



Lampiran I. Data Hasil Analisa Bilangan TBA Pada Minyak Goreng

Jenis produk	Hari	waktu pengambilan	D (absorbans)			Bilangan TBA (mg ma/ kg bahan)			Rata-rata
			Ulangan			Ulangan			
			1	2	3	1	2	3	
MB	1		0.147	0.145	0.149	1.146	1.131	1.162	1.1466
			0.171	0.173	0.173	1.333	1.349	1.349	1.3442
			0.191	0.196	0.194	1.499	1.529	1.513	1.5106
MA		1	0.261	0.259	0.263	2.036	2.020	2.051	2.0358
			0.301	0.298	0.302	2.348	2.324	2.356	2.3426
			0.203	0.205	0.207	1.583	1.599	1.615	1.5990
MT		2	0.269	0.273	0.275	2.098	2.129	2.145	2.1242
			0.309	0.310	0.315	2.410	2.418	2.457	2.4284
			0.214	0.219	0.216	1.669	1.708	1.685	1.6874
MM		3	0.278	0.280	0.283	2.168	2.184	2.207	2.1866
			0.318	0.322	0.324	2.480	2.512	2.527	2.5064
			0.148	0.150	0.153	1.154	1.170	1.193	1.1726
MP		1	0.184	0.187	0.181	1.435	1.459	1.412	1.4352
			0.211	0.206	0.208	1.646	1.607	1.622	1.6250
			0.281	0.277	0.280	2.192	2.161	2.184	2.1788
MB	2	1	0.328	0.326	0.328	2.558	2.543	2.558	2.5532
			0.222	0.219	0.217	1.732	1.708	1.693	1.7108
			0.292	0.290	0.292	2.278	2.262	2.278	2.2724
MA		2	0.340	0.339	0.338	2.652	2.644	2.636	2.6442
			0.234	0.229	0.231	1.825	1.786	1.802	1.8044
			0.305	0.308	0.306	2.379	2.402	2.387	2.3894
MT		3	0.348	0.352	0.354	2.714	2.746	2.761	2.7404
			0.149	0.152	0.151	1.162	1.186	1.178	1.1752
			0.188	0.190	0.189	1.466	1.482	1.474	1.4742
MM		1	0.212	0.217	0.215	1.654	1.693	1.677	1.6744
			0.284	0.286	0.288	1.989	2.215	2.231	2.2308
			0.330	0.332	0.337	2.574	2.599	2.629	2.5974
MP		2	0.227	0.224	0.225	1.771	1.747	1.755	1.7576
			0.298	0.296	0.298	2.324	2.309	2.324	2.3192
			0.343	0.344	0.347	2.675	2.683	2.707	2.6884
MB	3	1	0.239	0.234	0.237	1.864	1.825	1.849	1.8460
			0.309	0.312	0.311	2.410	2.434	2.426	2.4232
			0.359	0.356	0.354	2.800	2.77	2.761	2.7794
MA		2	0.148	0.152	0.153	1.154	1.186	1.193	1.1778
			0.189	0.192	0.191	1.474	1.498	1.499	1.4872
			0.222	0.220	0.218	1.732	1.716	1.700	1.7160
MT		3	0.295	0.296	0.298	2.301	2.309	2.324	2.3114
			0.357	0.353	0.355	2.785	2.753	2.769	2.7690
			0.235	0.232	0.234	1.833	1.810	1.825	1.8226
MM		1	0.311	0.310	0.311	2.426	2.418	2.426	2.4232
			0.370	0.368	0.365	2.886	2.870	2.847	2.8678
			0.243	0.245	0.248	1.895	1.911	1.934	1.9136
MP		2	0.331	0.332	0.334	2.582	2.599	2.605	2.5922
			0.377	0.373	0.376	2.941	2.910	2.933	2.9276

Lampiran 2. Data Hasil Analisa Bilangan TBA Pada Makanan Gorengan

Jenis produk	Hari	waktu pengambilan	D (absorbans)			Bilangan TBA (mg ma/ kg bahan)			Rata-rata
			ulangan			ulangan			
			1	2	3	1	2	3	
T	1	1	0.216	0.218	0.217	1.685	1.700	1.693	1.6926
		2	0.275	0.279	0.277	2.145	2.176	2.161	2.1606
		3	0.315	0.317	0.312	2.457	2.473	2.434	2.4544
M		1	0.219	0.223	0.222	1.708	1.739	1.732	1.7264
		2	0.282	0.285	0.287	2.110	2.223	2.239	2.2204
		3	0.333	0.327	0.329	2.597	2.551	2.566	2.5714
P		1	0.228	0.230	0.227	1.778	1.794	1.771	1.7810
		2	0.299	0.295	0.293	2.332	2.301	2.285	2.3062
		3	0.343	0.339	0.337	2.675	2.644	2.629	2.6494
T	2	1	0.232	0.228	0.227	1.810	1.778	1.771	1.7862
		2	0.295	0.299	0.300	2.301	2.332	2.340	2.3244
		3	0.347	0.350	0.349	2.707	2.730	2.722	2.7196
M		1	0.236	0.239	0.242	1.841	1.864	1.888	1.8642
		2	0.316	0.318	0.313	2.465	2.480	2.441	2.4622
		3	0.361	0.359	0.363	2.816	2.800	2.831	2.8158
P		1	0.250	0.246	0.248	1.950	1.919	1.934	1.9344
		2	0.325	0.324	0.329	2.535	2.527	2.566	2.5428
		3	0.388	0.391	0.392	3.026	3.050	3.058	3.0446
T	3	1	0.233	0.229	0.231	1.817	1.786	1.801	1.8018
		2	0.306	0.302	0.307	2.387	2.356	2.395	2.3790
		3	0.355	0.352	0.353	2.769	2.746	2.753	2.7560
M		1	0.243	0.245	0.243	1.895	1.911	1.895	1.9006
		2	0.330	0.326	0.328	2.574	2.543	2.558	2.5584
		3	0.373	0.378	0.376	2.909	2.948	2.933	2.9302
P		1	0.256	0.255	0.253	1.997	1.989	1.973	1.9864
		2	0.331	0.336	0.335	2.582	2.621	2.613	2.6052
		3	0.385	0.384	0.389	3.003	2.995	3.034	3.0108
T	4	1	0.247	0.244	0.246	1.927	1.903	1.919	1.9162
		2	0.322	0.325	0.327	2.512	2.535	2.551	2.5324
		3	0.371	0.374	0.376	2.894	2.917	2.933	2.9146
M		1	0.261	0.258	0.256	2.036	2.012	1.997	2.0150
		2	0.343	0.339	0.341	2.675	2.644	2.660	2.6598
		3	0.402	0.396	0.404	3.136	3.089	3.151	3.1252
P		1	0.267	0.269	0.264	2.083	2.098	2.059	2.0800
		2	0.356	0.359	0.355	2.777	2.800	2.769	2.7820
		3	0.435	0.401	0.398	3.159	3.128	3.104	3.1304

Lanjutan Lampiran 1.

Jenis produk	Hari	waktu pengambilan	D (absorbans)			Bilangan TBA (mg ma / kg bahan)			Rata-rata
			Ulangan			Ulangan			
			1	2	3	1	2	3	
MB	5		0.152	0.150	0.153	1.186	1.170	1.193	1.1830
MA			0.197	0.195	0.193	1.537	1.521	1.505	1.5210
MT		1	0.226	0.230	0.228	1.763	1.794	1.778	1.7784
		2	0.305	0.307	0.305	2.379	2.395	2.379	2.3842
		3	0.355	0.357	0.359	2.855	2.769	2.785	2.7846
MM		1	0.242	0.238	0.243	1.888	1.856	1.895	1.8798
		2	0.318	0.321	0.319	2.480	2.504	2.488	2.4908
		3	0.372	0.376	0.373	2.902	2.933	2.909	2.9146
MP		1	0.257	0.255	0.258	2.005	1.989	2.012	2.0020
		2	0.336	0.333	0.338	2.621	2.597	2.636	2.6182
		3	0.388	0.390	0.391	3.026	3.042	3.050	3.0394

Keterangan:

prosedur analisa mengacu pada Apriyantono *et al* (1989)

Bilangan TBA (mg ma/kg bahan) = 7.8 * D (absorbans)

Ambang batas bilangan TBA dalam bahan pangan : 1.296 mg malonaldehid / kg bahan (konversi dari 18 µmol malonaldehid / kg bahan menurut Abubakar, 1992 dalam Legowo *et al*, 2002).

MB = minyak baru

MA = minyak awal (campuran minyak baru dengan minyak bekas)

MT = minyak bekas penggorengan tahu

MM = minyak bekas penggorengan mendoan

MP = minyak bekas penggorengan pisang

1 = waktu pengambilan pada awal penggorengan

2 = waktu pengambilan 2 jam kemudian

3 = waktu pengambilan 4 jam kemudian

Lanjutan Lampiran 2.

Jenis produk	Hari	waktu pengambilan	D (absorbans)			Bilangan TBA (mg ma/ kg bahan)			Rata-rata
			ulangan			ulangan			
			1	2	3	1	2	3	
T	5	1	0.249	0.251	0.254	1.942	1.958	1.981	1.9604
		2	0.331	0.332	0.336	2.582	2.599	2.621	2.5974
		3	0.383	0.384	0.385	2.987	2.995	3.003	2.9952
M		1	0.273	0.271	0.275	2.129	2.114	2.145	2.1294
		2	0.353	0.355	0.349	2.753	2.769	2.722	2.7482
		3	0.399	0.404	0.402	3.112	3.151	3.136	3.1330
P		1	0.286	0.289	0.284	2.231	2.254	2.215	2.2334
		2	0.361	0.364	0.366	2.816	2.839	2.855	2.8366
		3	0.412	0.417	0.415	3.214	3.253	3.237	3.2344

Keterangan:

prosedur analisa mengacu pada Apriyantono *et al.*, (1989)

Bilangan TBA (mg ma/kg bahan) = $7.8 \cdot D$ (absorbans)

Ambang batas bilangan TBA dalam bahan pangan : 1.296 mg malonaldehid / kg bahan (konversi dari 18 μ mol malonaldehid / kg bahan menurut Abubakar, 1992 dalam Legowo *et al*, 2002).

T = Tahu

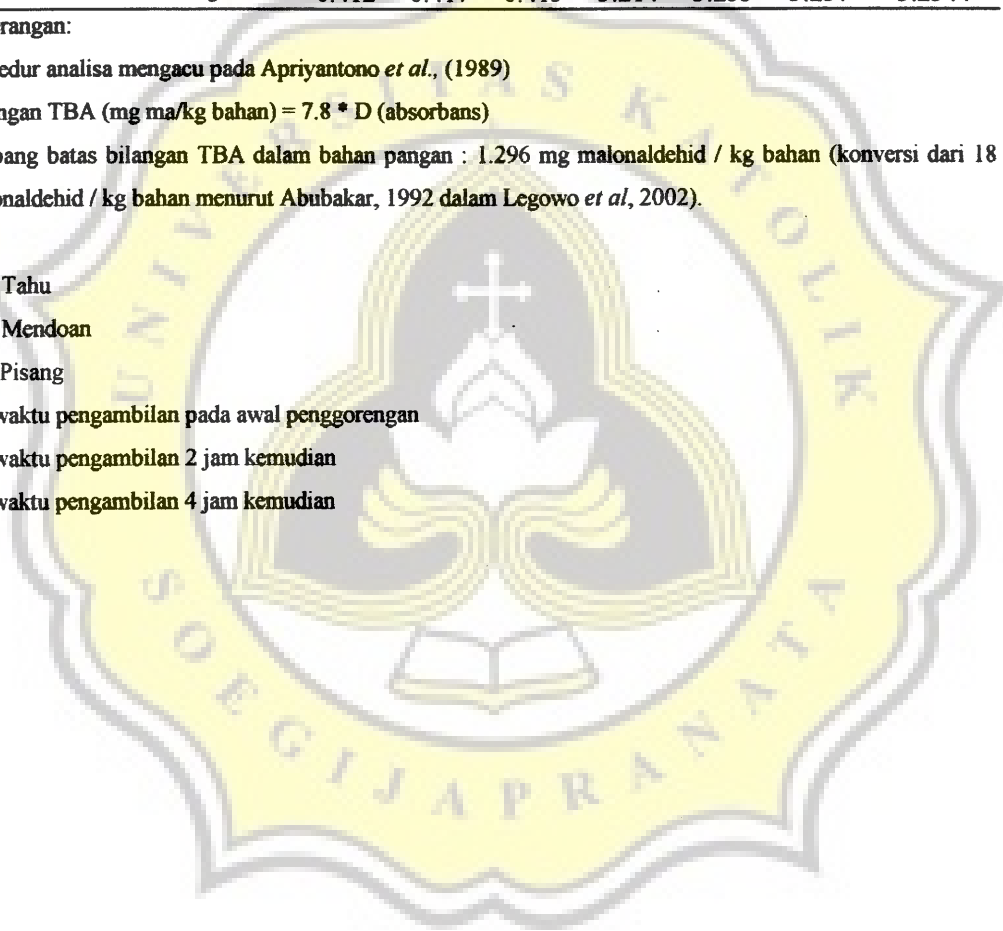
M = Mendoan

P = Pisang

1 = waktu pengambilan pada awal penggorengan

2 = waktu pengambilan 2 jam kemudian

3 = waktu pengambilan 4 jam kemudian



Lampiran 3. Kadar TBA Makanan Gorengan Berdasarkan Tahapan Penggorengan

Waktu pengambilan (jam)	No.	Bahan	Kadar TBA (mg malonaldehid/kg bahan)
15.00	1	singkong	
	2	tahu (A1)	1.830 ± 0.107
	3	mendoan (B1)	1.927 ± 0.153
	4	pisang (C1)	2.003 ± 0.168
	5	tahu isi	
	6	bakwan	
	7	timus	
	8	tahu isi	
	9	bakwan	
18.00	10	tahu (A2)	2.399 ± 0.173
	11	mendoan (B2)	2.530 ± 0.203
	12	pisang (C2)	2.615 ± 0.211
	13	mendoan	
20.00	14	tahu isi	
	15	tahu (A3)	2.735 ± 0.230
	16	mendoan (B3)	2.915 ± 0.234
	17	pisang (C3)	3.014 ± 0.221

Keterangan :

Interval waktu penggorengan : 10 – 15 menit

A1, B1, C1 : makanan gorengan yang diambil pada 1 jam pertama penggorengan

A2, B2, C2 : makanan gorengan yang diambil 2 jam kemudian

A3, B3, C3 : makanan gorengan yang diambil 4 jam kemudian

Lampiran 4. Kadar TBA Minyak Goreng Berdasarkan Tahapan Penggorengan

Waktu pengambilan (jam)	No.	Bahan	Kadar TBA (mg malonaldehid/kg bahan)
15.00	1	minyak singkong	
	2	minyak tahu (A1)	1.661 ± 0.106
	3	minyak mendoan (B1)	1.754 ± 0.108
	4	minyak pisang (C1)	1.851 ± 0.118
	5	minyak tahu isi	
	6	minyak bakwan	
	7	minyak timus	
	8	minyak tahu isi	
	9	minyak bakwan	
18.00	10	minyak tahu (A2)	2.228 ± 0.133
	11	minyak mendoan (B2)	2.326 ± 0.142
	12	minyak pisang (C2)	2.440 ± 0.181
20.00	13	minyak mendoan	
	14	minyak tahu isi	
	15	minyak tahu (A3)	2.609 ± 0.181
	16	minyak mendoan (B3)	2.709 ± 0.194
	17	minyak pisang (C3)	2.798 ± 0.203

Keterangan :

Interval waktu penggorengan : 10 – 15 menit

A1, B1, C1 : minyak bekas penggorengan makanan yang diambil pada 1 jam pertama penggorengan

A2, B2, C2 : minyak bekas penggorengan makanan yang diambil 2 jam kemudian

A3, B3, C3 : minyak bekas penggorengan makanan yang diambil 4 jam kemudian

Lampiran 5. Two Way Anova Minyak Goreng Berdasarkan Jenis Produk dan Waktu Pengambilan

Univariate Analysis of Variance

Between-Subjects Factors

	Value Label	N	
JNS_PRDK	1,00	minyak tahu	15
	2,00	minyak mendoan	15
	3,00	minyak pisang	15
WKT_AMBL	1,00		15
	2,00		15
	3,00		15

Descriptive Statistics

Dependent Variable: BIL_TBA

JNS_PRDK	WKT_AMBL	Mean	Std. Deviation	N
minyak tahu	1,00	1,6620	,1018	5
	2,00	2,2280	,1299	5
	3,00	2,6080	,1810	5
	Total	2,1660	,4231	15
minyak mendoan	1,00	1,7540	,1071	5
	2,00	2,3240	,1426	5
	3,00	2,7080	,1932	5
	Total	2,2620	,4293	15
minyak pisang	1,00	1,8500	,1164	5
	2,00	2,4420	,1734	5
	3,00	2,8000	,2016	5
	Total	2,3640	,4342	15
Total	1,00	1,7553	,1282	15
	2,00	2,3313	,1656	15
	3,00	2,7053	,1955	15
	Total	2,2640	,4269	45

Levene's Test of Equality of Error Variances

Dependent Variable: BIL_TBA

F	df1	df2	Sig.
,574	8	36	,792

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design:

Intercept+JNS_PRDK+WKT_AMBL+JNS_PRDK *
WKT_AMBL

Lanjutan Lampiran 5

Tests of Between-Subjects Effects

Dependent Variable: BIL_TBA

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7,166 ^a	8	,896	37,777	,000
Intercept	230,656	1	230,656	9727,318	,000
JNS_PRDK	,294	2	,147	6,202	,005
WKT_AMBL	6,871	2	3,435	144,878	,000
JNS_PRDK * WKT_AMBL	1,360E-03	4	3,400E-04	,014	1,000
Error	,854	36	2,371E-02		
Total	238,676	45			
Corrected Total	8,020	44			

a. R Squared = ,894 (Adjusted R Squared = ,870)

Estimated Marginal Means

1. JNS_PRDK

Dependent Variable: BIL_TBA

JNS_PRDK	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
minyak tahu	2,166	,040	2,085	2,247
minyak mendoan	2,262	,040	2,181	2,343
minyak pisang	2,364	,040	2,283	2,445

2. WKT_AMBL

Dependent Variable: BIL_TBA

WKT_AMBL	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1,00	1,755	,040	1,675	1,836
2,00	2,331	,040	2,251	2,412
3,00	2,705	,040	2,625	2,786

3. JNS_PRDK * WKT_AMBL

Dependent Variable: BIL_TBA

JNS_PRDK	WKT_AMBL	Mean	Std. Error	95% Confidence interval	
				Lower Bound	Upper Bound
minyak tahu	1,00	1,662	,069	1,522	1,802
	2,00	2,228	,069	2,088	2,368
	3,00	2,608	,069	2,468	2,748
minyak mendoan	1,00	1,754	,069	1,614	1,894
	2,00	2,324	,069	2,184	2,464
	3,00	2,708	,069	2,568	2,848
minyak pisang	1,00	1,850	,069	1,710	1,990
	2,00	2,442	,069	2,302	2,582
	3,00	2,800	,069	2,660	2,940

**Post Hoc Tests
JNS_PRDK
Homogeneous Subsets**

BIL_TBA

Duncan^{a,b}

JNS_PRDK	N	Subset	
		1	2
minyak tahu	15	2,1660	
minyak mendoan	15	2,2620	2,2620
minyak pisang	15		2,3640
Sig.		,096	,078

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 2,371E-02.

a. Uses Harmonic Mean Sample Size = 15,000.

b. Alpha = ,05.

**WKT_AMBL
Homogeneous Subsets**

BIL_TBA

Duncan^{a,b}

WKT_AMBL	N	Subset		
		1	2	3
1,00	15	1,7553		
2,00	15		2,3313	
3,00	15			2,7053
Sig.		1,000	1,000	1,000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 2,371E-02.

a. Uses Harmonic Mean Sample Size = 15,000.

b. Alpha = ,05.

Lampiran 6. Two Way Anova Makanan Gorengan Berdasarkan Jenis Produk dan Waktu Pengambilan

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
jns_prdk	1.00	tahu	15
	2.00	mendoan	15
	3.00	pisang	15
wkt_ambl	1.00		15
	2.00		15
	3.00		15

Descriptive Statistics

Dependent Variable: bil TBA

jns_prdk	wkt_ambl	Mean	Std. Deviation	N
tahu	1.00	1.8320	.10849	5
	2.00	2.3980	.17413	5
	3.00	2.7680	.21064	5
	Total	2.3327	.42829	15
mendoan	1.00	1.9280	.15320	5
	2.00	2.5300	.20445	5
	3.00	2.9160	.23490	5
	Total	2.4580	.45989	15
pisang	1.00	2.0020	.16784	5
	2.00	2.6160	.21007	5
	3.00	3.0120	.21982	5
	Total	2.5433	.46846	15
Total	1.00	1.9207	.15267	15
	2.00	2.5147	.20452	15
	3.00	2.8987	.23031	15
	Total	2.4447	.45071	45

Levene's Test of Equality of Error Variances

Dependent Variable: bil TBA

F	df1	df2	Sig.
.290	8	36	.965

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design:

Intercept+jns_prdk+wkt_ambl+jns_prdk*wkt_ambl

Lanjutan Lampiran 6.

Tests of Between-Subjects Effects

Dependent Variable: bil TBA

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7.628 ^a	8	.954	26.201	.000
Intercept	268.938	1	268.938	7389.980	.000
jns_prdk	.337	2	.168	4.628	.016
wkt_amb1	7.284	2	3.642	100.075	.000
jns_prdk*wkt_amb1	.007	4	.002	.051	.995
Error	1.310	36	.036		
Total	277.876	45			
Corrected Total	8.938	44			

a. R Squared = .853 (Adjusted R Squared = .821)

Estimated Marginal Means

1. jns_prdk

Dependent Variable: bil TBA

jns_prdk	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
tahu	2.333	.049	2.233	2.433
mendoan	2.458	.049	2.358	2.558
pisang	2.543	.049	2.443	2.643

2. wkt_amb1

Dependent Variable: bil TBA

wkt_amb1	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1.00	1.921	.049	1.821	2.021
2.00	2.515	.049	2.415	2.615
3.00	2.899	.049	2.799	2.999

Lanjutan Lampiran 6.

3. jns_prdk * wkt_amb1

Dependent Variable: bil_TBA

jns_prdk	wkt_amb1	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
tahu	1.00	1.832	.085	1.659	2.005
	2.00	2.398	.085	2.225	2.571
	3.00	2.768	.085	2.595	2.941
mendoan	1.00	1.928	.085	1.755	2.101
	2.00	2.530	.085	2.357	2.703
	3.00	2.916	.085	2.743	3.089
pisang	1.00	2.002	.085	1.829	2.175
	2.00	2.616	.085	2.443	2.789
	3.00	3.012	.085	2.839	3.185

Post Hoc Tests

jns_prdk

Homogeneous Subsets

bil_TBA

Duncan^{a,b}

jns_prdk	N	Subset	
		1	2
tahu	15	2.3327	
mendoan	15	2.4580	2.4580
pisang	15		2.5433
Sig.		.080	.229

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = .036.

a. Uses Harmonic Mean Sample Size = 15.000.

b. Alpha = .05.

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wkt_amb1
Homogeneous Subsets

bil_TBA

Duncan^{a,b}

wkt_amb1	N	Subset		
		1	2	3
1.00	15	1.9207		
2.00	15		2.5147	
3.00	15			2.8987
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = .036.

a. Uses Harmonic Mean Sample Size = 15.000.

b. Alpha = .05.

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
TBA_myk	2.2640	.42693	45
TBA_bp	2.4404	.44973	45

Correlations

		TBA_myk	TBA_bp
TBA_myk	Pearson Correlation	1	.993**
	Sig. (2-tailed)	.	.000
	N	45	45
TBA_bp	Pearson Correlation	.993**	1
	Sig. (2-tailed)	.000	.
	N	45	45

** . Correlation is significant at the 0.01 level (2-tailed).