

THESIS

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Animal Nutrition and Feed Safety

Kaposvár
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**Hungarian University of Agriculture and Life
Sciences**

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Animal Nutrition and Feed Safety

**APPLICATION OF BEEKEEPING BY-PRODUCT
(SLUM GUM) IN FISH FEED**

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APPENDICES

APPENDIX 1

Initial mean body weight

Anova: Single Factor of Initial BW						
SUMMARY						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>	Tukey	
Control (i)	36	1679	46,64	56,64	a	
SG10 (i)	36	1684	46,78	85,38	ab	
SG30 (i)	36	1679	46,64	55,67	b	
ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0,46	2	0,231	0,00351	0,9965	3,0829
Within Groups	6918,83	105	65,894			
Total	6919,30	107				

Q TEST						
group 1	group 2	mean	std err	lower	upper	p-value
Control (i)	SG10 (i)	0,139 a	1,35	-4,41	4,69	0,997
Control (i)	SG30 (i)	0 ab	1,35	-4,55	4,55	1
SG10 (i)	SG30 (i)	0,139 b	1,35	-4,41	4,69	1,0

Final body weight

TUKEY HSD/KRAMER			alpha	0,05		
group	mean	n	ss	Std Err	Lower	Upper
Control	67,3333333	36	6600	2,09469916	63,1799319	71,4867348
SG10	64,5	36	6723	2,09469916	60,3465985	68,6534015
SG30	61,25	36	3262,75	2,09469916	57,0965985	65,4034015
		108	16585,75			

ANOVA					
<i>Sources</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P value</i>
Between Groups	667,166667	2	333,583333	2,11182792	0,12612785
Within Groups	16585,75	105	157,959524		
Total	17252,9167	107	161,242212		

Q TEST in the final body weight						
group 1	group 2	mean	std err	lower	upper	p-value
Control	SG10	2,83333333	2,09469916	-4,2090452	9,87571189	0,60593635
Control	SG30	6,08333333	2,09469916	-0,9590452	13,1257119	0,10470194
SG10	SG30	3,25	2,09469916	-3,7923786	10,2923786	0,51799689

Weight Gain

TUKEY HSD/KRAMER		alpha		0,05	
<i>group</i>	<i>mean</i>	<i>n</i>	<i>ss</i>	<i>df</i>	<i>q-crit</i>
Control	248	3	148,666667		
SG10	213	3	1098,66667		
SG30	175	3	516,666667		
		9	1764	6	4,339

ANOVA					
<i>Sources</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P value</i>
Between Groups	7994,89	2	3997,44	13,5967	0,0059
Within Groups	1764	6	294		
Total	9758,89	8	1219,861		

Q TEST						
group 1	group 2	mean	std err	lower	upper	p-value
Control	SG10	35,6667	9,8995	-7,2872	78,6206	0,0961
Control	SG30	73	9,8995	30,0461	115,9539	0,0048
SG10	SG30	37,333333	9,8995	-5,6206	80,2872	0,0826

FCR

TUKEY HSD/KRAMER			alpha	0,05	
<i>group</i>	<i>mean</i>	<i>n</i>	<i>ss</i>	<i>df</i>	<i>q-crit</i>
Control	1,78	3	0,00413716		
SG10	2,05	3	0,08651209		
SG30	2,44	3	0,06202708		
		9	0,15267634	6	4,339

ANOVA					
<i>Sources</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P value</i>
Between Groups	0,66807241	2	0,33403621	13,1272288	0,00643701
Within Groups	0,15267634	6	0,02544606		
Total	0,82074875	8	0,10259359		

Q TEST						
group 1	group 2	mean	std err	lower	upper	p-value
Control	SG10	0,27364	0,09210	-0,12597	0,67325	0,16980
Control	SG30	0,66396	0,09210	0,26435	1,06357	0,00534
SG10	SG30	0,39032	0,09210	-0,00929	0,78993	0,05462

	group	mean	sd	n	Tukey
1	Control	1.778437	0.04548166	3	a
2	SG10	2.052079	0.20798088	3	ab
3	SG30	2.442398	0.17610662	3	b

SGR

TUKEY HSD/KRAMER			alpha	0,05	
<i>group</i>	<i>mean</i>	<i>n</i>	<i>ss</i>	<i>df</i>	<i>q-crit</i>
Control	1,31	3	0,00257271		
SG10	1,15	3	0,02203892		
SG30	0,97	3	0,01017135		
		9	0,03478298	6	4,339

ANOVA

<i>Sources</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P value</i>
Between Groups	0,17245918	2	0,08622959	14,8744462	0,00472787
Within Groups	0,03478298	6	0,00579716		
Total	0,20724215	8	0,02590527		

Q TEST

group 1	group 2	mean	std err	lower	upper	p-value	mean-crit
Control	SG10	0,2	0,0	0,0	0,4	0,083	0,191
Control	SG30	0,3	0,0	0,1	0,5	0,0038	0,19
SG10	SG30	0,2	0,0	0,0	0,4	0,070	0,191

Df Sum Sq Mean Sq F value Pr(>F)

group 2 0.17246 0.08623 14.87 0.00473 **

Residuals 6 0.03478 0.00580

Signif. codes:

0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Linear Hypotheses:

Pr(>|t|)

SG10 - Control == 0 0.08328 .

SG30 - Control == 0 0.00356 **

SG30 - SG10 == 0 0.07055 .

Signif. codes:

0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Adjusted p values reported -- single-step method)

PER

TUKEY HSD/KRAMER			alpha	0,05	
<i>group</i>	<i>mean</i>	<i>n</i>	<i>ss</i>	<i>df</i>	<i>q-crit</i>
Control	1,74	3	0,00386481		
SG10	1,53	3	0,04284762		
SG30	1,26	3	0,01539077		
		9	0,0621032	6	4,339

ANOVA					
<i>Sources</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P value</i>
Between Groups	0,35692093	2	0,17846046	17,2416678	0,00325555
Within Groups	0,0621032	6	0,01035053		
Total	0,41902413	8	0,05237802		

Q TEST						
group 1	group 2	mean	std err	lower	upper	p-value
Control	SG10	0,21562239	0,05873822	-0,0392427	0,47048751	0,09037577
Control	SG30	0,48674483	0,05873822	0,23187972	0,74160995	0,00264201
SG10	SG30	0,27112244	0,05873822	0,01625733	0,52598756	0,03938335

Df Sum Sq Mean Sq F value Pr(>F)

group 2 0.3569 0.17846 17.24 0.00326 **

Residuals 6 0.0621 0.01035

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Linear Hypotheses:

Estimate Std. Error t value Pr(>|t|)

SG10 - Control == 0 -0.21562 0.08307 -2.596 0.09048 .

SG30 - Control == 0 -0.48674 0.08307 -5.860 0.00239 **

SG30 - SG10 == 0 -0.27112 0.08307 -3.264 0.03934 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Adjusted p values reported -- single-step method)

CF

TUKEY HSD/KRAMER			alpha	0,05	
<i>group</i>	<i>mean</i>	<i>n</i>	<i>ss</i>	<i>df</i>	<i>q-crit</i>
Control	0,422179	3	0,0011205		
SG10	0,37623956	3	0,00617346		
SG30	0,32521394	3	0,00403484		
		9	0,0113288	6	4,339

ANOVA					
<i>Sources</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P value</i>
Between Groups	0,01411627	2	0,00705813	3,738154	0,08825533
Within Groups	0,0113288	6	0,00188813		
Total	0,02544507	8	0,00318063		

Q TEST						
group 1	group 2	mean	std err	lower	upper	p-value
Control	SG10	0,04593944	0,0250874	-0,0629148	0,15479369	0,44785552
Control	SG30	0,09696506	0,0250874	-0,0118892	0,2058193	0,07595655
SG10	SG30	0,05102562	0,0250874	-0,0578286	0,15987986	0,38169581