2007a. Title. Journal title vol:pages.
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119 Journal title vol:pages. <https://doi.org/xx.xxxx/xxx/xxxxxx>.

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121 vol:pages. <https://doi.org/xx.xxxx/xxx/xxxxxx>.

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126 Carter, H.D., Q.S. Jones, and L.D. Brown. 1987. Title. Journal title vol:pages.
127 <https://doi.org/xx.xxxx/xxx/xxxxxx>.

128 McLin, A.J., H.D. Carter, and L.D. Brown. 1986a. Title. Journal title vol:pages.
129 <https://doi.org/xx.xxxx/xxx/xxxxxx>.

130 McLin, A.J., H.D. Carter, and L.D. Brown. 1986b. Title. Journal title vol:pages.
136 <https://doi.org/xx.xxxx/xxx/xxxxxx>.

137

Tables and Figures

138 Tables and figures are at the end of a manuscript and must give independent information to be
139 understood without the reader needing to read text in the manuscript. The tables are provided in
140 chronological order of appearance in the manuscript, followed by captions for figures (given in a
141 list) and the figures themselves last. Figures are listed in the order they appear in the manuscript.
142 Figures should be twice the size that will be in the typeset article, usually at least half a page in
143 the manuscript. Abbreviations must be defined in each table and figure. It is acceptable to
144 explain the abbreviation meaning in a footnote to the table. The listing of proprietary products in a
table or figure must give the manufacturer name and location. All tables and figures must show
145 the measure of variation and evidence of statistical analysis of the data.

148

149 Tables must be created using the table feature in MS Word. Tables shown as image files or in
150 formats that cannot be edited will result in rejection of the manuscript.

151

152 Do not use image files or non-editable formats for tables.

153

154 Figures should also give independent information, have a caption and appropriate legends, and Include Alt-text in images. Each figure should be on a separate page with identification of the figure number and the legend for the figure. Because *MMB* is an online journal, figures should be submitted in the format and with sufficient resolution in which they can be best interpreted, and in color if that enhances the depiction of the information. Figures should be twice the size that it is anticipated that they will appear in the typeset publication. Photographs are discouraged unless absolutely the only means to show, explain, or describe a concept or apparatus.

155 Examples)

156 **Table 1.** Impacts of aging time and freeze-thaw cycles on water loss characteristics of beef sirloin.

Treatments ¹	Drip loss (%)	Compression loss (%)	Aging loss (%)	Freeze-thaw loss (%)	Cook loss (%)	Total loss ² (%)
A0	2.23 ^{cd}	18.13	3.15 ^b	-	30.56 ^{ab}	33.71 ^b
A0FT	4.11 ^a	17.04	-	6.11 ^b	32.71 ^a	38.82 ^a
A0FT×2	3.63 ^{ab}	15.65	-	7.82 ^a	31.90 ^a	39.72 ^a
A4	1.43 ^d	17.18	6.00 ^a	-	27.42 ^b	33.41 ^b
A4FT	2.94 ^{bc}	17.40	-	3.12 ^d	32.24 ^a	35.36 ^{ab}
A4FT×2	2.75 ^{bc}	17.10	-	4.59 ^c	31.70 ^{ab}	36.29 ^{ab}
SEM ³	0.35	0.65	0.41	0.48	1.09	1.18
P-value	<0.0001	0.1333	<0.0001	<0.0001	0.0074	0.0004

157 ¹ A0: no further aging and never freeze-thawed; A4: 4 weeks aging and never freeze-thawed; FT: one time freeze-thawed; FT×2: repeated freeze-thawed.

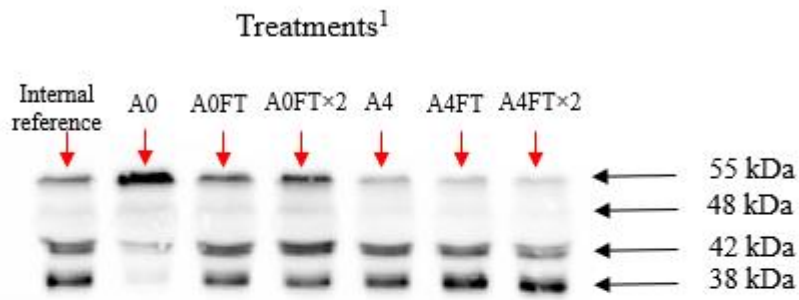
158 ² Sum of the aging loss, freeze-thaw loss, and cook loss.

159 ³ Standard error of the means.

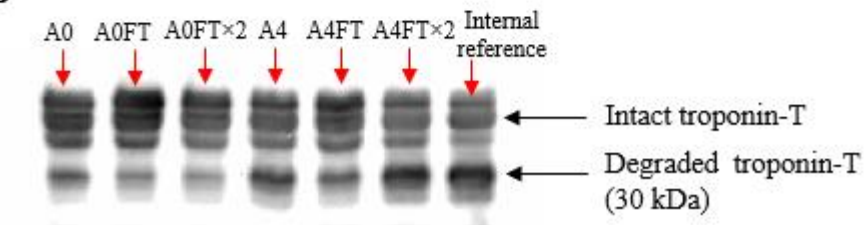
160 ^{a-d} Different superscripts in column show significant differences among treatments.

161 4: 4 weeks aging and never freeze-thawed; FT: one time freeze-thawed; FT×2: repeated freeze-thawed.

A



B



162

163 **Fig. 1.** A representative western blot image showing relative abundance of intact and degraded

desmin (A) and troponin-T (B) of all treatments.

164 ¹ A0: no further aging and never freeze-thawed; A4: 4 weeks aging and never freeze-thawed; FT: one time freeze-thawed; FT×2: repeated freeze-thawed.

Alt-text: Western blot showing reduced intact protein bands and increased fragments over time, indicating enhanced degradation during aging.