

Table S1. The quality characteristics of whole eggs of Japanese quails depending on the dose and fermentation of rapeseed meal applied

Group			C	RM5	RM10	RM15	FRM5	FRM10	FRM15	Total	SEM
Trait		term (wks)									
Egg weight (g)		0	9.72 _w	10.1 _w	9.82 _w	9.35 _w	9.48 _w	9.92 _w	9.94 _w	9.97 _w	0.101
		4	10.38 ^{bc} _w	9.81 ^a _w	10.01 ^{abc} _w	10.11 ^{abc} _x	10.09 ^{abc} _x	10.53 ^c _x	9.93 ^{ab} _w	10.12 _x	0.073
		8	11.25 ^b _x	10.70 ^{ab} _x	10.83 ^{ab} _x	11.04 ^a _{xy}	11.14 ^b _y	10.99 ^{ab} _{xy}	11.09 ^b _x	10.86 _y	0.128
		12	11.54 ^b _x	10.95 ^{ab} _x	11.28 ^{ab} _x	11.12 ^{ab} _y	11.08 ^{ab} _y	11.30 ^{ab} _y	11.52 ^b _x	11.25 _z	0.066
		Total	10.79 ^b	10.42 ^{ab}	10.57 ^b	10.14 ^a	10.57 ^b	10.75 ^b	10.63 ^b		0.054
Specific gravity		0	1.072 _x	1.077 _y	1.076 _x	1.075 _y	1.074 _x	1.074	1.074 _y	1.075 _y	0.0007
		4	1.069 ^{ab} _{wx}	1.069 ^{ab} _{wx}	1.067 ^a _w	1.071 ^{ab} _x	1.070 ^{ab} _x	1.068 ^{ab}	1.073 ^b _{xy}	1.070 _x	0.0007
		8	1.065 ^{ab} _w	1.073 ^b _{xy}	1.068 ^{ab} _w	1.069 ^{ab} _{wx}	1.062 ^a _w	1.068 ^{ab}	1.064 ^{ab} _w	1.067 _w	0.0012
		12	1.069 _{wx}	1.068 _w	1.068 _w	1.067 _x	1.067 _{wx}	1.068	1.068 _{wx}	1.070 _x	0.0005
		Total	1.068 ^{ab}	1.071 ^b	1.069 ^{ab}	1.070 ^{ab}	1.067 ^a	1.069 ^{ab}	1.070 ^{ab}		0.000
Proportions (%)	eggshell	0	12.80 ^a _w	14.50 ^b _x	15.72 ^b _x	14.34 ^b	14.87 ^b _x	14.26 ^{ab} _{wx}	15.17 ^b _y	14.37	0.201
		4	14.2 ^{ab} _x	14.49 ^b _x	13.43 ^{ab} _y	13.01 ^a	13.71 ^{ab} _x	13.67 ^{ab} _{wx}	13.79 ^{ab} _x	13.77	0.170
		8	14.51 ^a _x	13.19 ^a _w	13.89 ^a _y	15.61 ^b	13.47 ^a _x	13.40 ^a _w	12.84 ^a _w	14.67	1.835
		12	13.78 _{wx}	13.72 _{wx}	13.88 _y	13.78	14.24 _{wx}	14.51 _x	13.96 _{xy}	13.98	0.126
		Total	13.91 ^a	13.93 ^a	14.02 ^a	18.20 ^b	13.97 ^a	13.93 ^a	13.92 ^a		0.499
	albumen	0	61.39 ^c _y	57.58 ^a	57.54 ^a	59.49 ^{abc} _y	59.88 ^{abc} _x	60.57 ^{bc} _y	58.37 ^{bc} _y	59.32 _x	0.384
		4	57.10 _{wx}	57.12	58.18	58.72 _y	57.59 _{wx}	57.82 _x	57.37 _{xy}	57.70 _{wy}	0.219
		8	58.45 ^b _{xy}	57.86 ^b	58.57 ^b	53.00 ^a _w	60.15 ^b _x	58.22 ^b _x	55.84 ^b _{wx}	54.71 _w	2.821
		12	53.78 _w	55.44	55.80	55.66 _x	53.72 _w	55.13 _w	54.96 _w	54.92 _w	0.281
		Total	57.45	56.94	57.55	52.00	57.58	57.72	56.62		0.773
	yolk	0	25.81 ^{ab} _w	27.92 ^b _w	26.73 ^{ab} _w	26.18 ^{ab}	25.25 ^a _w	26.46 ^{ab} _w	26.45 ^{ab} _w	26.39 _w	0.320
		4	28.63 _w	28.40 _w	28.39 _x	28.27	28.69 _x	28.51 _w	28.84 _x	28.53 _w	0.157
		8	29.18 _w	30.20 _x	30.83 _y	31.08	29.91 _{xy}	28.39 _w	31.32 _y	35.15 _z	3.618
		12	32.44 ^b _x	30.84 ^{ab} _x	30.32 ^a _y	30.56 ^a	30.03 ^{ab} _y	30.36 ^a _x	31.00 ^{ab} _y	31.10 _{wx}	0.229
		Total	29.23 ^a	29.47 ^a	29.39 ^a	37.74 ^b	29.44 ^a	28.59 ^a	29.46 ^a		0.988

^{a-d} means in the same row (group) significant at $p \leq 0.05$; _{w-z} means in the same column (terms) significant at $p \leq 0.05$; SEM+ standard error of mean; C - control group; RM5, RM10, RM15- 5%, 10%, 15% of post-extraction rapeseed meal respectively; FRM5, FRM10, FRM15- 5%, 10%, 15% of fermented post-extraction rapeseed meal respectively

Table S2. The quality characteristics of yolk of Japanese quails eggs depending on the dose and fermentation of rapeseed meal applied

Group		C	RM5	RM10	RM15	FRM5	FRM10	FRM15	Total	SEM
Trait	term (wks)									
Colour (pts)	0	9.80 ^b _x	9.46 ^{ab} _{wx}	8.80 ^a _w	8.66 ^a _w	9.27 ^{ab} _w	9.07 ^{ab} _w	8.86 ^a _w	9.07 _w	0.122
	4	10.05 ^a _x	10.50 ^{bc} _y	10.80 ^c _y	10.80 ^c _y	10.60 ^{bc} _x	10.70 ^{bc} _y	10.30 ^{ab} _x	10.54 _z	0.055
	8	8.95 ^a _w	9.55 ^{ab} _x	10.05 ^b _c _x	10.45 ^c _y	10.25 ^c _x	10.00 ^{bc} _x	10.45 ^c _x	9.95 _y	0.091
	12	9.05 ^{ab} _w	8.90 ^a _w	10.16 ^d _x	9.65 ^{bcd} _x	9.20 ^{abc} _w	9.80 ^{cd} _x	10.20 ^d _x	9.56 _x	0.103
	Total	9.43 ^a	9.62 ^{ab}	10.12 ^c	9.88 ^{bc}	9.90 ^{bc}	9.96 ^{bc}	9.92 ^{bc}		0.051
Weight (g)	0	2.49 ^a _w	2.85 ^b _w	2.62 ^{ab} _w	2.44 ^a _w	2.40 ^a _w	2.61 ^{ab} _w	2.62 ^{ab} _w	2.57 _w	0.039
	4	2.98 ^{ab} _x	2.78 ^a _w	2.83 ^{ab} _x	2.86 ^{ab} _x	2.90 ^{ab} _x	3.00 ^{ab} _x	2.83 ^{ab} _w	2.89 _x	0.027
	8	3.26 ^a _x	3.27 ^{ab} _x	3.34 ^{bc} _y	3.42 ^c _y	3.35 ^c _y	3.11 ^{bc} _x	3.48 ^c _x	3.32 _y	0.047
	12	3.75 ^{ab} _y	3.38 ^a _x	3.42 ^d _y	3.40 ^{bcd} _y	3.54 ^{abc} _y	3.44 ^{cd} _y	3.58 ^d _x	3.50 _z	0.031
	Total	3.16	3.09	3.11	3.02	3.13	3.08	3.14		0.024
Acidity (pH)	0	6.03 _w	6.10 _w	6.15 _x	6.36 _y	5.98 _x	6.31	6.25 _x	6.17 _x	0.030
	4	6.23 ^a _y	6.28 ^{ab} _y	6.37 ^c _y	6.38 ^c _z	6.32 ^c _y	6.32 ^{bc}	6.33 ^{abc} _y	6.31 _y	0.009
	8	6.10 ^{bc} _z	6.21 ^c _x	6.09 ^c _w	6.26 ^{bc} _x	5.98 ^{bc} _x	6.18 ^a	6.20 ^a _w	6.14 _x	0.010
	12	5.83 ^{bc} _x	5.85 ^c _w	5.84 ^c _w	5.84 ^{bc} _w	5.79 ^{bc} _w	5.69 ^a	5.77 ^b _x	5.80 _w	0.009
	Total	6.05 ^{ab}	6.11 ^{ab}	6.11 ^{ab}	6.18 ^b	6.02 ^a	6.08 ^{ab}	6.09 ^{ab}		0.014

^{a-d}— means in the same row (group) significant at $p \leq 0.05$; _{w-z} — means in the same column (terms) significant at $p \leq 0.05$; SEM+ standard error of mean; C - control group; RM5, RM10, RM15— 5%, 10%, 15% of post-extraction rapeseed meal respectively; FRM5, FRM10, FRM15— 5%, 10%, 15% of fermented post-extraction rapeseed meal respectively

Table S3. The albumen quality characteristics of Japanese quail eggs depending on the dose and fermentation of rapeseed meal applied

Group		C	RM5	RM10	RM15	FRM5	FRM10	FRM15	Total	SEM
Trait	term (wks)									
Height (mm)	0	3.78 ^d _w	3.58 ^{bcd} _w	3.66 ^{cd} _w	3.09 ^{abc} _w	3.61 ^{cd} _w	2.94 ^{ab} _w	2.82 ^a _w	3.30 _w	0.088
	4	4.04 _w	4.06 _w	3.77 _w	3.95 _x	4.02 _w	4.01 _x	4.06 _z	3.99 _x	0.057
	8	3.63 _w	3.89 _w	3.87 _w	3.86 _x	3.45 _w	3.76 _x	3.86 _z	3.76 _y	0.075
	12	4.54 _x	4.72 _x	4.81 _x	4.40 _y	4.53 _x	4.66 _y	4.54 _y	4.60 _z	0.070
	Total	4.01	4.11	4.07	3.82	3.94	3.92	3.84		0.040
Haugh's units	0	86.71 ^c _w	85.05 ^{bc} _w	85.96 ^c _w	82.87 ^{abc} _w	85.77 ^c _{wx}	81.29 ^{ab} _w	80.51 ^a _w	83.67 _w	0.546
	4	87.12 _{wx}	88.34 _{xy}	86.42 _w	87.42 _x	87.98 _{xy}	87.50 _{xy}	88.32 _{xy}	87.60 _x	0.319
	8	84.35 ^{ab} _w	86.56 ^{ab} _{wx}	86.35 ^{ab} _w	87.13 ^b _x	83.08 ^a _w	85.43 ^{ab} _x	86.04 ^{ab} _x	85.55 _y	0.513
	12	89.69 _x	91.02 _y	91.18 _y	89.22 _x	89.71 _y	90.35 _y	89.59 _y	90.10 _z	0.400
	Total	86.97	88.00	87.64	86.61	86.74	86.53	86.18		0.244
Weight (g)	0	5.99	5.82 _w	5.66 _w	5.57 _w	5.67 _w	6.02	5.82 _{wx}	5.73 _w	0.078
	4	5.92 ^{ab}	5.61 ^a _w	5.82 ^{ab} _{wx}	5.94 ^{ab} _{wx}	5.81 ^{ab} _w	6.09 ^b	5.69 ^a _w	5.84 _w	0.050
	8	6.65 ^b	6.20 ^{ab} _x	6.33 ^{ab} _y	5.39 ^a _{wx}	6.70 ^b _x	6.40 ^b	6.18 ^{ab} _{xy}	6.26 _x	0.123
	12	6.21	6.08 _x	6.29 _{xy}	6.20 _x	5.98 _w	6.23	6.34 _y	6.19 _x	0.051
	Total	6.21 ^b	5.93 ^{ab}	6.08 ^{ab}	5.77 ^a	6.08 ^{ab}	6.19 ^b	6.01 ^{ab}		0.044
Alkalinity (pH)	0	8.40 _x	8.90 _x	9.00 _y	9.07 _y	9.10 _x	8.93 _y	8.86 _y	8.89 _w	0.049
	4	9.24 ^{ab} _y	9.27 ^b _z	9.33 ^b _z	9.24 ^b _y	9.20 ^{ab} _y	8.55 ^a _y	9.29 ^b _z	9.16 _x	0.065
	8	9.00 ^a _x	9.01 ^b _y	8.83 ^b _x	9.05 ^b _x	9.05 ^{ab} _x	9.12 ^{ab} _x	8.63 ^b _x	8.95 _w	0.052
	12	8.71 ^a _w	8.85 ^b _w	8.82 ^b _w	8.82 ^b _w	8.78 ^{ab} _w	8.78 ^{ab} _w	8.84 ^b _w	8.80 _w	0.009
	Total	8.94	9.03	8.99	9.03	9.02	8.82	8.91		0.024

^{a-d}— means in the same row (group) significant at $p \leq 0.05$; _{w-z} — means in the same column (terms) significant at $p \leq 0.05$; SEM+ standard error of mean; C - control group; RM5, RM10, RM15— 5%, 10%, 15% of post-extraction rapeseed meal respectively; FRM5, FRM10, FRM15— 5%, 10%, 15% of fermented post-extraction rapeseed meal respectively

Table S4. Eggshell quality traits of Japanese quail eggs depending on the dose and fermentation of rapeseed meal applied

Group		C	RM5	RM10	RM15	FRM5	FRM10	FRM15	Total	SEM
Trait	term (wks)									
Weight (g)	0	1.25 ^a _w	1.46 ^{bc}	1.54 ^c _x	1.34 ^{ab} _w	1.41 ^{abc} _w	1.40 ^{abc} _w	1.50 ^{bc} _{xy}	1.41 _w	0.022
	4	1.48 ^b _x	1.42 ^{ab}	1.35 ^{ab} _w	1.32 ^a _w	1.37 ^{ab} _w	1.43 ^{ab} _w	1.37 ^{ab} _w	1.39 _w	0.018
	8	1.62 ^{bc} _x	1.41 ^a	1.51 ^{ab} _w	1.69 ^c _y	1.50 ^{ab} _x	1.47 ^a _w	1.42 ^a _{wx}	1.52 _x	0.019
	12	1.59 ^{ab} _x	1.50 ^a	1.57 ^{ab} _x	1.53 ^a _x	1.57 ^{ab} _x	1.64 ^b _x	1.61 ^{ab} _y	1.57 _y	0.015
	Total	1.50	1.44	1.48	1.46	1.47	1.49	1.47		0.010
Thickness (mm)	0	0.196 ^c	0.184 ^{bc}	0.169 ^{ab}	0.168 ^{ab}	0.153 ^a	0.164 ^{ab}	0.163 ^{ab}	0.171 _w	0.003
	4	0.171 ^a	0.173 ^a	0.179 ^{ab}	0.185 ^b	0.184 ^b	0.183 ^b	0.180 ^{ab}	0.179 _x	0.001
	8	0.177 ^a	0.198 ^{bc}	0.192 ^b	0.212 ^{cd}	0.219 ^d	0.218 ^d	0.204 ^{bcd}	0.203 _z	0.002
	12	0.187	0.191	0.189	0.188	0.193	0.191	0.182	0.186 _y	0.003
	Total	0.182	0.187	0.184	0.188	0.191	0.191	0.182		0.001
Strength (N)	0	10.66	10.20	12.99	11.94	11.38	10.95	12.13	11.53	0.356
	4	12.55	10.80	11.51	13.01	12.01	12.85	12.15	12.13	0.305
	8	10.31 ^a	12.88 ^{ab}	13.38 ^b	11.87 ^{ab}	11.57 ^{ab}	11.49 ^{ab}	12.15 ^{ab}	11.93	0.340
	12	12.47	11.39	12.01	11.82	12.45	11.90	12.04	12.01	0.341
	Total	11.54	11.43	12.40	12.15	11.89	11.86	12.12		0.168
Density (g/cm ³)	0	0.309 ^a _w	0.356 ^{ab} _x	0.420 ^c _x	0.388 ^{bc}	0.440 ^c _y	0.417 ^{bc} _y	0.423 ^c _y	0.391 _x	0.009
	4	0.384 ^c _y	0.382 ^{bc} _x	0.341 ^{ab} _w	0.319 ^a	0.339 ^a _x	0.342 ^{abc} _{wx}	0.343 ^{abc} _x	0.350 _w	0.006
	8	0.385 ^{ab} _y	0.308 ^a _w	0.334 ^a _w	0.469 ^b	0.285 ^a _w	0.287 ^a _w	0.295 ^a _w	0.338 _w	0.015
	12	0.365 ^{xy}	0.339 _x	0.351 _w	0.350	0.346 _x	0.362 _{xy}	0.369 _x	0.354 _w	0.005
	Total	0.365 ^a	0.345 ^{ab}	0.354 ^{ab}	0.382 ^b	0.312 ^{ab}	0.347 ^{ab}	0.356 ^{ab}		0.005

^{a-d}— means in the same row (group) significant at $p \leq 0.05$; _{w-z} - means in the same column (terms) significant at $p \leq 0.05$; SEM+ standard error of mean; C - control group; RM5, RM10, RM15— 5%, 10%, 15% of post-extraction rapeseed meal respectively; FRM5, FRM10, FRM15— 5%, 10%, 15% of fermented post-extraction rapeseed meal respectively