APPENDIX A

HUMAN SUBJECTS FORMS FOR SENSORY EVALUATION

Human Subjects Forms for Sensory Evaluation
Protocol for Projects of Sensory Evaluation

Project title:

Principal Investigators: Sonia Gonzalez, Dr. George J. Flick Jr. Department of Food Science & Technology

If the project involves sensory evaluation, please complete the following questions about the project to assist you and the Institutional Review Board in determining the risk level of the project.

Definition: Sensory evaluation is the evaluation of food or other substances by the senses including taste, touch, smell, sight and hearing.

Check all that apply:

1. The procedure for sensory evaluation in this project involves:
   - __X___ Tasting in the mouth (includes tests where the panelist is instructed to spit it out)
   - _____ Substances applied to the skin
   - __X___ Substances smelled for odor components
   - _____ Substances evaluated by sound when chewed
   - _____ Substances evaluated by visual senses

2. The product/s to be evaluated are:
   - __X___ Made entirely of ingredients approved by FDA for consumption or application under approved conditions of processing
   - _____ Made of ingredients approved by FDA but not approved for the use in the project (e.g. heating of aspartame, fat substitutes approved only as an emulsifier).
   - _____ Made partially or entirely of experimental ingredients pending FDA approval.
   - _____ Made partially or entirely of experimental ingredients not approved for human consumption or topical use
   - _____ Made from materials from or altered by biotechnology

3. The processing or preparation of the product is:
   - __X___ By usual approved good manufacturing or preparation practices for that food or topical product.
   - _____ By experimental procedures including non-good manufacturing practices. Briefly describe the procedures.

4. The packaging of the product includes:
   - ___ Processing or storage in FDA-approved packaging materials.
   - _____ Processing or storage in packaging materials not approved by FDA.

5. Describe the storage protocols for the product that are necessary to maintain the product in safe condition.
   Samples will be stored in ice and in the cooler for one day after filleting prior to thorough cooking and presentation to panelists.

6. If microbiological cultures are a part of the food processing or preparation procedure, describe what cultures will be used, if they will be active on consumption, and give evidence that these cultures are known to be safe for human consumption.
   No microbiological cultures will be used.

7. Allergies
   - __X___ Are any ingredients to be used potentially allergenic as consumed or by topical application? If yes, describe. Have panelists been made aware of these ingredients?
     There is the potential risk that panelists may be allergic to cooked fish. They will be informed they will be consuming cooked salmon and will be free to abstain from the project of they wish.

When you have completed this form, indicate the risk level to the panelists of this project. Complete the appropriate form; for "not at risk", the Certificate of Exemption form; for "at minimal risk", the Request for Approval form.

Virginia Polytechnic Institute and State University
Informed Consent for Participation in Sensory Evaluation

Title of Project*:*

Principal Investigator: *Sonia Gonzalez*

I. THE PURPOSE OF THIS PROJECT

You are invited to participate on a sensory evaluation panel about *frozen fish fillets*. *The purpose of the project is to determine if there is an overall difference between wild and farmed fish fillets.*

II. PROCEDURES

There will be ___*1*___ session involving about _*10*____ minutes at each session. You will be presented with approximately _9_____ samples at each session. Should you find a sample unpalatable or offensive, you may choose to spit it out and continue to other samples.

Certain individuals are sensitive to some foods such as milk, eggs, fish, wheat gluten, strawberries, chocolate, artificial sweeteners, etc. If you are aware of any food or drug allergies, list them in the following space.

_____
_____
_____

III. BENEFITS/RISKS OF THE PROJECT

Your participation in the project will provide information about differences and similarities in flavor of wild and farmed fish. Some risk may be involved if you have an unknown food allergy.

IV. EXTENT OF AN0NYMITY AND CONFIDENTIALITY

The results of your performance as a panelist will be kept strictly confidential. Individual panelists will be referred to by code for analyses and in any publication of the results.

V. COMPENSATION

Panelists will be rewarded with snacks at the end of each session.

VI. FREEDOM TO WITHDRAW

It is essential to sensory evaluation projects that you complete each session in so far as possible. However, there may be conditions preventing your completion of all sessions. If after reading and becoming familiar with the sensory project, you decide not to participate as a panelist, you may withdraw at any time without penalty.

VII. APPROVAL OF RESEARCH

This research project has been approved by the Institutional Review Board for projects involving human subjects at Virginia Polytechnic Institute and State University and by the human subjects review of the Department of Food Science and Technology.

VIII. SUBJECT'S RESPONSIBILITIES

I know of no reason I cannot participate in this study which will require: (list sessions to be attended or other requirements.)

_____

Signature/Date

Please provide address and phone number so investigator may reach you in case of emergency or schedule changes.

Address _____

Phone _____

----------(tear off)----------

IX. SUBJECT'S PERMISSION (provide tear off for human subject to keep)

I have read the information about the conditions of this sensory evaluation project and give my voluntary consent for participation in this project.

I know of no reason I cannot participate in this study

_____

Signature

Should I have any questions about this research or its conduct, I should contact:

Sonia Gonzalez (540) 231-7849

Investigator Phone

George J. Flick Jr. (540) 231-6965

Investigator Phone

David Moore (540) 231-4991

Chair, IRB/Phone for Research Division

APPENDIX B

SENSORY TEST SCORECARD

DATE: _____

JUDGE NUMBER_____ JUDGE NAME _____

PRODUCT:

There are three sets of triangle test. Taste and /or smell each sample from left to right and check the odd sample.

TRIANGLE TEST 1

CODE	CHECK ODD SAMPLE	COMMENTS
_____	☐	_____
_____	☐	_____
_____	☐	_____

TRIANGLE TEST 2

CODE	CHECK ODD SAMPLE	COMMENTS
_____	☐	_____
_____	☐	_____
_____	☐	_____

TRIANGLE TEST 3

CODE	CHECK ODD SAMPLE	COMMENTS
_____	☐	_____
_____	☐	_____
_____	☐	_____

THANK YOU!

APPENDIX C

FATTY ACID PROFILES

Table C-1. Fatty acid profile (% total fatty acids) of wild and farmed yellow perch fillets (n = 3; mean ± standard deviation)

Fatty acid	Wild	Farmed
14:0	0.78±0.17	0.85±0.06
15:0	0.27±0.02	0.24±0.06
16:0	17.5±0.75	20.9±0.79
17:0	0.30±0.06	0.29±0.05
18:0	4.09±0.19	5.23±0.42
20:0	0.13±0.03	0.10±0.02
24:0	10.4±1.07	8.91±1.46
14:1	0.03±0.01	0.05±0.01
t916:1	0.08±0.01	0.11±0.03
16:1n-5	0.78±0.24	Not found
16:1n-7	3.41±0.58	2.19±0.13
Trans 18:1 isomers		
t9 18:1	0.23±0.05	0.25±0.07
t11 18:1	0.06±0.01	0.11±0.03
Cis 18:1		
c9 18:1	7.27±0.81	7.51±1.11
c11 18:1	3.49±0.09	1.97±0.10
c13 18:1	0.20±0.06	0.16±0.04
c15 18:1	0.12±0.03	0.19±0.05

Fatty acid	Wild	Farmed
Non-conjugated 18:2		
c9,t12 18:2	0.21±0.04	0.28±0.05
t9,c12 18:2	0.16±0.01	0.13±0.01
c9,t12 18:2	4.61±1.11	4.43±1.03
18:3		
18:3n-6	0.29±0.13	0.15±0.03
18:3n-3	0.71±0.24	0.29±0.05
C20		
20:1	0.39±0.04	0.43±0.05
20:2n-6	0.18±0.16	0.25±0.05
20:3n-6	0.17±0.03	0.12±0.05
20:4n-6	7.37±0.74	2.61±0.22
20:5n-3	0.22±0.05	0.26±0.17
C22		
22:1n-9	0.12±0.03	0.10±0.02
22:4n-6	0.51±0.12	0.18±0.01
22:5n-3	3.17±0.40	1.41±0.02
22:6n-3	32.3±2.67	39.4±3.86
C24		
24:1n-9	0.33±0.05	0.31±0.05

*One or more of the fatty acid concentrations reported in this table might be erroneous (provided by service laboratory). Please refer to published manuscript for correct information.

Table C-2. Selected fatty acid concentrations (% of total fatty acids) of feeds varying protein concentration (38 % (YP1), 45% (YP2), 55% (YP3))

Fatty acid	Protein concentrations		
	YP1	YP 2	YP 3
	% of total fatty acids*		
14:0	6.56 ± 0.58[a]	8.75 ± 0.01[b]	8.67 ± 0.03[b]
16:0	19.8 ± 0.68[a]	21.0 ± 0.01[ab]	21.7 ± 0.01[b]
18:0	3.92 ± 0.03[a]	4.10 ± 0.01[a]	4.26 ± 0.06[b]
24:0	14.4 ± 1.05	16.5 ± 0.02	16.1 ± 0.05
16:1n-7	8.30 ± 0.82[a]	10.87 ± 0.01[b]	10.8 ± 0.06[b]
18:1n-7	2.74 ± 0.01[a]	2.95 ± 0.01[b]	2.96 ± 0.03[b]
18:1n-9	8.11 ± 0.30[a]	6.89 ± 0.03[b]	6.33 ± 0.11[b]
20:1n-9	1.12 ± 0.12	1.07 ± 0.00	0.90 ± 0.01
18:2n-6	8.09 ± 0.27[a]	1.87 ± 0.01[b]	1.49 ± 0.01[b]
20:4n-6	1.07 ± 0.10[a]	1.63 ± 0.01[b]	1.75 ± 0.06[b]
18:3n-3	1.69 ± 0.08[a]	0.94 ± 0.00[b]	0.94± 0.00[b]
20:5n-3	0.12 ± 0.01[a]	0.16 ± 0.01[a]	0.19 ±0.01[b]
22:5n-3	2.39 ± 0.19[b]	2.71 ± 0.00[b]	2.65 ± 0.06[a]
22:6n-3	12.7 ± 2.30	11.3 ± 0.00	12.1 ± 0.06
Saturated fatty acids	46.2 ± 0.92[a]	52.0 ± 0.05[b]	52.0 ± 0.01[b]
Unsaturated fatty acids	53.9 ± 0.92[a]	48.1 ± 0.04[b]	47.7 ± 0.01[b]
n-3 fatty acids	16.9 ± 2.17	15.10 ± 0.01	15.9 ± 0.00
n-6 fatty acids	11.1 ± 0.41[a]	5.62 ± 0.05[b]	5.39 ± 0.02[b]
n-3/n-6	1.53 ± 0.25[a]	2.69 ± 0.03[b]	2.95 ± 0.01[b]

[ab]Means ± standard deviation (n = 2 per diet) with different letters in the same row are significantly different at $p \leq 0.05$.

*One or more of the fatty acid concentrations reported in this table might be erroneous (provided by service laboratory). Please refer to published manuscript for correct information.

Table C-3. Fatty acid profile of yellow perch fed three diets varying protein concentration: 38%, 45%, and 55% (means ± standard deviation)

Fatty acid*	38%	45%	55%
14:0	1.46±0.21	1.49±0.47	2.00±0.48
15:0	0.20±0.02	0.20±0.11	0.35±0.03
16:0	23.5±0.73	22.1±0.76	22.7±0.31
17:0	0.34±0.03	0.30±0.03	0.37±0.02
18:0	6.23±0.14	5.49±0.54	5.68±0.59
20:0	0.04±0.08	0.12±0.03	0.11±0.02
24:0	10.46±0.59	9.61±0.86	11.8±1.08
14:1	0.02±0.04	0.02±0.03	0.06±0.04
t916:1	0.12±0.02	0.14±0.04	0.16±0.01
16:1n-5	0.33±0.05	0.42±0.04	0.32±0.03
16:1n-7	3.41±0.49	3.67±1.50	4.70±1.23
Trans 18:1 isomers			
t9 18:1	0.11±0.02	0.10±0.05	0.11±0.02
t11 18:1	0.03±0.03	0.06±0.03	0.05±0.01
Cis 18:1			
c9 18:1 n-9	6.22±0.59	7.24±1.97	6.74±0.71
c11 18:1 n-7	1.51±0.11	1.60±0.25	1.62±0.08
c13 18:1 n-5	0.17±0.01	0.11±0.09	0.17±0.04
c15 18:1 n-3	0.14±0.02	0.12±0.05	0.11±0.03

Fatty acid	YP1	YP2	YP3
Non-conjugated 18:2			
t9,c12 18:2	0.17±0.03	0.16±0.01	0.18±0.01
c9,c12 18:2	0.87±0.16	2.84±0.92	1.04±0.39
Conjugated 18:2			
Other t/t cla	0.17±0.02	0.24±0.07	0.20±0.05
18:3			
18:3n-6	0.11±0.02	0.10±0.09	0.12±0.02
18:3n-3	0.22±0.02	0.44±0.15	0.27±0.05
C20			
20:1	0.35±0.05	0.45±0.11	0.38±0.03
20:2n-6	0.32±0.07	0.26±0.06	0.22±0.03
20:3n-6	0.18±0.04	0.17±0.03	0.19±0.05
20:4n-6	3.43±0.26	2.44±0.11	3.62±0.63
20:5n-3	0.07±0.01	0.06±0.03	0.08±0.02
C22			
22:1n-9	0.12±0.02	0.09±0.08	0.14±0.01
22:4n-6	0.19±0.03	0.24±0.05	0.36±0.08
22:5n-3	1.83±0.04	1.85±0.17	2.08±0.05
22:6n-3	37.2±1.32	37.4±3.44	33.5±0.57
C24			
24:1n-9	0.18±0.02	0.12±0.12	0.24±0.06

*One or more of the fatty acid concentrations reported in this table might be erroneous (provided by service laboratory). Please refer to published manuscript for correct information.

Table C-4. Fatty acid profile (% of total fatty acids) of wild and farmed southern flounder fillets (mean ± standard deviation; n = 3)

Fatty acid*	Wild	Farmed
14:0	1.12±0.09	5.33±1.30
15:0	0.53±0.08	0.33±0.28
16:0	21.6±0.56	20.5±0.68
17:0	0.66±0.03	0.46±0.02
18:0	7.01±0.39	4.85±1.25
20:0	0.28±0.07	0.22±0.05
24:0	4.74±0.20	10.12±0.32
t916:1	0.40±0.03	0.14±0.11
16:1n-5	0.44±0.07	0.46±0.06
16:1n-7	2.72±0.19	7.40±1.94
Trans 18:1 isomers		
t9 18:1	0.25±0.03	0.07±0.02
t11 18:1	0.06±0.05	0.24±0.29
Cis 18:1		
c9 18:1n-9	7.56±0.39	6.83±4.86
c11 18:1n-7	1.69±0.27	2.10±0.62
c13 18:1n-5	0.18±0.05	0.15±0.01
c15 18:1n-6	0.40±0.08	0.06±0.07

Fatty acid	Wild	Farmed
Non-conjugated 18:2		
c9,t12 18:2	0.13±0.03	0.12±0.11
t9,c12 18:2	0.03±0.05	0.12±0.02
c9,c12 18:2	2.94±0.16	1.70±0.19
Conjugated 18:2		
c9,t11 18:2	Not found	0.06±0.06
Other t/t CLA	0.03±0.03	0.69±0.23
18:3		
18:3n-6	0.11±0.12	0.20±0.17
18:3n-3	0.44±0.07	0.71±0.22
C20		
20:1	0.48±0.11	1.07±0.12
20:2n-6	0.68±0.10	0.41±0.01
20:3n-6	0.40±0.09	0.23±0.01
20:4n-6	8.92±0.79	1.63±0.36
20:5n-3	0.20±0.07	0.07±0.02
C22		
22:1n-9	0.39±0.02	0.34±0.16
22:4n-6	1.99±0.10	0.22±0.03
22:5n-3	5.56±0.66	5.05±0.27
22:6n-3	27.7±0.51	24.2±3.61
C24		
24:1n-9	0.23±0.09	0.29±0.05

*One or more of the fatty acid concentrations reported in this table might be erroneous (provided by service laboratory). Please refer to published manuscript for correct information.

Table C-5. Fatty acid profile (% of total fatty acids) of southern flounder fed a commercial diet or a crab-meal supplemented diet (mean ± standard deviation; n = 3)

Fatty acid	Flounder fed commercial diet	Flounder fed crab-meal supplemented diet
14:0	2.77±0.69	1.98±0.64
15:0	0.39±0.07	0.38±0.07
16:0	22.9±1.88	24.2±2.00
17:0	0.41±0.06	0.43±0.07
18:0	6.76±0.66	7.18±0.33
20:0	0.23±0.01	0.18±0.01
24:0	7.58±0.60	7.20±0.40
t916:1	0.18±0.03	0.22±0.04
16:1n-5	0.35±0.04	0.43±0.02
16:1n-7	4.07±0.99	3.07±0.82
Trans 18:1 isomers		
t9 18:1	0.12±0.02	0.06±0.03
t11 18:1	0.04±0.01	0.05±0.01
Cis 18:1		
c9 18:1n-9	9.70±1.42	6.68±0.76
c11 18:1n-7	2.24±0.26	2.22±0.16
c13 18:1n-5	0.13±0.03	0.09±0.02
c15 18:1n-6	0.23±0.02	0.25±0.01

Fatty acid	Flounder fed commercial diet	Flounder fed crab-meal supplemented diet
Non-conjugated 18:2		
c9,t12 18:2	0.18±0.08	0.15±0.07
t9,c12 18:2	0.04±0.08	0.03±0.05
c9,c12 18:2	3.90±1.87	1.39±0.73
Conjugated 18:2		
t11,t13 18:2	0.12±0.08	0.09±0.07
Other t/t CLA	0.54±0.28	0.31±0.16
18:3		
18:3n-6	0.13±0.11	0.46±0.37
18:3n-3	0.55±0.11	0.33±0.10
C20		
20:1	0.85±0.07	0.63±0.04
20:2n-6	0.72±0.03	0.42±0.03
20:3n-6	0.27±0.06	0.25±0.03
20:4n-6	2.57±0.03	3.31±0.08
20:5n-3	0.08±0.03	0.09±0.04
C22		
22:1n-9	0.39±0.02	0.34±0.16
22:4n-6	0.23±0.03	0.30±0.03
22:5n-3	3.62±0.33	3.45±0.28
22:6n-3	26.8±4.76	32.9±5.71
C24		
24:1n-9	0.16±0.03	0.17±0.03

*One or more of the fatty acid concentrations reported in this table might be erroneous (provided by service laboratory). Please refer to published manuscript for correct information.

Table C-6. Complete fatty acid profile* (% of total fatty acids) of wild salmon body zones (1= front dorsal; 2= front ventral; 3= Scottish dorsal; 4= Scottish ventral; 5= tail dorsal; 6= tail ventral) (n=5; mean ± standard deviation)

Fatty acid	1	2	3	4	5	6
12:0	0.07±0.03	0.08±0.04	0.08±0.05	0.09±0.04	0.10±0.08	0.13±0.10
14:0	3.89±2.30	4.81±1.94	4.11±1.70	4.57±0.02	3.77±1.98	4.09±1.81
15:0	0.47±0.27	0.55±0.27	0.51±0.25	0.50±0.23	0.53±0.33	0.59±0.31
16:0	23.0±8.86	22.5±9.02	26.0±10.9	22.5±7.14	29.5±13.8	33.0±12.8
17:0	0.47±0.30	0.51±0.31	0.51±0.29	0.47±0.28	0.56±0.34	0.61±0.32
18:0	4.65±1.84	4.31±0.89	5.38±2.49	4.36±1.48	6.49±3.11	7.27±2.87
20:0	0.23±0.23	0.15±0.07	0.24±0.25	0.12±0.06	0.11±0.07	0.27±0.30
24:0	9.47±5.27	9.26±5.11	7.96±5.18	8.99±4.93	6.77±6.08	5.02±5.96
14:1	0.05±0.03	0.07±0.03	0.05±0.01	0.07±0.03	0.04±0.02	0.05±0.02
t916:1	0.19±0.07	0.23±0.08	0.22±0.07	0.21±0.08	0.23±0.11	0.26±0.10
16:1n-5	0.42±0.20	0.50±0.22	0.43±0.14	0.47±0.25	0.36±0.14	0.39±0.12
16:1n-7	4.04±1.17	5.09±0.88	4.45±1.10	4.93±0.82	3.65±1.24	3.96±1.20
Trans 18:1 isomers						
t9 18:1	0.09±0.04	0.07±0.02	0.08±0.02	0.01±0.01	0.09±0.03	0.10±0.03
t10 18:1	0.02±0.02	0.02±0.01	0.02±0.02	0.01±0.01	0.02±0.02	0.02±0.02
t11 18:1	0.01±0.01	0.04±0.06	0.02±0.02	0.06±0.04	0.03±0.02	0.01±0.01
t16 18:1	0.06±0.03	0.03±0.02	0.03±0.01	0.04±0.02	0.04±0.03	0.04±0.03
Cis 18:1						
c9 18:1	13.2±3.22	16.1±1.07	14.5±2.46	16.0±2.60	12.4±3.63	13.6±3.79
c11 18:1	2.90±0.51	2.87±0.56	2.97±0.93	2.82±0.47	2.92±0.76	3.18±1.14
c12 18:1	0.07±0.05	0.08±0.04	0.07±0.03	0.07±0.04	0.08±0.05	0.08±0.03
c13 18:1	0.82±0.44	0.95±0.41	0.84±0.30	0.91±0.46	0.80±0.36	0.89±0.35
c15 18:1	0.15±0.08	0.16±0.09	0.16±0.07	0.15±0.07	0.18±0.10	0.19±0.09

Fatty acid	1	2	3	4	5	6
Non-conjugated 18:2						
c9,t12 18:2	0.15±0.09	0.11±0.06	0.07±0.06	0.12±0.02	0.10±0.11	0.13±0.14
c9,c12 18:2	0.91±0.47	1.21±0.60	0.97±0.51	1.19±0.32	0.61±0.50	0.60±0.49
Conjugated 18:2						
c9,t11 18:2	0.03±0.04	0.03±0.03	0.02±0.03	0.02±0.01	0.05±0.05	0.04±0.05
Other t/t cla	1.27±0.42	1.70±0.49	1.26±0.56	1.46±0.70	0.92±0.30	0.86±0.36
18:3						
18:3n-6	0.09±0.04	0.11±0.03	0.07±0.02	0.10±0.02	0.07±0.02	0.05±0.04
18:3n-3	0.51±0.24	0.63±0.31	0.52±0.21	0.58±0.25	0.37±0.17	0.33±0.17
C20						
20:1	4.16±1.94	5.22±1.40	4.28±1.37	5.06±1.92	3.57±1.81	3.84±1.45
20:2n-6	0.83±0.65	0.91±0.49	0.95±0.53	0.88±0.55	1.13±0.86	1.24±0.86
20:3n-6	0.06±0.03	0.07±0.03	0.07±0.04	0.07±0.02	0.04±0.04	0.04±0.04
20:4n-6	0.74±0.27	0.60±0.25	0.62±0.26	0.61±0.28	0.58±0.43	0.49±0.40
20:5n-3	0.03±0.01	0.03±0.01	0.03±0.02	0.03±0.01	0.04±0.03	0.05±0.02
C22						
22:1n-9	0.55±0.24	0.76±0.26	0.67±0.26	0.66±0.25	0.51±0.27	0.64±0.34
22:2n-6	0.11±0.22	0.12±0.22	0.10±0.19	0.09±0.15	0.10±0.12	0.12±0.15
22:4n-6	0.05±0.03	0.05±0.03	0.05±0.03	0.05±0.02	0.04±0.04	0.03±0.03
22:5n-6	0.23±0.03	0.21±0.02	0.19±0.05	0.18±0.07	0.18±0.07	0.17±0.05
22:5n-3	2.22±1.26	2.27±1.29	1.89±1.20	2.16±1.18	1.63±1.49	1.22±1.39
22:6n-3	22.0±13.71	15.2±8.45	17.6±11.90	17.3±9.92	19.5±18.29	14.4±16.92
C24						
24:1n-9	0.87±0.49	1.04±0.37	0.93±0.29	0.97±0.36	0.94±0.49	1.02±0.42

*One or more of the fatty acid concentrations reported in this table might be erroneous (provided by service laboratory). Please refer to published manuscript for correct information.

Table C-7. Fatty acid profile (% of total fatty acids) of farmed salmon body zones (1= front dorsal; 2= front ventral; 3= Scottish dorsal; 4= Scottish ventral; 5= tail dorsal; 6= tail ventral) (n=5; mean ± standard deviation)

Fatty acid	1	2	3	4	5	6
12:0	0.10±0.04	0.11±0.03	0.08±0.02	0.11±0.03	0.10±0.06	0.08±0.01
14:0	4.70±1.65	5.54±1.40	4.20±0.61	4.74±0.60	3.97±1.50	3.83±0.31
15:0	0.41±0.15	0.45±0.13	0.35±0.05	0.38±0.05	0.37±0.17	0.32±0.02
16:0	22.4±9.35	22.3±6.88	19.0±2.60	18.8±2.48	22.8±9.58	18.1±1.03
17:0	0.38±0.15	0.41±0.12	0.33±0.03	0.35±0.04	0.36±0.12	0.31±0.03
18:0	5.49±2.42	5.36±1.78	4.60±0.58	4.59±0.67	5.78±2.34	4.49±0.24
20:0	0.23±0.14	0.20±0.05	0.12±0.07	0.17±0.01	0.14±0.06	0.14±0.02
24:0	6.95±3.86	5.29±4.10	7.82±1.72	7.15±2.40	7.42±4.09	8.31±0.52
14:1	0.04±0.02	0.06±0.01	0.04±0.03	0.06±0.01	0.04±0.01	0.05±0.01
t916:1	0.16±0.05	0.18±0.04	0.15±0.02	0.16±0.01	0.16±0.05	0.14±0.01
16:1n-5	0.24±0.02	0.28±0.03	0.23±0.02	0.25±0.02	0.22±0.02	0.23±0.01
16:1n-7	5.95±0.84	7.37±0.90	6.15±0.82	6.88±0.88	5.18±0.92	5.93±0.60
Trans 18:1 isomers						
t9 18:1	0.13±0.03	0.14±0.03	0.13±0.01	0.13±0.01	0.14±0.03	0.13±0.01
t10 18:1	0.05±0.01	0.05±0.01	0.04±0.00	0.05±0.00	0.04±0.01	0.04±0.01
t11 18:1	0.02±0.01	0.02±0.01	0.02±0.00	0.02±0.00	0.02±0.01	0.02±0.00
t16 18:1	0.02±0.02	0.03±0.02	0.02±0.01	0.02±0.00	0.03±0.03	0.02±0.01
Cis 18:1						
c9 18:1	19.8±2.80	23.9±3.59	20.4±3.09	22.6±3.80	17.9±3.44	19.8±2.03
c11 18:1	3.02±0.33	3.60±0.64	2.98±0.23	3.22±0.36	2.86±0.44	2.93±0.15
c12 18:1	0.06±0.03	0.07±0.02	0.05±0.00	0.06±0.01	0.06±0.04	0.05±0.00
c13 18:1	0.18±0.05	0.19±0.04	0.17±0.02	0.16±0.01	0.16±0.05	0.15±0.01
c15 18:1	0.13±0.06	0.13±0.05	0.10±0.02	0.11±0.00	0.12±0.06	0.10±0.01

Fatty acid	1	2	3	4	5	6
Non-conjugated 18:2						
c9,t12 18:2	0.24±0.08	0.26±0.05	0.23±0.05	0.23±0.04	0.26±0.16	0.23±0.04
c9,c12 18:2	7.22±3.74	7.90±4.03	8.68±0.94	9.60±1.02	6.26±3.27	8.95±0.56
Conjugated 18:2						
c9,t11 18:2	0.05±0.04	0.04±0.03	0.02±0.00	0.02±0.00	0.06±0.08	0.03±0.01
Other t/t cla	0.95±0.16	1.00±0.30	1.02±0.04	1.06±0.20	0.94±0.25	0.97±0.11
18:3						
18:3n-6	0.15±0.09	0.15±0.10	0.19±0.02	0.21±0.03	0.13±0.08	0.21±0.04
18:3n-3	1.38±0.67	1.37±0.80	1.60±0.25	1.70±0.34	1.23±0.56	1.66±0.10
C20						
20:1	1.18±0.17	1.47±0.25	1.20±0.10	1.38±0.14	1.06±0.15	1.14±0.09
20:2n-6	1.19±1.23	1.05±0.75	0.73±0.18	0.71±0.17	1.02±0.99	0.65±0.09
20:3n-6	0.19±0.11	0.18±0.09	0.23±0.03	0.23±0.03	0.20±0.09	0.25±0.02
20:4n-6	0.89±0.48	0.60±0.37	0.99±0.20	0.80±0.22	1.00±0.53	1.05±0.09
20:5n-3	0.05±0.02	0.06±0.02	0.05±0.01	0.05±0.01	0.06±0.03	0.05±0.01
C22						
22:1n-9	0.20±0.04	0.21±0.03	0.18±0.02	0.20±0.02	0.17±0.05	0.18±0.03
22:2n-6	0.02±0.00	0.02±0.00	0.02±0.00	0.02±0.00	0.02±0.00	0.02±0.00
22:4n-6	0.11±0.06	0.10±0.07	0.14±0.03	0.12±0.07	0.12±0.07	0.14±0.01
22:5n-6	0.22±0.13	0.16±0.12	0.25±0.06	0.21±0.07	0.25±0.14	0.27±0.03
22:5n-3	2.45±1.34	1.96±1.46	2.83±0.67	2.63±0.89	2.62±1.43	3.02±0.28
22:6n-3	12.0±7.50	6.69±5.17	13.6±4.47	9.63±3.99	15.7±9.40	14.9±2.83
C24						
24:1n-9	0.35±0.06	0.38±0.05	0.33±0.03	0.34±0.03	0.36±0.10	0.34±0.06

*One or more of the fatty acid concentrations reported in this table might be erroneous (provided by service laboratory). Please refer to published manuscript for correct information.

Table C-8. Fatty acid profile (% of total fatty acids) of GMO salmon body zones (1= front dorsal; 2= front ventral; 3= Scottish dorsal; 4= Scottish ventral; 5= tail dorsal; 6= tail ventral) (n=5; mean ± standard deviation)

Fatty acid	1	2	3	4	5	6
12:0	0.09±0.04	0.06±0.01	0.09±0.06	0.08±0.03	0.09±0.08	0.12±0.08
14:0	3.49±1.15	2.93±0.21	2.84±0.75	3.35±0.87	2.53±1.09	3.29±0.87
15:0	0.35±0.14	0.27±0.02	0.32±0.19	0.31±0.09	0.28±0.13	0.39±0.16
16:0	21.4±6.67	16.4±0.96	23.5±11.77	18.4±4.68	21.8±6.27	27.3±10.27
17:0	0.35±0.12	0.28±0.02	0.34±0.16	0.31±0.09	0.31±0.09	0.40±0.14
18:0	5.47±1.74	4.20±0.31	6.11±3.26	4.77±1.36	5.88±1.71	7.12±2.92
20:0	0.13±0.06	0.11±0.01	0.17±0.13	0.13±0.05	0.10±0.03	0.13±0.04
24:0	3.28±2.92	5.06±0.16	4.32±2.48	4.00±2.18	4.83±2.67	2.88±2.60
14:1	0.09±0.02	0.08±0.01	0.07±0.01	0.09±0.01	0.06±0.03	0.08±0.02
t916:1	0.15±0.04	0.12±0.01	0.13±0.02	0.14±0.04	0.12±0.04	0.14±0.03
16:1n-5	0.20±0.03	0.18±0.01	0.18±0.01	0.19±0.02	0.18±0.03	0.20±0.02
16:1n-7	6.40±1.08	5.97±0.42	4.90±0.68	6.44±0.84	4.65±1.36	5.56±0.76
Trans 18:1 isomers						
t9 18:1	0.29±0.07	0.26±0.01	0.26±0.02	0.28±0.05	0.25±0.06	0.29±0.05
t10 18:1	0.15±0.03	0.14±0.01	0.13±0.01	0.15±0.02	0.12±0.04	0.15±0.03
t11 18:1	0.06±0.02	0.05±0.00	0.05±0.01	0.05±0.01	0.12±0.16	0.06±0.01
t16 18:1	0.03±0.02	0.02±0.00	0.03±0.02	0.03±0.01	0.02±0.02	0.03±0.02
Cis 18:1						
c9 18:1	29.7±5.44	27.6±1.69	22.7±2.90	29.7±4.39	21.3±6.33	25.5±3.76
c11 18:1	3.05±0.64	2.71±0.12	2.51±0.16	2.92±0.51	2.53±0.59	2.92±0.39
c12 18:1	0.20±0.08	0.18±0.03	0.15±0.01	0.18±0.03	0.14±0.05	0.18±0.04
c13 18:1	0.18±0.05	0.15±0.01	0.17±0.06	0.17±0.04	0.16±0.06	0.19±0.04
c15 18:1	0.12±0.05	0.10±0.01	0.12±0.06	0.11±0.03	0.11±0.03	0.13±0.04

Fatty acid	1	2	3	4	5	6
Non-conjugated 18:2						
c9,t12 18:2	0.29±0.03	0.33±0.04	0.33±0.11	0.32±0.03	0.23±0.03	0.28±0.03
c9,c12 18:2	8.36±5.36	13.4±0.93	8.82±4.76	11.3±4.97	7.19±3.53	6.63±5.53
Conjugated 18:2						
c9,t11 18:2	0.07±0.03	0.07±0.01	0.10±0.08	0.08±0.02	0.06±0.03	0.09±0.04
Other t/t cla	0.79±0.12	0.94±0.10	0.94±0.42	0.90±0.12	0.62±0.11	0.72±0.19
18:3						
18:3n-6	0.16±0.13	0.29±0.04	0.18±0.10	0.22±0.12	0.15±0.07	0.12±0.11
18:3n-3	0.81±0.57	1.34±0.08	0.92±0.40	1.11±0.53	0.78±0.35	0.72±0.47
C20						
20:1	1.17±0.26	1.08±0.07	0.90±0.10	1.18±0.21	0.87±0.27	1.02±0.17
20:2n-6	1.27±0.75	0.74±0.07	1.30±1.26	1.03±0.59	1.14±1.06	1.74±1.33
20:3n-6	0.18±0.14	0.28±0.02	0.20±0.11	0.23±0.11	0.19±0.10	0.14±0.13
20:4n-6	0.60±0.48	0.82±0.15	0.87±0.44	0.65±0.32	1.11±0.58	0.65±0.50
20:5n-3	0.03±0.02	0.02±0.00	0.04±0.03	0.03±0.02	0.03±0.02	0.04±0.02
C22						
22:1n-9	0.17±0.05	0.14±0.01	0.14±0.02	0.16±0.04	0.16±0.09	0.18±0.06
22:2n-6	0.02±0.00	0.02±0.00	0.02±0.00	0.02±0.00	0.02±0.00	0.01±0.01
22:4n-6	0.08±0.06	0.13±0.01	0.10±0.05	0.10±0.06	0.10±0.05	0.06±0.06
22:5n-6	0.14±0.12	0.20±0.02	0.20±0.11	0.17±0.09	0.23±0.13	0.12±0.11
22:5n-3	1.24±1.04	1.93±0.07	1.54±0.84	1.56±0.82	1.65±0.88	1.02±0.89
22:6n-3	8.41±7.40	10.3±2.35	13.3±7.91	8.12±4.44	18.8±11.6	8.42±7.46
C24						
24:1n-9	0.32±0.10	0.26±0.02	0.31±0.11	0.29±0.07	0.30±0.08	0.36±0.11

*One or more of the fatty acid concentrations reported in this table might be erroneous (provided by service laboratory). Please refer to published manuscript for correct information.

VITAE

Sonia González Artola was born on November 3, 1973 in San Salvador, El Salvador. Sonia obtained her high-school diploma from the German School in San Salvador in 1992. She graduated in 1998 from the Jesuit University: Universidad Centroamericana "José Simeón Cañas" with a B.S in Agricultural Chemistry. Short after her graduation she started working for the government of El Salvador, in the Food Aid division (First Lady's Bureau) as chief of food quality control. In the fall of 1999, she was awarded with a Fulbright scholarship to obtain a Master of Science degree in Food Science and Technology at Virginia Polytechnic Institute and State University.

Sonia obtained her Masters degree in July, 2001. Her thesis title was: "Oxidation and Textural Characteristics of Butter and Ice Cream with Modified Fatty Acid Profiles".

She stayed at the Food Science and Technology Department to pursue a Doctoral degree.

WORK EXPERIENCE

Graduate Research Assistant, Food Science and Technology

Virginia Polytechnic Institute and State University

Blacksburg, Virginia

Head of the Department of Food Quality Control

Food Aid Division (DAA), First Lady's Bureau (Secretaria Nacional de la Familia)

Government of El Salvador

Laboratory Technician at the University's Food Quality Control Extension Lab

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PUBLICATIONS

S. Gonzalez, S.E. Duncan, S.F. O'Keefe, S.S. Sumner, and J.H. Herbein. 2003. Oxidation and Textural Characteristics of Butter and Ice Cream with Modified Fatty Acid Profiles. Journal of Dairy Science. 86:70-77

SKILLS AND CERTIFICATIONS

- Seafood HACCP certification course (FDA/AFDO). Hampton VA, Summer 2003
- Human Subjects Protection Training. Blacksburg, VA, 2000, 2001,2002, 2003.
- Writing skills: Proposal submitted in 2001 to obtain funds for a Ph.D program: "Identification of Off-Aroma Compounds in Dry Cat Food (Purina Cat Chow) at Specific Storage Conditions and Impact On Palatability Of The Product"

AWARDS RECEIVED

- Graduate Student of the year, FST Department, May 2004
- Graduate Student Assembly Travel Award, 2001
- Fulbright Scholarship to pursue a M.S. in Food Science at Virginia Polytechnic Institute and State University, US, by Institute of International Education, IIE, 1999-2001

ORAL PRESENTATIONS

S. Gonzalez, G.J. Flick, S.E. Duncan, S.F. O'Keefe, S.R. Craig and E. McLean. "Chemical, physical and sensorial differences between farmed yellow perch (Perca flavescens) fed diets varying in protein concentration". 5th International Conference on Recirculating Aquaculture. July, 2004, Roanoke, Virginia.

S. Gonzalez, G.J. Flick, S.E. Duncan, S.F. O'Keefe, S.R. Craig, E. McLean, M. Schwarz and D. Kaufmann. "Variations in chemical, physical and sensorial properties of aquacultured and wild southern flounder (*Paralichthys lethostigma*)". Aquaculture 2004. March 1-5 2004, Honolulu, Hawaii.

S. Gonzalez, G.J. Flick, S.R. Craig, E. McLean, and M. Schwarz. "Reevaluation of the protein requirement of southern flounder (*Paralichthys lethostigma*)". Aquaculture America 2003. February 18-21,2003, Louisville, Kentucky.

S. Gonzalez, G.J. Flick, L. Douglas, E. McLean, S. Smith and S.R. Craig. "Composition and shelf-life of yellow perch (*Perca flavescens*)". Aquaculture America 2003. February 18-21, 2003, Louisville, Kentucky.

S. Gonzalez, S.E. Duncan, S.F. O'Keefe, S.S. Sumner, and J.H. Herbein. 2003. "Oxidation and Textural Characteristics of Butter and Ice Cream with Modified Fatty Acid Profiles". ADSA 2001. Indianapolis, Indiana.

POSTER PRESENTATIONS

S. Gonzalez, G.J. Flick, S.E. Duncan, S.F. O'Keefe, S.R. Craig, E. McLean, and M. Schwarz. "Chemical, physical and sensorial differences in cultured southern flounder (*Paralichthys lethostigma*) fed commercial and crabmeal-based diets". Aquaculture 2004. March 1-5 2004, Honolulu, Hawaii.

S. Gonzalez, S.E. Duncan, S.S. Sumner, S.F. O'Keefe and J.H. Herbein. "Evaluation of Quality Properties of Butter and Ice Cream with a High Content of Linoleic and Oleic Acid". 17TH Annual Research Symposium of Virginia Tech. Blacksburg, VA, March 26, 2001