

Table 6 Blood biochemistry in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks

Group	TP g/dl	ALB g/dl	A/G	Glu mg/dl	CHO mg/dl	TG mg/dl	T-BIL mg/dl	γ -GTP IU/L	ALT IU/L	AST IU/L		
Male	Cont.	Mean	2.8	0.8	148	89	163	0.1	1	74	136	
		SD	0.2	0.1	10	26	77	0.0	2	44	68	
	0.04%	Mean	2.8	0.8	147	90	159	0.1	0	55	101	
		SD	0.2	0.1	14	16	51	0.0	1	21	31	
	0.2%	Mean	2.9	0.9	155	81	164	0.1	0	56	105	
		SD	0.2	0.1	19	20	51	0.1	1	27	37	
	1%	Mean	2.9	0.9	150	75	126	0.0	0	48	92*	
		SD	0.2	0.1	13	14	32	0.1	1	15	28	
	5%	Mean	2.8	0.9	159	77	165	0.0	0	74	115	
		SD	0.3	0.1	16	19	74	0.1	1	43	52	
	Female	Cont.	Mean	3.2	1.0	145	75	171	0.1	0	115	192
			SD	0.2	0.1	15	20	127	0.0	1	66	96
0.04%		Mean	3.2	1.0	142	66	185	0.1	1	122	178	
		SD	0.3	0.2	12	16	142	0.0	2	63	90	
0.2%		Mean	3.3	1.0	144	77	197	0.1	1	141	201	
		SD	0.2	0.1	16	23	138	0.0	1	90	117	
1%		Mean	3.3	1.0	143	62	201	0.1	1	118	185	
		SD	0.4	0.2	16	14	156	0.0	1	96	133	
5%		Mean	3.3	1.0	145	65	146	0.1	0	86	158	
		SD	0.4	0.2	17	19	115	0.0	1	61	78	

*: P<0.05 (Significant difference from control)

Table 6 Blood biochemistry in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks (Continued)

Sex	Group	ALP		UN	CRE	CK	Ca	IP	Na	K	Cl	
		IU/L	IU/L	mg/dl	mg/dl	IU/L	mg/dl	mg/dl	mEq/L	mEq/L	mEq/L	
Male	Cont.	Mean	368	20	0.35	575	10.1	5.3	143	4.5	105	
		SD	159	3	0.04	365	0.4	1.0	2	0.4	2	
	0.04%	Mean	362	21	0.33	482	10.0	5.0	143	4.5	105	
		SD	117	2	0.05	271	0.3	0.6	1	0.4	1	
	0.2%	Mean	337	20	0.33	502	10.1	4.9	143	4.5	105	
		SD	100	2	0.04	207	0.3	0.5	1	0.3	1	
	1%	Mean	432	19	0.34	421	10.0	5.0	144	4.4	105	
		SD	126	3	0.05	194	0.3	0.6	1	0.3	1	
	5%	Mean	371	19	0.32	429	10.1	5.1	143	4.4	104	
		SD	91	3	0.03	192	0.2	0.4	1	0.4	1	
	Female	Cont.	Mean	258	24	0.33	261	10.2	4.7	143	4.1	105
			SD	120	3	0.03	118	0.4	1.0	2	0.5	2
0.04%		Mean	252	23	0.33	286	10.2	4.6	143	4.0	105	
		SD	112	3	0.04	118	0.1	0.8	2	0.4	2	
0.2%		Mean	242	23	0.33	240	10.4	4.7	143	4.1	105	
		SD	87	2	0.04	95	0.3	0.9	2	0.3	2	
1%		Mean	237	23	0.33	265	10.3	4.8	142	4.0	105	
		SD	103	3	0.03	101	0.4	0.8	2	0.3	2	
5%		Mean	212	23	0.33	317	10.4	4.6	143	3.9	106	
		SD	101	3	0.04	132	0.3	0.9	1	0.4	2	

Table 7 Absolute organ weights (g) in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks

Group		Final bw	Brain	Pitui.	Thyroid	Thym.	Heart	Lung	Liver	Spleen	Adren.	Kidney	Testes	Ovaries	
Male	Cont.	Mean	2.28	0.031	0.038	0.124	1.29	1.75	17.03	1.06	0.073	3.12	3.53	-	
		SD	68.7	0.11	0.028	0.050	0.18	0.20	3.45	0.30	0.039	1.12	0.81	-	
	0.04%	Mean	550.5	2.32	0.014	0.036	0.133	1.24	1.79	17.06	0.98	0.062	2.91	3.78	-
		SD	73.4	0.10	0.005	0.014	0.060	0.16	0.25	2.59	0.35	0.012	0.38	0.42	-
	0.2%	Mean	553.7	2.30	0.012	0.035	0.126	1.26	1.80	16.42	0.94	0.060	2.87	3.82	-
		SD	42.9	0.09	0.002	0.016	0.040	0.12	0.14	1.63	0.11	0.008	0.27	0.31	-
	1%	Mean	525.4	2.29	0.012*	0.033	0.125	1.21	1.74	15.41	0.91	0.060	2.74	3.76	-
		SD	48.2	0.10	0.002	0.013	0.030	0.12	0.18	1.69	0.16	0.007	0.22	0.36	-
	5%	Mean	562.7	2.30	0.012	0.041	0.181	1.28	1.84	16.98	1.26	0.067	3.15	3.75	-
		SD	53.3	0.09	0.001	0.019	0.208	0.13	0.23	2.14	1.48	0.005	0.30	0.22	-
	Female	Cont.	Mean	326.8	2.11	0.022	0.033	0.146	1.29	9.97	0.63	0.082	1.96	-	0.097
			SD	50.5	0.07	0.005	0.011	0.034	0.10	0.15	1.80	0.11	0.013	0.24	0.032
0.04%		Mean	336.4	2.09	0.021	0.031	0.157	0.88	1.28	10.30	0.69	0.082	1.97	-	0.106
		SD	43.6	0.08	0.005	0.010	0.045	0.10	0.10	1.47	0.12	0.014	0.21	0.026	
0.2%		Mean	336.0	2.11	0.024	0.029	0.144	0.89	1.30	10.36	0.67	0.081	1.97	-	0.109
		SD	41.3	0.10	0.011	0.006	0.038	0.09	0.13	1.43	0.07	0.009	0.17	0.034	
1%		Mean	333.5	2.10	0.021	0.029	0.166	0.88	1.28	10.10	0.66	0.082	1.88	-	0.113
		SD	37.2	0.06	0.004	0.005	0.092	0.08	0.11	1.35	0.08	0.010	0.18	0.026	
5%		Mean	326.2	2.06	0.022	0.033	0.148	0.83	1.22	9.50	0.62	0.081	1.89	-	0.101
		SD	35.2	0.09	0.005	0.008	0.049	0.08	0.09	1.01	0.08	0.012	0.17	0.035	

*: P<0.05 (Significant difference from control)

Table 8 Relative organ weights (g/kg) in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks

Group	Final bw	Brain	Pitui.	Thyroid	Thym.	Heart	Lung	Liver	Spleen	Adren.	Kidney	Testes	Ovaries		
Male	Cont.	Mean	535.3	4.31	0.069	0.076	0.231	2.44	3.33	32.23	2.01	0.142	6.03	6.61	
		SD	68.7	0.54	0.177	0.073	0.085	0.62	8.69	0.62	0.101	3.14	1.43	-	
	0.04%	Mean	550.5	4.28	0.025	0.068	0.242	0.327	31.01	1.78	0.112	5.29	6.95	-	
		SD	73.4	0.57	0.009	0.034	0.106	0.37	2.12	0.66	0.019	0.37	1.02	-	
	0.2%	Mean	553.7	4.18	0.022	0.062	0.227	0.327	29.65	1.70	0.108	5.19	6.94	-	
		SD	42.9	0.38	0.004	0.027	0.071	0.24	1.94	0.19	0.012	0.32	0.74	-	
	1%	Mean	525.4	4.38	0.022	0.062	0.239	0.333	29.35	1.72	0.116	5.23	7.19	-	
		SD	48.2	0.41	0.003	0.021	0.055	0.28	1.86	0.21	0.014	0.32	0.76	-	
	5%	Mean	562.7	4.12	0.021	0.072	0.309	0.327	30.14	2.16	0.119	5.62	6.71	-	
		SD	53.3	0.37	0.002	0.032	0.306	0.32	1.84	2.14	0.011	0.44	0.66	-	
	Female	Cont.	Mean	326.8	6.59	0.068	0.100	0.449	2.75	4.00	30.50	1.94	0.253	6.07	0.302
			SD	50.5	0.88	0.015	0.027	0.100	0.53	2.31	0.24	0.036	0.68	-	0.107
0.04%		Mean	336.4	6.31	0.063	0.094	0.471	2.64	30.65	2.05	0.246	5.91	-	0.321	
		SD	43.6	0.85	0.015	0.033	0.137	0.42	2.35	0.27	0.043	0.75	-	0.096	
0.2%		Mean	336.0	6.37	0.071	0.088	0.436	2.66	30.84	2.00	0.244	5.92	-	0.326	
		SD	41.3	0.77	0.031	0.020	0.132	0.22	2.06	0.29	0.037	0.59	-	0.105	
1%		Mean	333.5	6.36	0.062	0.089	0.489	0.64	30.30	2.00	0.246	5.68	-	0.343	
		SD	37.2	0.72	0.012	0.019	0.217	0.20	2.42	0.28	0.027	0.51	-	0.084	
5%		Mean	326.2	6.39	0.068	0.101	0.459	2.55	29.22	1.89	0.252	5.85	-	0.310	
		SD	35.2	0.72	0.017	0.029	0.157	0.21	2.21	0.17	0.044	0.68	-	0.105	

Table 9 Urinary findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks

SEX	GROUP AND DOSE	COLOR		PH					PROTEIN			GLUCOSE		OCCULT BLOOD						
		Y	SC YB	6.0	6.5	7.0	7.5	8.0	8.5	-	1+	2+	3+ 4+	-	10	-	2+	3+		
MALE	CONTROL	NO.OF ANIMALS		10		10					10			10		10				
		10	0 0 0	0	0	0	4	4	2	0	0	1	7	1	1	10	8	1	1	0
	0.04%	NO.OF ANIMALS		10		10					10			10		10				
	10	0 0 0	0	1	1	3	3	2	0	0	5	4	0	1	10	7	2	0	1	
	0.20%	NO.OF ANIMALS		10		10					10			10		10				
	10	9	1	0	0	0	2	6	2	0	1	2	5	1	1	10	8	1	1	0
	1%	NO.OF ANIMALS		10		10					10			10		10				
	10	0	10	0	0	0	2	6	1	0	2	3	2	3	0	10	8	2	0	0
	5%	NO.OF ANIMALS		10		10					10			10		10				
	10	0	7	3	1	1	0	3	5	0	0	3	1	4	2	10	9	1	0	0
FEMALE	CONTROL	NO.OF ANIMALS		10		10					10			10		10				
		10	0 0 0	1	0	1	3	5	0	3	1	3	1	2	0	10	9	1	0	0
	0.04%	NO.OF ANIMALS		10		10					10			10		10				
	10	8	2	0	0	0	1	4	2	3	1	2	5	1	1	10	9	0	1	0
	0.20%	NO.OF ANIMALS		10		10					10			10		10				
	10	8	2	0	0	0	1	5	4	2	2	2	1	3	0	10	10	0	0	0
	1%	NO.OF ANIMALS		10		10					10			10		10				
	10	2	8	0	0	1	0	3	6	0	2	1	3	3	1	10	10	0	0	0
	5%	NO.OF ANIMALS		10		10					10			10		10				
	10	3	7	0	4	2	0	2	0	2	0	5	2	1	1	10	10	0	0	0

Y:YELLOW SC:STRAW-COLORED YB:YELLOWISH-BROWN

Table 9 Urinary findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks (Continued)

SEX	GROUP AND DOSE	NO. OF ANIMALS	KETONES - 1+	BILIRUBIN -	UROBILINOGEN 0.1
MALE	CONTROL	10	10	10	10
	0.04%	NO. OF ANIMALS	7 2 1	10	10
			10	10	10
	0.20%	NO. OF ANIMALS	7 3 0	10	10
			10	10	10
	1%	NO. OF ANIMALS	9 0 1	10	10
			10	10	10
	5%	NO. OF ANIMALS	10 0 0	10	10
			7 3 0	10	10
	FEMALE	CONTROL	10	10	10
0.04%		NO. OF ANIMALS	10 0 0	10	10
			10	10	10
0.20%		NO. OF ANIMALS	9 1 0	10	10
			10	10	10
1%		NO. OF ANIMALS	10 0 0	10	10
			10	10	10
5%		NO. OF ANIMALS	10 0 0	10	10
			8 2 0	10	10

Table 10 Urinalysis in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks

Male	Group	Volume ml/day	Gravity g/ml	Na mEq/l	K mEq/l	Cl mEq/l	Ca mg/dl	Na mEq/day	K mEq/day	Cl mEq/day	Ca mg/day	
												Mean
Male	Cont.	7.3	1.069	140	249.8	80	20.7	1.0	1.7	0.6	1.54	
		3.3	0.016	53	57.2	28	8.1	0.4	0.4	0.2	0.95	
	0.04%	7.8	1.065	141	251.1	99	21.8	1.1	1.9	0.8	1.71	
		0.9	0.016	51	74.3	49	7.1	0.3	0.4	0.3	0.61	
	0.2%	7.5	1.067	143	264.3	99	17.2	1.1	2.0	0.7	1.23	
		1.2	0.011	46	48.9	36	7.5	0.4	0.5	0.3	0.46	
	1%	7.8	1.076	172	324.0*	133*	19.6	1.3	2.5**	1.0**	1.57	
		1.5	0.009	35	53.5	37	8.0	0.4	0.5	0.3	0.76	
	5%	9.3**	1.072	137	249.6	98	28.8*	1.3	2.3*	0.9*	2.69**	
		1.4	0.010	35	48.6	34	3.9	0.2	0.3	0.3	0.64	
	Female	Cont.	6.1	1.062	160	298.5	118	30.4	0.9	1.8	0.7	1.90
			2.7	0.011	34	54.1	27	6.2	0.2	0.7	0.2	0.98
0.04%		7.5	1.069	190	383.3	149	26.0	1.3	2.5	1.0	1.91	
		3.7	0.026	74	158.5	69	6.3	0.5	1.0	0.5	0.90	
0.2%		6.3	1.071	198	382.6	145	24.9	1.2	2.3	0.9	1.59	
		2.1	0.017	54	120.6	52	5.6	0.3	0.7	0.3	0.69	
1%		5.8	1.074	181	361.6	133	28.7	1.0	2.1	0.8	1.68	
		2.2	0.013	44	44.4	26	4.0	0.3	0.7	0.3	0.65	
5%		9.7	1.057	118	245.0	98	31.7	1.0	2.1	0.8	3.01*	
		4.8	0.017	40	85.3	43	4.6	0.3	0.7	0.4	1.33	

*: P<0.05, **: P<0.01 (Significant difference from control)

Table 11 Macroscopic findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks

ORGAN FINDING	SEX DOSE	MALE				
		CONTROL	0.04%	0.20%	1%	5%
APPEARANCE	NO.OF ANIMALS	18	20	20	20	19
PLANTER EROSION		3	3	2	5	2
STAINING' UROGENITAL REGION		1	0	0	0	0
NO ABNORMALITIES		14	17	18	15	17
SUBMANDIBULAR LN ENLARGEMENT	NO.OF ANIMALS	18	20	20	20	19
		0	0	0	0	1
NO ABNORMALITIES		18	20	20	20	18
LACRIMAL GLAND DISCOLORATION	NO.OF ANIMALS	18	20	20	20	19
		0	2	0	0	0
FOCUS' WHITE		0	0	3	1	3
SPOT' WHITE		0	0	0	0	1
NO ABNORMALITIES		18	18	17	19	15
THYMUS ENLARGEMENT	NO.OF ANIMALS	18	20	20	20	19
		0	0	0	0	1
NO ABNORMALITIES		18	20	20	20	18
LUNG FOCUS' WHITE	NO.OF ANIMALS	18	20	20	20	19
		0	0	0	0	1
SPOT' RED		1	0	0	0	0
SPOT' WHITE		0	0	0	0	0
NO ABNORMALITIES		17	20	20	20	18
LIVER DIAPHRAGMATIC HERNIA	NO.OF ANIMALS	18	20	20	20	19
		0	0	0	0	0
DILATATION' EXTRAHEPATIC BILE DUCT		0	0	0	0	0
ENLARGEMENT		1	0	0	0	0
FOCUS' RED		0	0	0	0	0
NO ABNORMALITIES		17	20	20	20	19
LN:LYMPH NODE						

Table 11 Macroscopic findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks (Continued)

ORGAN FINDING	SEX DOSE	CONTROL	MALE			
			0.04%	0.20%	1%	5%
SPLEEN	NO.OF ANIMALS	18	20	20	20	19
		1	1	0	0	1
NO ABNORMALITIES		17	19	20	20	18
PANCREAS	NO.OF ANIMALS	18	20	20	20	19
		0	0	0	0	0
NO ABNORMALITIES		18	20	20	20	19
ADRENAL GLAND	NO.OF ANIMALS	18	20	20	20	19
		0	0	0	0	0
		2	0	0	0	0
		0	0	1	0	0
NO ABNORMALITIES		16	20	19	20	19
KIDNEY	NO.OF ANIMALS	18	20	20	20	19
		0	1	0	0	0
		1	0	0	0	0
		17	19	20	20	19
TESTIS	NO.OF ANIMALS	18	20	20	20	19
		2	1	0	0	0
		16	19	20	20	19
		NO ABNORMALITIES				
EPIDIDYMS	NO.OF ANIMALS	18	20	20	20	19
		1	0	0	0	0
		17	20	20	20	19
		NO ABNORMALITIES				
PROSTATE	NO.OF ANIMALS	18	20	20	20	19
		0	0	0	1	1
		0	0	0	0	0
		18	20	20	19	18

Table 11 Macroscopic findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks (Continued)

ORGAN	FINDING	SEX		MALE				
		DOSE	CONTROL	0.04%	0.20%	1%	5%	
EYE	WHITISH' LENS	NO.OF ANIMALS	18	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0	0
SUBCUTIS	NO ABNORMALITIES		18	20	20	20	20	19
	NO.OF ANIMALS		18	20	20	20	20	19
	MASS' LEFT CHEEK		0	0	0	0	0	0
	MASS' RIGHT ABDOMEN		0	0	0	0	0	0
	NODULE' WHITE		0	0	0	0	0	0
NO ABNORMALITIES		18	20	20	20	20	19	
FEMUR	NO.OF ANIMALS		18	20	20	20	20	19
	COLORED' YELLOWISH		0	0	0	0	3	19 **
	NO ABNORMALITIES		18	20	20	20	17	0
FEMUR BONE MARROW	NO.OF ANIMALS		18	20	20	20	20	19
	WHITISH		0	0	0	0	0	1
	NO ABNORMALITIES		18	20	20	20	20	18
STOMACH	NO.OF ANIMALS		18	20	20	20	20	19
	DARK RED' GLANDULAR REGION		0	0	0	0	0	1
	NO ABNORMALITIES		18	20	20	20	20	18
CECUM	NO.OF ANIMALS		18	20	20	20	20	19
	DARK ENLARGEMENT		0	0	0	0	0	0
	NO ABNORMALITIES		18	20	20	20	20	19
	NO ABNORMALITIES		18	20	20	20	20	19

** : P<0.01 (SIGNIFICANT DIFFERENCE FROM CONTROL)

Table 11 Macroscopic findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks (Continued)

ORGAN FINDING	SEX		MALE				
	DOSE	CONTROL	0.04%	0.20%	1%	5%	
PITUITARY GLAND	NO.OF ANIMALS	18	20	20	20	19	
FOCUS' DARK RED		0	0	0	0	0	
NODULE		1	1	0	0	0	
NODULE' BLACK		0	0	0	0	0	
NODULE' DARK RED		0	0	0	0	0	
SPOT' DARK RED		0	0	0	0	0	
SPOT' RED		0	0	0	0	0	
NO ABNORMALITIES		17	19	20	20	19	
THYROID GLAND	NO.OF ANIMALS	18	20	20	20	19	
CYST		0	0	0	0	1	
NO ABNORMALITIES		18	20	20	20	18	
ABDOMINAL CAVITY	NO.OF ANIMALS	18	20	20	20	19	
FLUID		0	0	0	0	0	
NODULE' YELLOW' ADIPOSE TISSUE		0	0	0	0	0	
NO ABNORMALITIES		18	20	20	20	19	
LYMPH NODE	NO.OF ANIMALS	18	20	20	20	19	
ENLARGED' PERIPANCREATIC		0	0	0	0	0	
ENLARGED' POPLITEAL		0	0	1	0	0	
NO ABNORMALITIES		18	20	19	20	19	

Table 11 Macroscopic findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks (Continued)

ORGAN	FINDING	SEX DOSE	CONTROL	FEMALE					
				NO.OF ANIMALS	0.04%	0.20%	1%	5%	
APPEARANCE									
	PLANTER EROSION		20	20	20	20	20	20	19
	STAINING' UROGENITAL REGION		0	0	0	0	0	0	0
	NO ABNORMALITIES		0	0	0	0	0	0	0
			20	20	20	20	20	20	19
SUBMANDIBULAR LN									
	ENLARGEMENT		20	20	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0	0	0
			20	20	20	20	20	20	19
LACRIMAL GLAND									
	DISCOLORATION		20	20	20	20	20	20	19
	FOCUS' WHITE		0	0	0	0	0	0	0
	SPOT' WHITE		0	0	0	0	0	0	0
	NO ABNORMALITIES		0	0	0	0	0	0	0
			20	20	20	20	20	20	19
THYMUS									
	ENLARGEMENT		20	20	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0	0	0
			20	20	20	20	20	20	19
LUNG									
	FOCUS' WHITE		20	20	20	20	20	20	19
	SPOT' RED		0	0	0	0	0	0	0
	SPOT' WHITE		0	0	0	0	0	0	0
	NO ABNORMALITIES		0	1	0	0	0	0	0
			20	19	19	20	20	20	19
LIVER									
	DIAPHRAGMATIC HERNIA		20	20	20	20	20	20	19
	DILATATION' EXTRAHEPATIC BILE DUCT		0	0	0	0	1	0	0
	ENLARGEMENT		0	0	0	0	0	0	0
	FOCUS' RED		0	0	0	0	0	0	0
	NO ABNORMALITIES		0	0	0	0	0	0	0
			20	20	20	20	20	19	19
	LN:L YMPH NODE								

Table 11 Macroscopic findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks (Continued)

ORGAN	FINDING	SEX DOSE	CONTROL	FEMALE			
				0.04%	0.20%	1%	5%
SPLEEN	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
PANCREAS	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
ADRENAL GLAND	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	SMALL		0	0	0	0	0
KIDNEY	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
OVARY	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
UTERUS	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
SPOT' BLACK	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
EDEMA	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
CYST' RIGHT HORN	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
DARK RED' RIGHT HORN	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
NO ABNORMALITIES	ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0

Table 11 Macroscopic findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks (Continued)

ORGAN	FINDING	SEX DOSE	FEMALE				
			CONTROL	0.04%	0.20%	1%	5%
EYE	WHITISH' LENS	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	1
SUBCUTIS			20	20	20	20	18
	NO ABNORMALITIES		20	20	20	20	19
	MASS' LEFT CHEEK		0	0	0	0	0
	MASS' RIGHT ABDOMEN		0	0	0	0	0
	NODULE' WHITE		0	1	0	0	0
FEMUR			20	19	20	20	19
FEMUR BONE MARROW	COLORED' YELLOWISH	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	19 **
			20	20	20	20	0
STOMACH	WHITISH	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
			20	20	20	20	19
CECUM	DARK RED' GLANDULAR REGION	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	0
			20	20	20	20	19
CECUM	DARK ENLARGEMENT	NO.OF ANIMALS	20	20	20	20	19
	NO ABNORMALITIES		0	0	0	0	1
			0	0	0	0	0
			20	20	20	20	18

** : P<0.01 (SIGNIFICANT DIFFERENCE FROM CONTROL)

Table 11 Macroscopic findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks (Continued)

ORGAN	FINDING	SEX DOSE	CONTROL	FEMALE				
				0.04%	0.20%	1%	5%	
PITUITARY GLAND		NO.OF ANIMALS	20	20	20	20	19	
	FOCUS' DARK RED		0	0	0	0	1	
	NODULE		0	0	1	0	1	
	NODULE' BLACK		0	0	0	3	0	
	NODULE' DARK RED		1	0	0	0	0	
	SPOT' DARK RED		1	0	0	0	0	
	SPOT' RED		0	0	1	0	1	
	NO ABNORMALITIES		18	20	18	17	16	
THYROID GLAND		NO.OF ANIMALS	20	20	20	20	19	
	CYST		0	0	0	0	0	
	NO ABNORMALITIES		20	20	20	20	19	
ABDOMINAL CAVITY		NO.OF ANIMALS	20	20	20	20	19	
	FLUID		0	0	0	0	0	
	NODULE' YELLOW' ADIPOSE TISSUE		0	1	0	0	0	
	NO ABNORMALITIES		20	19	20	20	19	
LYMPH NODE		NO.OF ANIMALS	20	20	20	20	19	
	ENLARGED' PERIPANCREATIC		0	0	0	0	0	
	ENLARGED' POPLITEAL		0	0	0	0	0	
	NO ABNORMALITIES		20	20	20	20	19	
CLITORAL GLAND		NO.OF ANIMALS	20	20	20	20	19	
	GREEN		0	0	0	0	1	
	HARD		0	0	0	0	1	
	YELLOW-BROWN		1	0	0	0	0	
	NO ABNORMALITIES		19	20	20	20	18	

Table 12 Histopathological findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks.

ORGAN FINDING	SEX		MALE			
	TEST ARTICLE	CONTROL	0.04%	0.20%	1%	5%
GRADE	- + + + + + +	- + + + + + +	- + + + + + +	- + + + + + +	- + + + + + +	- + + + + + +
BRAIN						
DILATATION' VENTRICLE	18	18	20	20	20	19
MINERALIZATION' VENTRICLE	17 1 0 0	18 2 0 0	18 2 0 0	20 0 0 0	20 0 0 0	19 0 0 0
	18 0 0 0	19 1 0 0	19 1 0 0	20 0 0 0	20 0 0 0	19 0 0 0
SPINAL CORD						
SWELLING' AXONAL	18	18	20	20	20	19
	18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
HEART						
CARDIOMYOPATHY	18	18	20	20	20	19
CELLULAR INFILTRATION' LEUKEMIA CELL	12 6 0 0	10 10 0 0	10 10 0 0	14 6 0 0	12 8 0 0	11 8 0 0
HEMORRHAGE' EPICARDIAL	18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
	18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
LUNG						
CALCIFICATION' VESSEL	18	18	20	20	20	19
CELLULAR INFILTRATION' LEUKEMIA CELL	11 7 0 0	15 5 0 0	15 5 0 0	16 4 0 0	20 0 0 0 *	16 3 0 0
FOCAL FIBROSIS' ALVEOLAR WALL	18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
GRANULOMA	18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
HISTIOCYTOSIS' ALVEOLAR	16 2 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 2 0 0	19 0 0 0
	16 2 0 0	19 1 0 0	19 1 0 0	19 1 0 0	19 1 0 0	18 1 0 0
TRACHEA						
CELLULAR INFILTRATION' LEUKEMIA CELL	18	18	20	20	20	19
CELLULAR INFILTRATION' MONONUCLEAR CELL	18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
DILATATION' GLAND' TRACHEAL	16 2 0 0	17 3 0 0	17 3 0 0	20 0 0 0	20 0 0 0	19 0 0 0
	17 1 0 0	18 2 0 0	17 3 0 0	17 3 0 0	19 1 0 0	17 2 0 0

-: NOT REMARKABLE; +: SLIGHT; ++: MODERATE; +++: MARKED

*: P<0.05 (SIGNIFICANT DIFFERENCE FROM CONTROL)

Table 12 Histopathological findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks. (Continued)

ORGAN FINDING	SEX		MALE				
	TEST ARTICLE	CONTROL	0.04%	0.20%	1%	5%	
	DOSE	GRADE	NO. OF ANIMALS	NO. OF ANIMALS	NO. OF ANIMALS	NO. OF ANIMALS	
LIVER			18	20	20	20	19
CELLULAR INFILTRATION' LEUKEMIA CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 0 1 0
CHOLANGITIS' EXTRAHEPATIC			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
DEPOSIT' PIGMENT' GLISSON'S SHEATH			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
DEPOSIT' PIGMENT' KUPFFER CELL			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
FOCAL NECROSIS' HEPATOCELLULAR			15 3 0 0	18 2 0 0	19 1 0 0	20 0 0 0	19 0 0 0
FOCUS ALTERAD HEPATOCYTE' CLEAR CELL			17 1 0 0	17 3 0 0	20 0 0 0	20 0 0 0	16 3 0 0
FOCUS ALTERAD HEPATOCYTE' VACUOLATED CELL			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
HEMATOPOIESIS' EXTRAMEDULLARY			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
HYPERPLASIA' BILE DUCT			16 2 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
HYPERTROPHY' HEPATOCELLULAR			17 0 1 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
INCREASE' MITOTIC FIGURE' HEPATOCELLULAR			17 0 1 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
MICROGRANULOMA			15 3 0 0	17 3 0 0	19 1 0 0	18 2 0 0	18 1 0 0
NECROSIS' COAGULATIVE			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
SINGLE CELL NECROSIS' HEPATOCELLULAR			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
SPONGIOSIS HEPATIS			18 0 0 0	20 0 0 0	19 1 0 0	20 0 0 0	19 0 0 0
PANCREAS			18	20	20	20	19
ABSCESS			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
ATROPHY' ACINAR CELL' FOCAL			14 4 0 0	17 3 0 0	17 3 0 0	17 3 0 0	13 6 0 0
CELLULAR INFILTRATION' LEUKEMIA CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
DEPOSIT' PIGMENT			16 2 0 0	19 1 0 0	20 0 0 0	20 0 0 0	19 0 0 0

--:NOT REMARKABLE,+ :SLIGHT,++:MODERATE,+++ :MARKED

Table 12 Histopathological findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks. (Continued)

ORGAN FINDING	SEX		MALE					
	TEST ARTICLE DOSE	ARTICLE DOSE	GRADE					
			CONTROL	0.04%	0.20%	1%	5%	
KIDNEY			18	20	20	20	20	19
CELL DEBRIS' INFLAMMATORY' PELVIS			11 6 1 0	15 5 0 0	17 3 0 0	13 7 0 0	8 10 1 0	
CELLULAR INFILTRATION' INFLAMMATORY' PELVIS			15 2 1 0	20 0 0 0	17 2 1 0	18 2 0 0	14 5 0 0	
CELLULAR INFILTRATION' LEUKEMIA CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 0 1 0	
CHANGE' BASOPHILIC' RENAL TUBULE			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
CHRONIC NEPHROPATHY			11 5 2 0	15 5 0 0	16 3 1 0	18 2 0 0	15 4 0 0	
CYST			18 0 0 0	19 1 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
DEGENERATION' RENAL TUBULE' FOCAL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
DILATATION' PELVIS			18 0 0 0	18 2 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
DILATATION' RENAL TUBULE			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
FOCUS' LYMPHOID CELL			17 1 0 0	19 1 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
HYALINE CAST			17 1 0 0	18 2 0 0	15 5 0 0	18 2 0 0	16 3 0 0	
HYPERPLASIA' TRANSITIONAL CELL' PELVIS			15 2 1 0	16 4 0 0	17 3 0 0	18 2 0 0	11 8 0 0	
MINERALIZATION' CORTICO-MEDULLARY JUNCTION			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
MINERALIZATION' PELVIS			17 0 1 0	15 5 0 0	17 3 0 0	16 4 0 0	6 12 1 0 *	
NECROSIS' PAPILLARY			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
NECROSIS' RENAL TUBULE			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
PYKNOSIS' COLLECTING DUCT			18 0 0 0	20 0 0 0	19 1 0 0	20 0 0 0	19 0 0 0	
URINARY BLADDER			18	20	20	20	19	
CELLULAR INFILTRATION' INFLAMMATORY			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
CELLULAR INFILTRATION' LEUKEMIA CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0	
PROTEINACEOUS PLUG			17 1 0 0	20 0 0 0	19 1 0 0	19 1 0 0	18 1 0 0	
THICKENING' MUCOSA			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
VACUOLIZATION' CYTOPLASMIC' MUCOSAL CELL			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
SPLEEN			18	20	20	20	19	
CELLULAR INFILTRATION' LEUKEMIA CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 0 1 0	
DEPOSIT' HEMOSIDERIN			6 12 2 0	5 13 2 0	8 12 0 0	7 13 0 0	9 10 0 0	
HEMATOPOIESIS' EXTRAMEDULLARY			16 1 1 0	18 1 1 0	19 1 0 0	18 2 0 0	19 0 0 0	
THYMUS			18	20	20	20	19	
ATROPHY			8 7 3 0	5 10 5 0	5 13 2 0	2 15 3 0 *	5 11 3 0	
CELLULAR INFILTRATION' LEUKEMIA CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 0 1 0	
CYST			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
HEMORRHAGE			16 2 0 0	19 1 0 0	20 0 0 0	20 0 0 0	18 1 0 0	
LYMPHOID HYPERPLASIA			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	
NECROSIS			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	

-:NOT REMARKABLE,+:SLIGHT,++:MODERATE,+++:MARKED
*: P<0.05 (SIGNIFICANT DIFFERENCE FROM CONTROL)

Table 12 Histopathological findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks. (Continued)

ORGAN FINDING	SEX		MALE					
	TEST ARTICLE	DOSE	CONTROL		0.04%	0.20%	1%	5%
	GRADE		- + + + + +	- + + + + +	- + + + + +	- + + + + +	- + + + + +	- + + + + +
MESENTERIC LN			18	20	20	20	20	19
ATROPHY' PARACORTEK			13 5 0 0	20 0 0 0 *	16 3 1 0	17 3 0 0	16 3 0 0	16 3 0 0
CELLULAR INFILTRATION' LEUKEMIA CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 0 1 0
CYST' SINUSOIDAL			18 0 0 0	19 1 0 0	19 1 0 0	19 1 0 0	19 0 0 0	19 0 0 0
ERYTHROCYTES' SINUS			15 3 0 0	13 7 0 0	19 1 0 0	17 3 0 0	15 4 0 0	15 4 0 0
HYPERPLASIA' ENDOTHELIAL CELL			18 0 0 0	20 0 0 0	20 0 0 0	19 1 0 0	19 0 0 0	19 0 0 0
SINUS HISTIOCYTOSIS			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0	19 0 0 0
TONGUE			18	20	20	20	20	19
CELLULAR INFILTRATION' INFLAMMATORY			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
PAROTID GLAND			18	20	20	20	20	19
CELLULAR INFILTRATION' MONONUCLEAR CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
LACRIMAL GLAND			18	20	20	20	20	19
CELLULAR INFILTRATION' INFLAMMATORY			17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
CELLULAR INFILTRATION' LEUKEMIA CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
CELLULAR INFILTRATION' MONONUCLEAR CELL' PERIDUCTAL			14 3 1 0	15 4 1 0	19 1 0 0	18 2 0 0	16 3 0 0	16 3 0 0
HARDERIAN ALTERATION			8 10 0 0	12 6 2 0	13 6 1 0	15 5 0 0	11 8 0 0	11 8 0 0
SUBMANDIBULAR LN			18	20	20	20	20	19
CELLULAR INFILTRATION' LEUKEMIA CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 0 1 0
DEPOSIT' PIGMENT			17 1 0 0	19 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
ERYTHROCYTES' SINUS			17 1 0 0	19 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
HEMORRHAGE			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
HYPERPLASIA' LYMPHOCYTE			17 1 0 0	20 0 0 0	20 0 0 0	19 1 0 0	18 1 0 0	18 1 0 0
PLASMACYTOSIS			11 7 0 0	17 3 0 0	13 7 0 0	14 6 0 0	13 6 0 0	13 6 0 0
STOMACH			18	20	20	20	20	19
CYST' LAMINA PROPRIA			17 1 0 0	20 0 0 0	19 1 0 0	20 0 0 0	20 0 0 0	18 1 0 0
EDEMA' SUBMUCOSA'			18 0 0 0	20 0 0 0	19 1 0 0	20 0 0 0	20 0 0 0	19 0 0 0
METAPLASIA' SQUAMOUS CELL			18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
VACUOLIZATION' CYTOPLASMIC' SQUAMOUS CELL			17 1 0 0	19 1 0 0	20 0 0 0	19 1 0 0	19 0 0 0	19 0 0 0
DUODENUM			18	20	20	20	20	19
DILATATION' CYSTIC' CRYPT			18 0 0 0	20 0 0 0	19 1 0 0	20 0 0 0	20 0 0 0	19 0 0 0

--:NOT REMARKABLE,+:SLIGHT,++:MODERATE,+++:MARKED

LN:LYMPH NODE

*: P<0.05 (SIGNIFICANT DIFFERENCE FROM CONTROL)

Table 12 Histopathological findings in rats treated with the enzymatically-decomposed rutin by dietary administration for 52 weeks. (Continued)

ORGAN FINDING	SEX		MALE				
	TEST ARTICLE	DOSE	CONTROL	0.04%	0.20%	1%	5%
	GRADE	- + + + + +	- + + + + +	- + + + + +	- + + + + +	- + + + + +	- + + + + +
ILEUM	NO.OF ANIMALS	18	20	20	20	20	19
CELLULAR INFILTRATION' LEUKEMIA CELL' SUBMUCOSA		18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
CECUM	NO.OF ANIMALS	18	20	20	20	20	19
CALCIFICATION' LAMINA PROPRIA		17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
CELLULAR INFILTRATION' LEUKEMIA CELL		18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
COLON	NO.OF ANIMALS	18	20	20	20	20	19
CELLULAR INFILTRATION' LEUKEMIA CELL		18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
RECTUM	NO.OF ANIMALS	18	20	20	20	20	19
CELLULAR INFILTRATION' LEUKEMIA CELL		18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
EDEMA' SUBMUCOSA		18 0 0 0	19 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
PITUITARY GLAND	NO.OF ANIMALS	18	20	20	20	20	19
ADENOMA' PARS DISTALIS		16 2 0 0	18 2 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
CYST' PARS DISTALIS		18 0 0 0	19 1 0 0	15 5 0 0	17 3 0 0	17 2 0 0	17 2 0 0
CYST' PARS INTERMEDIA		13 5 0 0	20 0 0 0 *	19 1 0 0	19 1 0 0	19 1 0 0	17 2 0 0
HYPERPLASIA' PARS DISTALIS		18 0 0 0	20 0 0 0	19 1 0 0	19 1 0 0	19 1 0 0	18 1 0 0
THYROID GLAND	NO.OF ANIMALS	18	20	20	20	20	19
ADENOMA' C-CELL		18 0 0 0	19 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
CELLULAR INFILTRATION' LEUKEMIA CELL		18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
DYSPLASIA		18 0 0 0	18 2 0 0	19 1 0 0	19 1 0 0	19 1 0 0	17 2 0 0
HYPERPLASIA' C-CELL		18 0 0 0	19 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
HYPERPLASIA' CYSTIC' FOLLICULAR CELL		18 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	18 1 0 0
HYPERPLASIA' FOCAL' FOLLICULAR CELL		16 2 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
HYPERTROPHY' FOLLICULAR CELL		17 1 0 0	20 0 0 0	20 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
PARATHYROID GLAND	NO.OF ANIMALS	18	20	19	20	20	19
ADENOMA		18 0 0 0	20 0 0 0	19 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0
HYPERPLASIA' NODULAR		18 0 0 0	20 0 0 0	19 0 0 0	20 0 0 0	20 0 0 0	19 0 0 0

--:NOT REMARKABLE,+;SLIGHT,++;MODERATE,+++;MARKED

*: P<0.05 (SIGNIFICANT DIFFERENCE FROM CONTROL)