

DAFTAR PUSTAKA

- [KKP] Kementerian Kelautan dan Perikanan. 2014. *Volume Produksi Kerapu-Rumput Laut-Nila 2009-2013*. Jakarta: Direktorat Jendral Budidaya Perikanan.
- Adi, Raharjo.1997. *Sosio Ekonomi Laut. Ujung Pandang* : Universitas Hassanuddin
- Anggadiredja, J.T. 1996. Kusmiyati, Sri Istini, dan H. Purwoto. Potensi dan Manfaat Rumput Laut Indonesia dalam Bidang Farmasi. *Prosiding Seminar Nasional Rumput Laut, APBIRI*. Jakarta.
- Anonim, 1995, Farmakope Indonesia, Edisi IV, 822, *Departemen Kesehatan Republik Indonesia*, Jakarta
- Ashary, Rahmat, Sumarni. 2019. *Pirolysis Limbah Pangkal Bambu Menjadi Karbon Aktif dan Asap Cair Menggunakan Zat Aktivator Asam Phosfat*. *Jurnal Inovasi Proses*, Vol.4. ISSN:2338-6452. Jakarta.
- Atkins, P.W., (1999), *Kimia Fisika Jilid II*. Erlangga, Jakarta.
- Campo VL, Kawano DF, da Silva DB, Carvalho I. 2009. Carageenans: Biological properties, chemical modifications and structural analysis - A review. *Carbohydrate Polymers* 77: sssssss167-180.
- Darmawan S. 2008. Sifat arang aktif tempurung kemiri dan pemanfaatannya sebagai penyerap emisi formaldehida papan serat berkerapatan sedang. [tesis]. Bogor: Sekolah Pasca Sarjana. Institut Pertanian Bogor.
- Doty, M.S. 1985. *Eucheuma alvarezii sp. (Gigartinales, Rhodophyta) from Malaysia*. Di dalam: Abbot IA Norris JN (Editor). *Taxonomy of economic Seaweeds*. California Sea Grant Collage Program.
- Ega. L., C. G. C. Lopulalan, dan F. Meiyasa. 2016. Artikel Penelitian Kajian Mutu Karaginan Rumput Laut Eucheuma cottonii Berdasarkan Sifat FisikoKimia pada Tingkat Konsentrasi Kalium Hidroksida (KOH) yang Berbeda. *Jurnal Aplikasi Teknologi Pangan*. 5 (2) : 38–44.
- Firdaus M, Astawan M, Muchtadi D, Wresdiyati T, Waspadji S, Karyono SS. 2012. Toksisitas akut ekstrak metanol rumput laut cokelat (*Sargassum echinocarpum*). *Jurnal Pengolahan Hasil Perikanan Indonesia* 15 (2): 148-155

- Firdaus M, Nugraha GRH, Utari DD. 2017. Fortification of seaweed (*Eucheuma cottonii*) flour on nutrition, iodine, and glycemic index of pasta. IOP Conference Series: *Earth and Environmental Science* 89 (1), 012011
- Food and Agriculture Organization (FAO) of The United Nation. 2016. *Cattle Meat Production*. <http://faostat.fao.org>. Diakses 28 Desember 2016.
- Gandjar, I. G. dan Rohman, A., 2007, *Kimia Farmasi Analisis*. Pustaka Pelajar, Yogyakarta
- Ghufran, M. K. 2011. *Kiat Sukses Budi Daya Rumput Laut Di Laut dan Tambak*. Andi Offset.
- H. Jankowska, Swiatkowski, A., Chorna, J. 1991. "Active Carbon". Horwood. London.
- Hassler, L.W. 1963. *Activated Carbon. 1st Edition*. Chemical Publishing Company Inc. New York.
- Manocha, Statish M. 2003. Porosus Carbon. *Department of Materials Science, Standar Patel Uiverstiy, India*. Sadhana, Vol. 28 (1 dan 2), pp 335-348
- McCabe, Warren L & Smith, J.C. 1999. "Operasi Teknik Kimia". Alih Bahasa Jasiji, E.Ir. Edisi ke-4. Penerbit Erlangga : Jakarta
- Necas, J & L, Bartosikova. 2013. Carrageenan : A Review. *Faculty Of Medicine and Densistry, Palacky University*. Olomouc, Czech Republic.
- Nikmah, Ulin. 2019. Mengenal Rumput Laut. ALPRIN. Semarang.
- Parenrengi, Andi dan Sulaeman. 2007. Mengenal Rumput Laut, *Kappaphycus alvarezii*. Balai Riset Perikanan Budidaya Air Payau, Maros. *Media Akuakultur*. Volume 2 Nomor 1. Protection Studies in Surface Science and Catalysis. Belanda: Elsivier
- Rowe, R.C., Sheckey, P.J., and Quinn, M.E. 2009. *Handbook of Pharmaceutical Excipients, Sixth Edition*. London: Pharmaceutical Press and American Pharmacists Association.
- Ruthven, D. M., 1984. *Principle of adsorption and Adsorption Process*. John Wiley dan Sons: New York, 124-141.
- Santoso, Joko., Uju., Ramadhan, W. 2018. Penuntun Praktikum Teknologi Industri Tumbuhan Laut. *Anggota IKAPI. IPB Science Techno Park*.

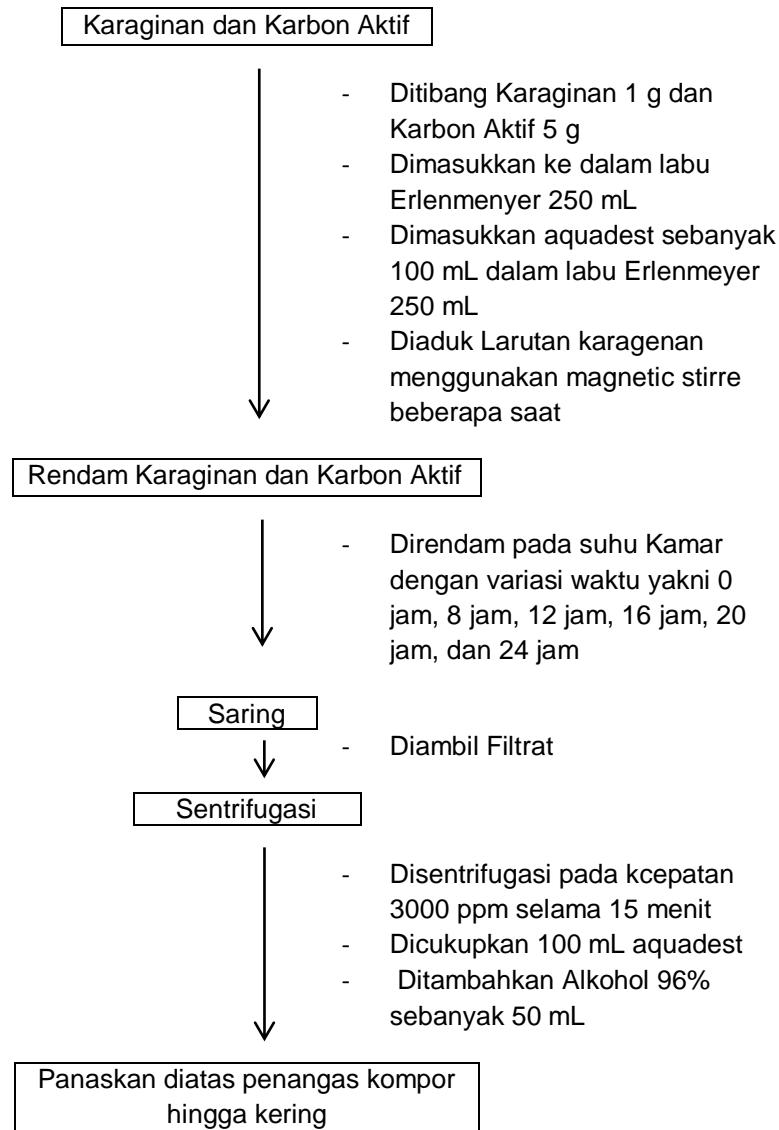
Bogor.

- Sari, Mayang. 2011. *Identifikasi Protein Menggunakan Fourier Transform Infrared (FTIR)*. Skripsi Tidak Diterbitkan. Depok. Departemen Teknik Kimia Fakultas Teknik. Universitas Indonesia.
- Sembiring, Meiliata Tryana dan Tuti Sarma, S, (2003), "Arang Aktif (Pengenalan dan Proses Pembuatannya)", *USU Digital Library, Indonesia*. hal 1-9.
- Sodini I, Boquien CY, Corrieu G, Lacroix C 1997a: Use of an immobilized cell bioreactor for the continuous inoculation of milk in fresh cheese manufacturing. *Journal of Industrial Microbiology and Biotechnology* 18, 56–61.
- Sontheimer, J.E.. (1985), .Activated Carbon for Water Treatment. *Netherlands, Elsevier*, pp. 51-105 .
- Sudibandriyo, M.. A Generalized Ono-Kondo Lattice Model for High Pressure on Carbon Adsorben. Ph. D dissertation, Oklahoma State University. Desember 2003
- Sudirjo, M. 2006. Pembuatan Karbon Aktif dari Kulit Kacang Tanah (*Arachis Hypogaeae*) dengan Aktivator Asam Sulfat. *Tugas Akhir Universitas Diponegoro*
- Sukardjo.2002. *Kimia Fisika*. Jakarta: Bineka Cipta.
- Swiatkowski, A., 1998, *Adsorption and its Application in Industry and Environmental*
- Swiatkowski, A.,1998, *Adsorption and iss Application in industry and Environmental Protection Student in Surface and Catalysis*. Belanda:Elsiviem volunteers. Asia Pac. J. Clin. Nutr. 12, 209–214.

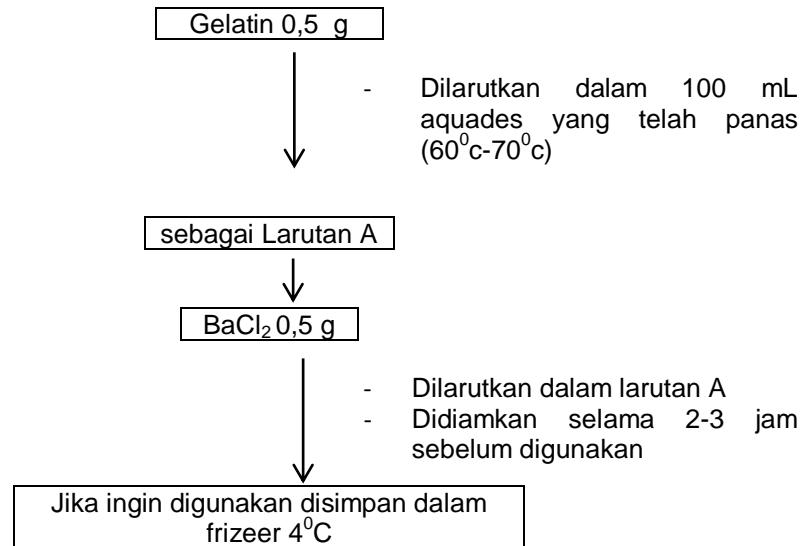
LAMPIRAN I

SKEMA KERJA

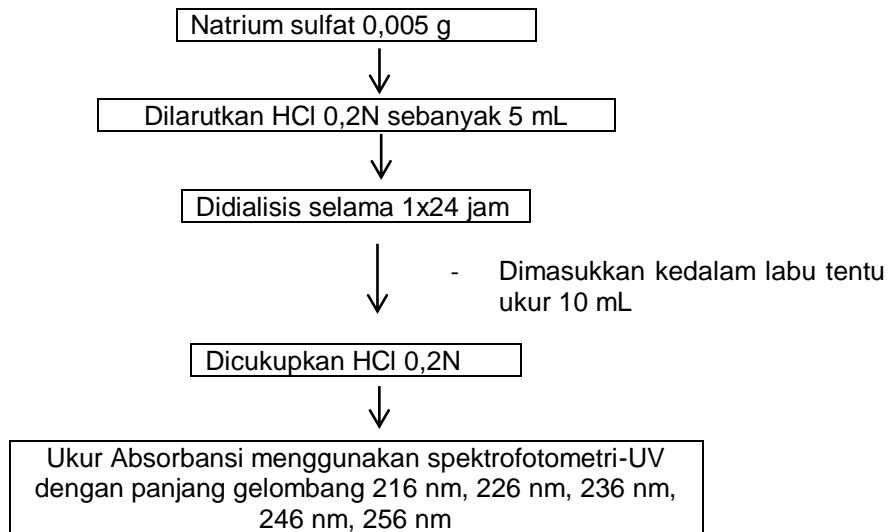
Preparasi sampel Karagenan



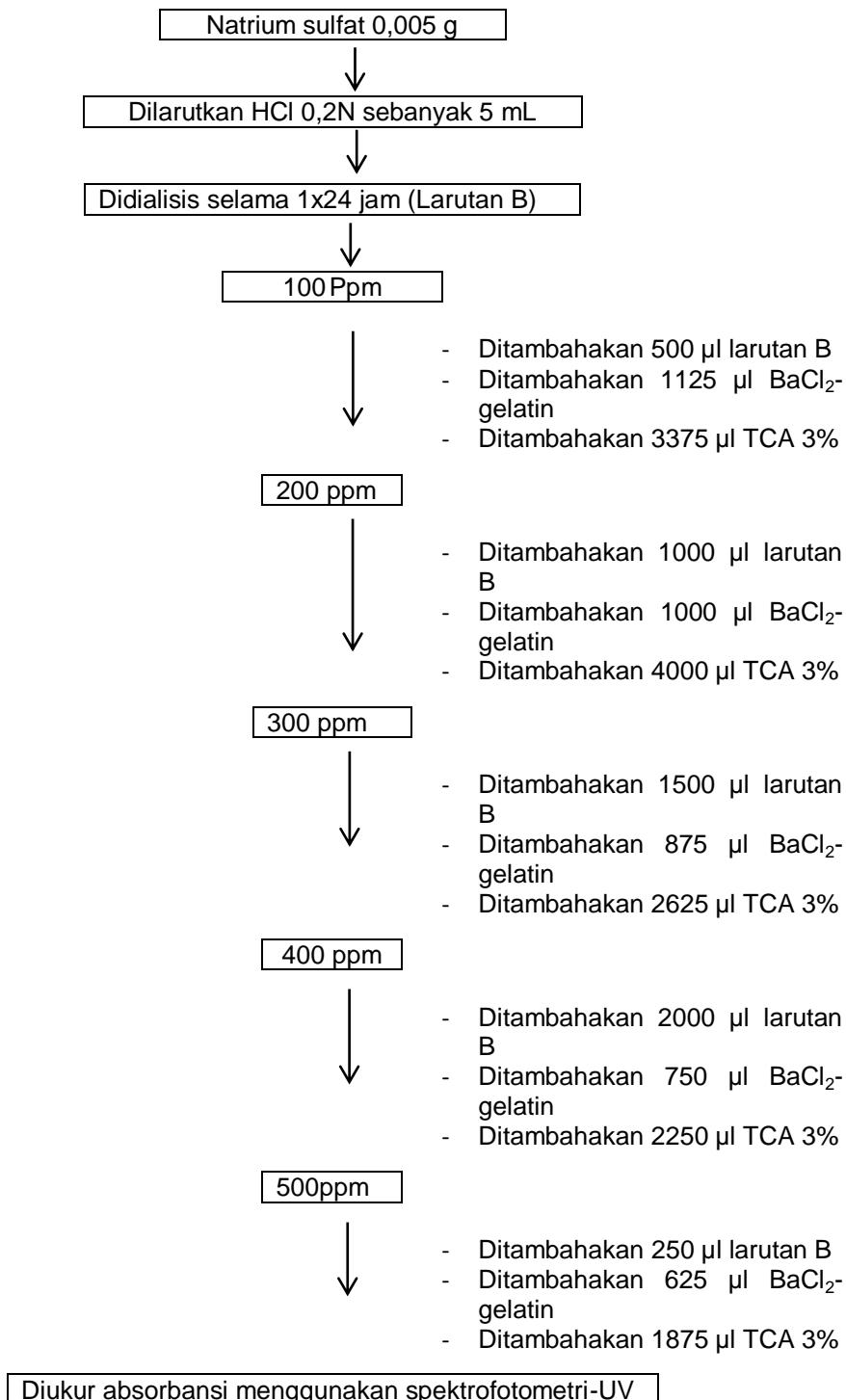
Penyiapan BaCl₂ - Gelatin



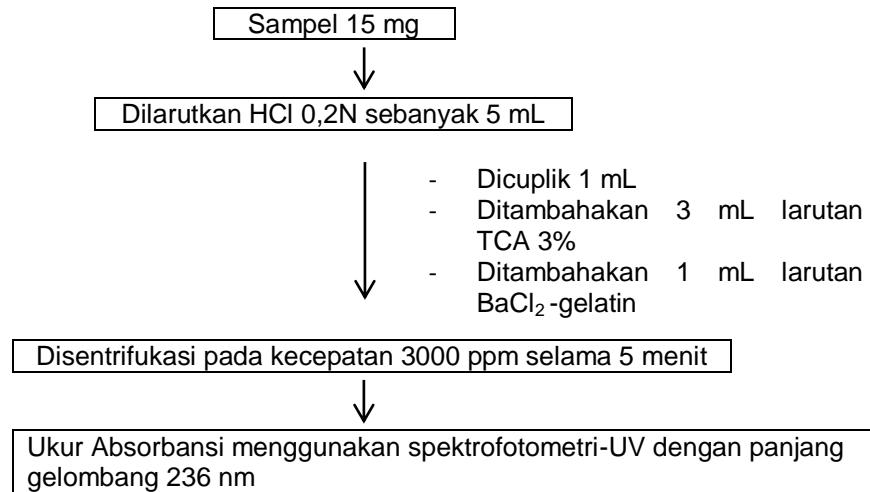
Penetuan Panjang Gelombang Maksimum



Pembuatan Larutan Standar



Pengukuran Sampel Preparat



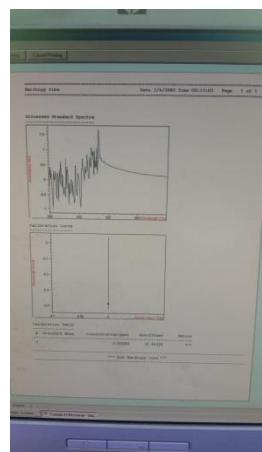
Lampiran 2. Gambar Penelitian



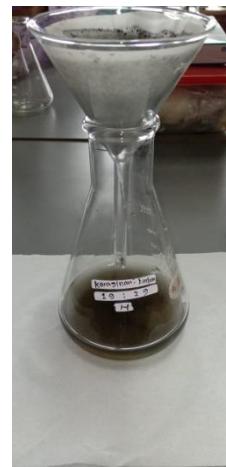
Gambar 11. Penimbangan BaCl₂
70°C



Gambar 12. Pemanasan Aquades 60-
70°C



Gambar 13. Hasil Pengukuran
Spektrofotometri UV



Gambar 14. Penyaringan Larutan
Karaginan dan Karbon Aktif



Gambar 15. Perendaman Karaginan dan Karbon Aktif



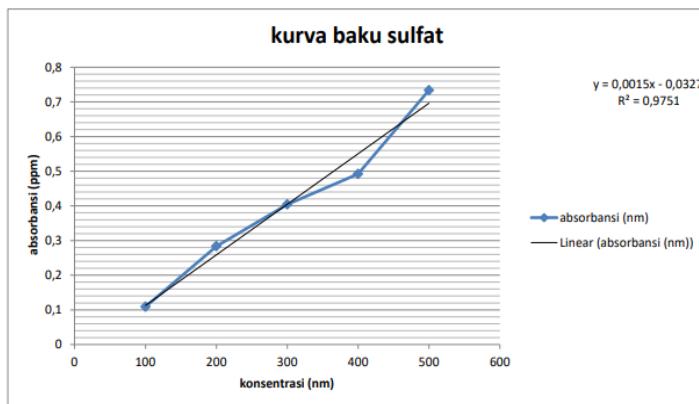
Gambar 16. Hasil Penyaringan



Gambar 17. Hasil Sentrifugasi



Gambar 18. Sampel Polisakarida Sulfat

Lampiran 3. Profil Spektrofotometri UV Kadar Karaginan**Gambar 19. Data Hasil Kurva Baku Sulfat**

Lampiran 4. Perhitungan Kadar Sulfat (ppm)

$$Y = 0,0015x - 0,0327$$

0 jam = 0,00057

$$0,00057 = 0,0015x - 0,0327$$

$$x = \frac{(0,00057) + 0,0327}{0,0015}$$

$$x = 22,18 \text{ ppm}$$

$$x = 0,02218 \mu\text{g/mL}$$

8 jam = 0,48691

$$0,48691 = 0,0015x - 0,0327$$

$$x = \frac{(0,48691) + 0,0327}{0,0015}$$

$$x = 346,406 \text{ ppm}$$

$$x = 0,346406 \mu\text{g/mL}$$

12 jam = 0,48463

$$0,48463 = 0,0015x - 0,0327$$

$$x = \frac{(0,48463) + 0,0327}{0,0015}$$

$$x = 344,8866 \text{ ppm}$$

$$x = 0,344886 \mu\text{g/mL}$$

16 jam = 0,35861

$$0,35861 = 0,0015x - 0,0327$$

$$x = \frac{(0,35861) + 0,0327}{0,0015}$$

$$x = 260,8733 \text{ ppm}$$

$$x = 0,260873 \mu\text{g/mL}$$

20 jam = 0,24939

$$0,24939 = 0,0015x - 0,0327$$

$$x = \frac{(0,24939) + 0,0327}{0,0015}$$

$$x = 188,06 \text{ ppm}$$

$$x = 0,18806 \mu\text{g/mL}$$

24 jam = 0,00001

$$0,00001 = 0,0015x - 0,0327$$

$$x = \frac{(0,00001) + 0,0327}{0,0015}$$

$$x = -21,80666 \text{ ppm}$$

$$x = 0,021806 \text{ } \mu\text{g}/\mu\text{L}$$

Lampiran 5. Uji Statistik

NPAR TESTS

/K-S(NORMAL)=Absorbansi

/MISSING ANALYSIS.

NPar Tests

Notes		
Output Created		19-APR-2022 00:01:14
Comments		
	Active Dataset	DataSet0
	Filter	<none>
Input	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	18
	Definition of Missing	User-defined missing values are treated as missing.
Missing Value Handling	Cases Used	Statistics for each test are based on all cases with valid data for the variable(s) used in that test.
		NPAR TESTS
Syntax		/K-S(NORMAL)=Absorbansi
		/MISSING ANALYSIS.
	Processor Time	00:00:00.00
Resources	Elapsed Time	00:00:00.03
	Number of Cases Allowed ^a	196608

a. Based on availability of workspace memory.

[DataSet0]

One-Sample Kolmogorov-Smirnov Test

		Absorbansi
N		18
Normal Parameters ^{a,b}	Mean	.2539739
	Std. Deviation	.20772608
	Absolute	.222
Most Extreme Differences	Positive	.222
	Negative	-.198
Kolmogorov-Smirnov Z		.943
Asymp. Sig. (2-tailed)		.336

a. Test distribution is Normal.

b. Calculated from data.

ONEWAY Absorbansi BY Waktu

/STATISTICS DESCRIPTIVES HOMOGENEITY

/MISSING ANALYSIS

/POSTHOC=TUKEY ALPHA(0.05).

Oneway

Notes

	Output Created	19-APR-2022 00:02:20
	Comments	
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	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	18
	Definition of Missing	User-defined missing values are treated as missing.
	Missing Value Handling	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
	Cases Used	ONEWAY Absorbansi BY Waktu
	Syntax	/STATISTICS DESCRIPTIVES HOMOGENEITY /MISSING ANALYSIS /POSTHOC=TUKEY ALPHA(0.05).
	Resources	Processor Time 00:00:00.03 Elapsed Time 00:00:00.04

[DataSet0]

Descriptives

Absorbansi

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean

					Lower Bound	Upper Bound
0 jam	3	.0001900	.00012124	.00007000	-.0001112	.0004912
8 jam	3	.4869100	.00583701	.00337000	.4724101	.5014099
12 jam	3	.4854033	.00453220	.00261667	.4741447	.4966619
16 jam	3	.3019333	.00184752	.00106667	.2973438	.3065228
20 jam	3	.2493900	.09031780	.05214500	.0250282	.4737518
24 jam	3	.0000167	.00000577	.00000333	.0000023	.0000310
Total	18	.2539739	.20772608	.04896151	.1506741	.3572736

Descriptives

Absorbansi

	Minimum	Maximum
0 jam	.00012	.00033
8 jam	.48017	.49028
12 jam	.48017	.48802
16 jam	.29980	.30300
20 jam	.14510	.30157
24 jam	.00001	.00002
Total	.00001	.49028

Test of Homogeneity of Variances

Absorbansi

Levene Statistic	df1	df2	Sig.
15.095	5	12	.000

ANOVA

Absorbansi

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.717	5	.143	104.749	.000
Within Groups	.016	12	.001		
Total	.734	17			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Absorbansi

Tukey HSD

(I) Waktu	(J) Waktu	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
0 jam	8 jam	-.48672000*	.03021284	.000	-.5882026	-.3852374
	12 jam	-.48521333*	.03021284	.000	-.5866959	-.3837308
	16 jam	-.30174333*	.03021284	.000	-.4032259	-.2002608
	20 jam	-.24920000*	.03021284	.000	-.3506826	-.1477174
	24 jam	.00017333	.03021284	1.000	-.1013092	.1016559

	0 jam	.48672000*	.03021284	.000	.3852374	.5882026
	12 jam	.00150667	.03021284	1.000	-.0999759	.1029892
8 jam	16 jam	.18497667*	.03021284	.001	.0834941	.2864592
	20 jam	.23752000*	.03021284	.000	.1360374	.3390026
	24 jam	.48689333*	.03021284	.000	.3854108	.5883759
	0 jam	.48521333*	.03021284	.000	.3837308	.5866959
	8 jam	-.00150667	.03021284	1.000	-.1029892	.0999759
12 jam	16 jam	.18347000*	.03021284	.001	.0819874	.2849526
	20 jam	.23601333*	.03021284	.000	.1345308	.3374959
	24 jam	.48538667*	.03021284	.000	.3839041	.5868692
	0 jam	.30174333*	.03021284	.000	.2002608	.4032259
	8 jam	-.18497667*	.03021284	.001	-.2864592	-.0834941
16 jam	12 jam	-.18347000*	.03021284	.001	-.2849526	-.0819874
	20 jam	.05254333	.03021284	.534	-.0489392	.1540259
	24 jam	.30191667*	.03021284	.000	.2004341	.4033992
	0 jam	.24920000*	.03021284	.000	.1477174	.3506826
	8 jam	-.23752000*	.03021284	.000	-.3390026	-.1360374
20 jam	12 jam	-.23601333*	.03021284	.000	-.3374959	-.1345308
	16 jam	-.05254333	.03021284	.534	-.1540259	.0489392
	24 jam	.24937333*	.03021284	.000	.1478908	.3508559
	0 jam	-.00017333	.03021284	1.000	-.1016559	.1013092
24 jam	8 jam	-.48689333*	.03021284	.000	-.5883759	-.3854108
	12 jam	-.48538667*	.03021284	.000	-.5868692	-.3839041
	16 jam	-.30191667*	.03021284	.000	-.4033992	-.2004341

20 jam	-.24937333*	.03021284	.000	-.3508559	-.1478908
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*. The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Absorbansi

Tukey HSD^a

Waktu	N	Subset for alpha = 0.05		
		1	2	3
24 jam	3	.0000167		
0 jam	3	.0001900		
20 jam	3		.2493900	
16 jam	3		.3019333	
12 jam	3			.4854033
8 jam	3			.4869100
Sig.		1.000	.534	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.