



# CERTIFICATION

**AOAC® Performance Tested<sup>SM</sup>**

Certificate No.

**011804**

The AOAC Research Institute hereby certifies the test kit known as:

**Wheat/Gluten ELISA Kit**

manufactured by

**Morinaga Institute of Biological Science, Inc.**

**SAHIURA 2-1-16**

**KANAZAWA-KU**

**YOKOHAMA-SHI**

**236-0003, Japan**

This method has been evaluated in the AOAC® *Performance Tested Methods*<sup>SM</sup> Program and found to perform as stated by the manufacturer contingent to the comments contained in the manuscript. This certificate means that an AOAC® Certification Mark License Agreement has been executed which authorizes the manufacturer to display the AOAC *Performance Tested*<sup>SM</sup> certification mark along with the statement - "THIS METHOD'S PERFORMANCE WAS REVIEWED BY AOAC RESEARCH INSTITUTE AND WAS FOUND TO PERFORM TO THE MANUFACTURER'S SPECIFICATIONS" - on the above mentioned method for a period of one calendar year from the date of this certificate (November 22, 2020 – December 31, 2021). Renewal may be granted at the end of one year under the rules stated in the licensing agreement.

A handwritten signature in black ink that reads "Scott Coates".

\_\_\_\_\_  
Scott Coates, Senior Director

Signature for AOAC Research Institute

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November 22, 2020

Date

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**SUBMITTING COMPANY**

Morinaga Institute of Biological Science, Inc.  
SAHIURA 2-1-16  
KANAZAWA-KU  
YOKOHAMA-SHI  
236-0003, Japan

**KIT NAME(S)**

Wheat/Gluten ELISA Kit

**CATALOG NUMBERS**

M2103

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**APPLICABILITY OF METHOD**

Target analyte – wheat protein/gluten (from wheat, barley, and rye cereals)

Matrixes – ice cream, water, soup, cider, rice flour, gluten-free bread

**Performance claims - Mean recovery and precision**

- I. Overnight extraction and low range assay: 83 ± 3.4 % for water spiked with gliadin, 79 ± 2.3 % for ice cream spiked with gliadin, 88 ± 0.8 % for soup spiked with gliadin, 110 ± 6.4% for water spiked with wheat flour, 108 ± 10.3 % for cider spiked with wheat flour, and 121 ± 6.4% for rice flour.
- II. Short time extraction and low range assay: 83 ± 1.9 % for water spiked with gliadin, 80 ± 2.8 % for ice cream spiked with gliadin, 84 ± 2.1 % for soup spiked with gliadin, 111 ± 10.8% for water spiked with wheat flour, 107 ± 9.2 % for cider spiked with wheat flour, and 130 ± 11.2% for rice flour.
- III. Overnight extraction and low range assay: 86 ± 2.0 % for water spiked with gliadin, 85 ± 1.2 % for ice cream spiked with gliadin, 88 ± 1.7 % for soup spiked with gliadin, 119 ± 4.2% for water spiked with wheat flour, 121 ± 1.8 % for cider spiked with wheat flour, and 130 ± 4.3% for rice flour.
- IV. Short time extraction and high range assay: 86 ± 1.2 % for water spiked with gliadin, 85 ± 1.4 % for ice cream spiked with gliadin, 88 ± 1.7 % for soup spiked with gliadin, 122 ± 3.5% for water spiked with wheat flour, 121 ± 4.0 % for cider spiked with wheat flour, and 141 ± 2.7% for rice flour.

**Mean limit of detection:**

- I. Overnight extraction and low range assay: 0.08 ppm for water, 0.04 ppm for ice cream, 0.07 ppm for soup, 0.03 ppm for cider, and 0.05 ppm for rice flour.
- II. Short time extraction and low range assay: 0.05 ppm for water, 0.03 ppm for ice cream, 0.05 ppm for soup, 0.02 ppm for cider, and 0.07 ppm for rice flour.
- III. Overnight extraction and high range assay: 0.03 ppm for water, 0.03 ppm for ice cream, 0.15 ppm for soup, 0.16 ppm for cider, and 0.14 ppm for rice flour.
- IV. Short time extraction and high range assay: 0.13 ppm for water, 0.05 ppm for ice cream, 0.15 ppm for soup, 0.10 ppm for cider, and 0.07 ppm for rice flour.

**ORIGINAL CERTIFICATION DATE**

January 29, 2018

**CERTIFICATION RENEWAL RECORD**

Renewed annually through December 2021

**METHOD MODIFICATION RECORD**

1. November 2018 Level 1

**SUMMARY OF MODIFICATION**

1. Editorial edits to insert: add logo, correct typographical errors

Under this AOAC® *Performance Tested*<sup>SM</sup> License Number, 011804 this method is distributed by:

NONE

Under this AOAC® *Performance Tested*<sup>SM</sup> License Number, 011804 this method is distributed as:

NONE

**PRINCIPLE OF THE METHOD (1)**

The Wheat/Gluten ELISA kit is a sandwich enzyme linked immunosorbent assay based on anti-gliadin polyclonal antibody. Gliadin is extracted from food samples by heating in boiling water for 10 minutes or shaking overnight with extraction buffer, which includes a detergent and reducing agent. A complex of antibody, antigen, and enzyme-conjugated antibody is formed by a two-step reaction and color development in the presence of enzyme with the addition of substrate. Absorbance is measured at a wavelength of 450 nm after the addition of a stop solution. The concentration of wheat protein/gluten, corresponding to the measured absorbance, can be determined by preparing a wheat protein standard solution curve.

**DISCUSSION OF THE VALIDATION STUDY (1)**

The Wheat/Gluten ELISA kit showed sufficient performance for wheat/ gluten detection in all of the foods tested. In the cross reactivity study, 37 of the 38 compounds showed negative results and only oat showed a false positive, however, the reactivity of oat was much lower than the threshold of gluten free (20 ppm). It is difficult to get pure oats because of contamination from agricultural distribution. Our oats may be have been naturally contaminated with gluten. The protein recovery rate of wheat, rye, and barley can be measured roughly to the same degree suggesting that the Wheat/ Gluten ELISA kit is suitable for gluten monitoring. In the matrix study, recovery was sufficient among the matrixes, regardless of the assay range and extraction method. In addition, the recovery rate in incurred bread was close to the known concentration. The Extraction Buffer contains a surfactant and a reducing agent to increase the efficiency of protein extraction so it should be possible to measure wheat/ gluten in processed foods like bread. Almost all LODs were below the lowest concentration of the standard. The kit was also determined to be robust and stable.

**Table 1 Data summary of water samples spiked with gluten (Overnight extraction + Low range assay) (1)**

Gluten contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.96	2.40	5.75	9.60	13.44
Mean*, ppm	0.00	0.76	1.94	4.84	8.22	11.70
Mean recovery, %	NA	79	81	84	86	87
Bias, ppm	0.00	-0.20	-0.46	-0.91	-1.38	-1.74
SD	0.00	0.03	0.11	0.24	0.44	0.47
RSDr, %	NA	3.9	5.7	5.0	5.4	4.0

\*10 individually extracted samples were tested for each concentration.

**Table 2 Data summary of water samples spiked with gluten (Short time extraction + Low range assay) (1)**

Gluten contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.96	2.40	5.75	9.60	13.44
Mean*, ppm	0.00	0.77	1.97	4.85	7.94	11.29
Mean recovery, %	NA	80	82	84	83	84
Bias, ppm	0.00	-0.19	-0.43	-0.90	-1.66	-2.15
SD	0.00	0.05	0.12	0.27	0.46	0.74
RSDr, %	NA	6.5	6.1	5.6	5.8	6.6

\*10 individually extracted samples were tested for each concentration.

**Table 3 Data summary of water samples spiked with gluten (Overnight extraction + High range assay) (1)**

Gluten contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	9.60	19.19	28.79	38.40	48.00
Mean*, ppm	0.04	8.03	16.05	24.86	33.68	42.04
Mean recovery, %	NA	84	84	86	88	88
Bias, ppm	0.04	-1.57	-3.14	-3.93	-4.72	-5.96
SD	0.09	0.52	0.99	1.60	1.55	2.41
RSDr, %	NA	6.5	6.2	6.4	4.6	5.7

\*10 individually extracted samples were tested for each concentration.

**Table 4 Data summary of water samples spiked with gluten (Short time extraction + High range assay) (1)**

Gluten contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	9.60	19.19	28.79	38.40	48.00
Mean*, ppm	0.01	8.32	16.31	24.71	32.69	42.23
Mean recovery, %	NA	87	85	86	85	88
Bias, ppm	0.01	-1.28	-2.88	-4.08	-5.71	-5.77
SD	0.02	0.40	0.78	1.54	1.51	2.31
RSDr, %	NA	4.8	4.8	6.2	4.6	5.5

\*10 individually extracted samples were tested for each concentration.

**Table 5 Data summary of ice cream samples spiked with gluten (Overnight extraction + Low range assay) (1)**

Gluten contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.96	2.40	5.75	9.60	13.44
Mean*, ppm	0.01	0.73	1.91	4.69	7.59	10.93
Mean recovery, %	NA	76	80	82	79	81
Bias, ppm	0.01	-0.23	-0.49	-1.06	-2.01	-2.51
SD	0.01	0.06	0.10	0.28	0.36	0.44
RSDr, %	NA	8.2	5.2	6.0	4.7	4.0

\*10 individually extracted samples were tested for each concentration.

**Table 6 Data summary of ice cream samples spiked with gluten (Short time extraction + Low range assay) (1)**

Gluten contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.96	2.40	5.75	9.60	13.44
Mean*, ppm	0.00	0.73	1.91	4.77	7.80	11.00
Mean recovery, %	NA	76	80	83	81	82
Bias, ppm	0.00	-0.23	-0.49	-0.98	-1.80	-2.44
SD	0.01	0.03	0.11	0.26	0.51	0.68
RSDr, %	NA	4.1	5.8	5.5	6.5	6.2

\*10 individually extracted samples were tested for each concentration.

**Table 7 Data summary of ice cream samples spiked with gluten (Overnight extraction + High range assay) (1)**

Gluten contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	9.60	19.19	28.79	38.40	48.00
Mean*, ppm	0.00	8.10	15.96	24.41	32.95	41.43
Mean recovery, %	NA	84	83	85	86	86
Bias, ppm	0.00	-1.50	-3.23	-4.38	-5.45	-6.57
SD	0.01	0.51	1.08	1.86	2.25	2.23
RSDr, %	NA	6.3	6.8	7.6	6.8	5.4

\*10 individually extracted samples were tested for each concentration.

**Table 8 Data summary of ice cream samples spiked with gluten (Short time extraction + High range assay) (1)**

Gluten contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	9.60	19.19	28.79	38.40	48.00
Mean*, ppm	0.01	8.12	15.94	24.22	33.13	41.34
Mean recovery, %	NA	85	83	84	86	86
Bias, ppm	0.01	-1.48	-3.25	-4.57	-5.27	-6.66
SD	0.02	0.67	0.74	1.63	1.71	3.19
RSDr, %	NA	8.3	4.6	6.7	5.2	7.7

\*10 individually extracted samples were tested for each concentration.

**Table 9 Data summary of soup samples spiked with gluten (Overnight extraction + Low range assay) (1)**

Gluten contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.96	2.40	5.75	9.60	13.44
Mean*, ppm	0.06	0.85	2.09	5.00	8.36	11.93
Mean recovery, %	NA	89	87	87	87	89
Bias, ppm	0.06	-0.11	-0.31	-0.75	-1.24	-1.51
SD	0.02	0.03	0.12	0.27	0.45	0.70
RSDr, %	NA	3.5	5.7	5.4	5.4	5.9

\*10 individually extracted samples were tested for each concentration.

**Table 10 Data summary of soup samples spiked with gluten (Short time extraction + Low range assay) (1)**

Gluten contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.96	2.40	5.75	9.60	13.44
Mean*, ppm	0.05	0.84	2.06	4.71	7.93	11.35
Mean recovery, %	NA	88	86	82	83	84
Bias, ppm	0.05	-0.12	-0.34	-1.04	-1.67	-2.09
SD	0.02	0.04	0.16	0.29	0.42	0.59
RSDr, %	NA	4.8	7.8	6.2	5.3	5.2

\*10 individually extracted samples were tested for each concentration.

**Table 11 Data summary of soup samples spiked with gluten (Overnight extraction + High range assay) (1)**

Gluten contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	9.60	19.19	28.79	38.40	48.00
Mean*, ppm	0.03	8.21	16.94	25.00	33.93	43.28
Mean recovery, %	NA	86	88	87	88	90
Bias, ppm	0.03	-1.39	-2.25	-3.79	-4.47	-4.72
SD	0.04	0.45	1.14	1.70	2.15	3.55
RSDr, %	NA	5.5	6.7	6.8	6.3	8.2

\*10 individually extracted samples were tested for each concentration.

**Table 12 Data summary of soup samples spiked with gluten (Short time extraction + High range assay) (1)**

Gluten contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	9.60	19.19	28.79	38.40	48.00
Mean*, ppm	0.03	8.54	16.37	25.59	33.40	42.85
Mean recovery, %	NA	89	85	89	87	89
Bias, ppm	0.03	-1.06	-2.82	-3.20	-5.00	-5.15
SD	0.04	0.63	1.18	1.09	1.53	1.53
RSDr, %	NA	7.4	7.2	4.3	4.6	3.6

\*10 individually extracted samples were tested for each concentration.

**Table 13 Data summary of water samples spiked with wheat protein (Overnight extraction + Low range assay) (1)**

Wheat protein contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.89	2.23	5.34	8.90	12.46
Mean*, ppm	0.01	0.88	2.40	6.11	10.22	13.85
Mean recovery, %	NA	99	108	114	115	111
Bias, ppm	0.01	-0.01	0.17	0.77	1.32	1.39
SD	0.03	0.07	0.12	0.47	0.53	0.88
RSDr, %	NA	8.0	5.0	7.7	5.2	6.4

\*10 individually extracted samples were tested for each concentration.

**Table 14 Data summary of water samples spiked with wheat protein (Short time extraction + Low range assay) (1)**

Wheat protein contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.89	2.23	5.34	8.90	12.46
Mean*, ppm	0.01	0.83	2.47	6.40	10.54	13.98
Mean recovery, %	NA	93	111	120	118	112
Bias, ppm	0.01	-0.06	0.24	1.06	1.64	1.52
SD	0.02	0.07	0.18	0.46	0.82	0.91
RSDr, %	NA	8.4	7.3	7.2	7.8	6.5

\*10 individually extracted samples were tested for each concentration.

**Table 15 Data summary of water samples spiked with wheat protein (Overnight extraction + High range assay) (1)**

Wheat protein contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	8.90	17.81	26.70	35.60	44.51
Mean*, ppm	0.00	10.03	21.84	32.63	42.96	52.37
Mean recovery, %	NA	113	123	122	121	118
Bias, ppm	0.00	1.13	4.03	5.93	7.36	7.86
SD	0.01	0.78	0.96	1.52	1.57	1.27
RSDr, %	NA	7.8	4.4	4.7	3.7	2.4

\*10 individually extracted samples were tested for each concentration.

**Table 16 Data summary of water samples spiked with wheat protein (Short time extraction + High range assay) (1)**

Wheat protein contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	8.90	17.81	26.70	35.60	44.51
Mean*, ppm	0.02	10.46	21.58	33.32	44.85	53.34
Mean recovery, %	NA	118	121	125	126	120
Bias, ppm	0.02	1.56	3.77	6.62	9.25	8.83
SD	0.04	0.46	1.32	1.78	2.09	4.05
RSDr, %	NA	4.4	6.1	5.3	4.7	7.6

\*10 individually extracted samples were tested for each concentration.

**Table 17 Data summary of cider samples spiked with wheat protein (Overnight extraction + Low range assay) (1)**

Wheat protein contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.89	2.23	5.34	8.90	12.46
Mean*, ppm	0.00	0.83	2.32	5.80	10.76	13.96
Mean recovery, %	NA	93	104	109	121	112
Bias, ppm	0.00	-0.06	0.09	0.46	1.86	1.50
SD	0.00	0.10	0.15	0.50	0.49	0.70
RSDr, %	NA	12.0	6.5	8.6	4.6	5.0

\*10 individually extracted samples were tested for each concentration.

**Table 18 Data summary of cider samples spiked with wheat protein (Short time extraction + Low range assay) (1)**

Wheat protein contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.89	2.23	5.34	8.90	12.46
Mean*, ppm	0.00	0.83	2.39	5.59	10.48	14.05
Mean recovery, %	NA	93	107	105	118	113
Bias, ppm	0.00	-0.06	0.16	0.25	1.58	1.59
SD	0.01	0.05	0.18	0.46	0.61	1.15
RSDr, %	NA	6.0	7.5	8.2	5.8	8.2

\*10 individually extracted samples were tested for each concentration.

**Table 19 Data summary of cider samples spiked with wheat protein (Overnight extraction + High range assay) (1)**

Wheat protein contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	8.90	17.81	26.70	35.60	44.51
Mean*, ppm	0.02	10.61	21.60	33.05	42.69	54.19
Mean recovery, %	NA	119	121	124	120	122
Bias, ppm	0.02	1.71	3.79	6.35	7.09	9.68
SD	0.05	0.54	1.18	1.99	2.80	2.76
RSDr, %	NA	5.1	5.5	6.0	6.6	5.1

\*10 individually extracted samples were tested for each concentration.

**Table 20 Data summary of cider samples spiked with wheat protein (Short time extraction + High range assay) (1)**

Wheat protein contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	8.90	17.81	26.70	35.60	44.51
Mean*, ppm	0.02	10.21	21.18	32.36	44.65	54.45
Mean recovery, %	NA	115	119	121	125	122
Bias, ppm	0.02	1.31	3.37	5.66	9.05	9.94
SD	0.03	0.42	1.35	1.99	2.73	3.33
RSDr, %	NA	4.1	6.4	6.1	6.1	6.1

\*10 individually extracted samples were tested for each concentration.

**Table 21 Data summary of rice flour samples spiked with wheat protein (Overnight extraction + Low range assay) (1)**

Wheat protein contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.89	2.23	5.34	8.90	12.46
Mean*, ppm	0.12	0.99	2.70	6.57	11.46	14.80
Mean recovery, %	NA	111	121	123	129	119
Bias, ppm	0.12	0.10	0.47	1.23	2.56	2.34
SD	0.04	0.10	0.23	0.21	0.55	0.64
RSDr, %	NA	10.1	8.5	3.2	4.8	4.3

\*10 individually extracted samples were tested for each concentration.

**Table 22 Data summary of rice flour samples spiked with wheat protein (Short time extraction + Low range assay) (1)**

Wheat protein contamination level, ppm	0	1	2.5	6	10	14
Known concentration, ppm	0.00	0.89	2.23	5.34	8.90	12.46
Mean*, ppm	0.02	0.99	2.87	7.21	12.59	16.73
Mean recovery, %	NA	111	129	135	141	134
Bias, ppm	0.02	0.10	0.64	1.87	3.69	4.27
SD	0.02	0.10	0.28	0.49	0.86	0.98
RSDr, %	NA	10.1	9.8	6.8	6.8	5.9

\*10 individually extracted samples were tested for each concentration.

**Table 23 Data summary of rice flour samples spiked with wheat protein (Overnight extraction + High range assay) (1)**

Wheat protein contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	8.90	17.81	26.70	35.60	44.51
Mean*, ppm	0.03	11.09	24.28	34.50	47.00	57.59
Mean recovery, %	NA	125	136	129	132	129
Bias, ppm	0.03	2.19	6.47	7.80	11.40	13.08
SD	0.04	0.73	1.24	2.29	3.81	2.62
RSDr, %	NA	6.6	5.1	6.6	8.1	4.5

\*10 individually extracted samples were tested for each concentration.

**Table 24 Data summary of rice flour samples spiked with wheat protein (Short time extraction + High range assay) (1)**

Wheat protein contamination level, ppm	0	10	20	30	40	50
Known concentration, ppm	0.00	8.90	17.81	26.70	35.60	44.51
Mean*, ppm	0.01	12.66	24.40	38.16	51.16	62.41
Mean recovery, %	NA	142	137	143	144	140
Bias, ppm	0.01	3.76	6.59	11.46	15.56	17.90
SD	0.02	0.92	1.99	2.15	3.98	3.09
RSDr, %	NA	7.3	8.2	5.6	7.8	5.0

\*10 individually extracted samples were tested for each concentration.

**Table 25 LOD and LOQ determination of water samples spiked with gluten (1)**

Extraction method	Overnight	Short time	Overnight	Short time
Assay range	Low	Low	High	High
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.04
	0.08	0.00	0.00	0.00
	0.00	0.05	0.00	0.12
	0.00	0.00	0.00	0.01
	0.00	0.00	0.00	0.00
	0.01	0.00	0.00	0.00
	0.01	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.03	0.00
Mean(n=10), ppm	0.01	0.01	0.00	0.02
Sr	0.025	0.016	0.009	0.038
LOD, ppm	0.08	0.05	0.03	0.13
LOQ, ppm	0.25	0.16	0.09	0.38

**Table 26 LOD and LOQ determination of ice cream samples spiked with gluten (1)**

Extraction method	Overnight	Short time	Overnight	Short time
Assay range	Low	Low	High	High
	0.01	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.03	0.00
	0.02	0.00	0.00	0.00
	0.00	0.00	0.00	0.03
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.04	0.03	0.00	0.04
Mean(n=10), ppm	0.01	0.00	0.00	0.01
Sr	0.013	0.009	0.009	0.015
LOD, ppm	0.04	0.03	0.03	0.05
LOQ, ppm	0.13	0.09	0.09	0.15

**Table 27 LOD and LOQ determination of soup samples spiked with gluten (1)**

Extraction method	Overnight	Short time	Overnight	Short time
Assay range	Low	Low	High	High
	0.05	0.04	0.00	0.00
	0.06	0.07	0.07	0.06
	0.10	0.05	0.00	0.08
	0.08	0.06	0.07	0.08
	0.04	0.05	0.00	0.00
	0.05	0.05	0.00	0.00
	0.05	0.03	0.00	0.00
	0.05	0.06	0.00	0.00
	0.03	0.04	0.00	0.00
	0.08	0.08	0.12	0.11
Mean(n=10), ppm	0.06	0.05	0.03	0.03
Sr	0.021	0.015	0.044	0.044
LOD, ppm	0.07	0.05	0.15	0.15
LOQ, ppm	0.21	0.15	0.44	0.44

**Table 40 LOD and LOQ determination of cider samples spiked with wheat protein (1)**

Extraction method	Overnight	Short time	Overnight	Short time
Assay range	Low	Low	High	High
	0.00	0.00	0.00	0.00
	0.02	0.00	0.00	0.00
	0.00	0.00	0.10	0.04
	0.00	0.00	0.13	0.07
	0.02	0.00	0.00	0.07
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.00	0.02	0.00	0.00
Mean(n=10), ppm	0.00	0.00	0.02	0.02
Sr	0.008	0.006	0.049	0.030
LOD, ppm	0.03	0.02	0.16	0.10
LOQ, ppm	0.08	0.06	0.49	0.30

Table 41 LOD and LOQ determination of rice flour samples spiked with wheat protein (1)

Extraction method	Overnight	Short time	Overnight	Short time
Assay range	Low	Low	High	High
	0.00	0.00	0.00	0.00
	0.04	0.07	0.05	0.00
	0.04	0.00	0.04	0.02
	0.01	0.02	0.04	0.02
	0.01	0.00	0.13	0.07
	0.01	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
	0.01	0.03	0.00	0.00
	0.01	0.03	0.00	0.00
	0.01	0.01	0.03	0.00
Mean(n=10), ppm	0.01	0.02	0.03	0.01
Sr	0.014	0.023	0.041	0.022
LOD, ppm	0.05	0.07	0.14	0.07
LOQ, ppm	0.14	0.22	0.41	0.22

## REFERENCES CITED

1. Saito, E., Doi, H., Kurihara, K., Kato, K., Aburatani, K., Shoji, M., and Naka, Y., Validation of the Wheat/Gluten ELISA Kit , AOAC® *Performance Tested<sup>SM</sup>* certification number 011804.
2. Osborne, T.B. (1924), *The Vegetable Proteins*, Longmans green and Co., London, UK
3. Holme, J (1966), *The Bakers Digest*, 40, 38-42
4. Shibata, S. and Nakae, T. (Ed.) (1990), *Komugikoseihinno chisiki [Knowledge of wheat products]*, Saiwai Shobo, Japan
5. Nihon mugirui kenkyukai (Ed.) (1964), *Komugiko-sono genryo to kakohin [Wheat-material and processing]*, Yuni Ato, Japan
6. CODEX STANDARD FOR FOODS FOR SPECIAL DIETARY USE FOR PERSONS INTOLERANT TO GLUTEN CODEX STAN 118-1979, revised 2008
7. *Official Methods of Analysis* (2012), Appendix M: Validation Procedures for Quantitative Food Allergen ELISA Method: Community Guidance and Best Practices, AOAC INTERNATIONAL
8. Koerner T.B., Abbott M, Godefroy S.B., Popping B., Yeung J.M., Diaz-Amigo C., Roberts J., Taylor S.L., Baumert J.L., Ulberth F., Wehling P., Koehler P. (2013). s, *J. AOAC Int.* 96, 1033-1040.
9. R. Matsuda, Y. Yoshioka, H. Akiyama, K. Aburatani, Y. Watanabe, T. Matsumoto, N. Morishita, H. Sato, T. Mishima, R. Gamo, Y. Kihira, T. Maitani (2006), *J. AOAC Int.* Vol. 89, 1600-1608
10. Doi H., Takahashi M., Yamamoto T., Shibata H. (2010), *Japanese Journal of Food Chemistry and Safety*, 17, 12-17