BAB V

KESIMPULAN DAN SARAN

A. Kesimpulan

Berdasarkan hasil penelitian yang telah dilakukan maka dapat disimpulkan sebagai berikut

Pertama, ekstrak etanol kayu secang (*Caeasalpinia sappan* Linn) dapat dibuat sebagai sediaan gel *hand sanitizer* dengan berbagai konsentrasi ekstrak etanol kayu secang dan mempunyai mutu fisik yang tidak baik dan stabilitas yang tidak baik.

Kedua, gel *hand sanitizer* ekstrak etanol kayu secang (*Caeasalpinia sappan* Linn) dengan berbagai konsentrasi memiliki aktivitas antibakteri terhadap bakteri *Staphylococcus aureus* ATCC 25923.

B. Saran

Dari penelitian yang telah dilakukan, disarankan pada peneliti selanjutnya agar didapatkan hasil yang lebih maksimal sebagai berikut :

1. Dilakukan percobaan antibakteri dengan menggunakan metode lain seperti sumuran atau dilusi
2. Perlu dilakukan uji aktivitas antibakteri gel *hand sanitizer* ekstrak etanol kayu secang (*Caeasalpinia sappan* Linn) menggunakan spesies bakteri patogen yang berbeda.
3. Perlu dilakukan isolasi senyawa utama kayu secang yaitu golongan senyawa brazilin yang memiliki aktivitas antibakteri untuk memaksimalkan dalam membunuh bakteri.

DAFTAR PUSTAKA

Anonim. 2007. *Germplasm Resources Information Network (GRIN)*, 2007 - 2011, database (version 2011)

Aiyelaagbe O.O. and Osamudiamen P.M.2009. *Phytochemical screening for active compounds in Mangifera indica*, Plant, Sci. Res, 2(1), 11-13.

Amalia Krishna Dewi. 2013. *Isolasi Identifikasi dan Uji Sensitivitas Staphylococcus aureus terhadap Amoxicillin dari Sampel Susu Kambing Peranakan Ettawa (PE) Penderita Mastitis Di Wilayah Girimulyo*. Kulonprogo. Yogyakarta. Universitas Gajah Mada

BIMFI. 2012. *Scientifik journal of indonesian phamaceutical student*. Volume 1. No 1. Juni-november 2012

Davis dan Stout.1971. *Disc Plate Method Of Microbiological Antibiotic Essay. Journal Of Microbiology*.22 : 4 - 9.

[Depkes RI]. 2000. *Inventaris Tanaman Obat Indonesia (1) Jilid 1*. Jakarta: Departemen Kesehatan Republik Indonesia. Hlm 221-222.

[Depkes RI] 1986. *Sediaan Galenika,* Departemen Kesehatan Republik Indonesia. Jakarta

[Depkes RI], 1995, *Farmakope Indonesia*, Edisi IV, 112, 712, 1203, Departemen Kesehatan Republik Indonesia, Jakarta.

[Depkes RI], 2004, *Farmakognosi*, Jilid 1, Cetakan Ketiga, Departemen Kesehatan Republik Indonesia. Jakarta

Dessy Triana. 2014. *Frekuensi β-Lactamase Hasil Staphylococcus aureus Secara Iodometri Di Laboratorium Mikrobiologi Fakultas Kedokteran Universitas Andalas. Prodi Kedokteran, FKIK, Universitas Bengkulu, Indonesia*. Vol. 10 No. 2 Juli 2014 : 992-995

Drs. H. Arief Hariana. 2006. *Tumbuhan Obat Dan Khasiatnya 3*. Penerbit Niaga Swadaya. Jakarta. ISBN 9790020082, 9789790020085

Endang S. Sunaryo. 2015. *Minuman Tradisional Penguat Kekebalan Tubuh. Penerbit PT Elex Media Komputindo Kelompok Gramedia*. Jakarta. ISBN 978-602-02-7416-4

Fadliah M. 2014. *Kualitas Organoleptik Dan Pertumbuhan Bakteri Pada Suhu Pasteurisasi Dengan Penambahan Kayu Secang (Caesalpinia sappan Linn) Selama Penyimpanan*. Fakultas Peternakan Universitas Hasanuddin . Makassar

Garg A, Aggarwal D, Garg S, and Sigla AK. 2002. Spreading of Semisolid Formulation: An Update. *Pharmaceutical Tecnology*. Hlm 84- 102.

Haslem E., 1989. *Plant polyphenols: Vegetable tannins revisied-chemistry and pharmacology of natural products*. Cambridge University Press, 169.

Hedi R. Dewoto. 2007. *Pengembangan Obat Tradisional Indonesia Menjadi fitofarmaka*. Departemen Farmakologi, Fakultas Kedokteran Universitas Indonesia. Jakarta. Maj Kedokt Indon, Volum: 57, Nomor: 7.

Ika Nur Fajariah. 2009. *Uji Aktivitas Antibakteri Fraksi Etil Asetat Ekstrak Etanol Kayu Secang (Caesalpinia sappan L.) Terhadap Staphylococcus aureus Dan Shigella dysenteriae Serta Bioautografinya*. Fakultas Farmasi. Universitas Muhammadiyah Surakarta

Indriani, H., 2003, *Stabilitas Pigmen Alami Kayu Secang (Caesalpinia sappan Linn) dalam Model Minuman Ringan*, Institut Pertanian, Bogor.

Irianto, K., 2013, *Mikrobiologi Medis*, Cetakan Kesatu, 81, Bandung, Alfabeta, cv

Isnaeni Walidah, Bambang Supriyanta, Sujono. 2014. *Daya Bunuh Hand Sanitizer Berbahan Aktif Alkohol 59% dalam Kemasan Setelah Penggunaan Berulang terhadap Angka Lempeng Total (ALT)*. JURNAL TEKNOLOGI LABORATORIUM Volume 3 Nomor 1.

Kepmenkes, 2014, *Farmakope edisi V*, Hlm 42.

Kusmiati, Dameria, Dody Priadi. 2014. *ANALISA SENYAWA AKTIF EKSTRAK KAYU SECANG (Caesalpinia sappan L.) YANG BERPOTENSI SEBAGAI ANTIMIKROBA*. Program Studi Farmasi FMIPA, Institut Sains dan Teknologi Nasional, Jakarta

KUSMIYATI, NI WAYAN SRI AGUSTINI, 2006, *Uji Aktivitas Senyawa Antibakteri dari Mikroalga Porphyridium cruentum,* Pusat Penelitian Bioteknologi, Lembaga Ilmu Pengetahuan Indonesia (LIPI), Cibinong 16911. B I O D I V E R S I T A S ISSN: 1412-033X Volume 8, Nomor 1 Januari 2007 Halaman: 48-53

Lully Hanni Endarini, 2016*, Farmakognosi Dan Fitokimia*, Kementrian Kesehatan Republik Indonesia, Jakarta

Lusia Oktora Ruma Kumala Sari. 2006. *Pemanfaatan Obat Tradisional Dengan Pertimbangan Manfaat Dan Keamanannya*. Majalah Ilmu Kefarmasian, Vol. III, No.1, April 2006, 01 – 07. ISSN : 1693-9883.

Nurwantoro dan Abbas, S. (2001) *Mikrobiologi Pangan Hewani Nabati*. Penerbit Kanisius, Yogyakarta

Nutrisia Aquariushinta Sayuti. 2015. *Formulasi Dan Uji Stabilitas Fisik Sediaan Gel Ektrak Daun Ketepeng*. Vol. 5 No.2. Jurnal Kefarmasian Indonesia,

Raymond C Rowe, Paul J Sheskey, Marian E Quinn, 2009, *Handbook of Pharmaceutical Excipients*, sixth edition, Penerbit : Pharmaceutical Press

Salle A.J. 1947. *Fundamental Principle of Bacteriology*. Megraw Hill.India. Hlm 505

Shu, M., 2013, *Formulasi Sediaan gel Hand Sanitizer dengan Bahan Aktif Triklosan 0,5% dan 1%*. Vol.2 No.1. Universitas Surabaya, Jurnal Ilmiah Mahasiswa,

Sudarsono, Gunawan, D., Wahyuono, S., Donatus, I.A., dan Purnomo, 2002, *Tumbuhan Obat II*, Hasil Penelitian, Sifat-sifat dan Penggunaan, 96-100, Pusat Studi Obat Tradisional, Universitas Gadjah Mada, Yogyakarta

Sri Yuliani, Suyanti Satuhu, 2012, *panduan lengkap minyak atsiri*, Jakarta : Penebar swadaya

Siswandono dan Soekardjo, B., 1995, *Kimia Medisinal*, 28-29, 157, Airlangga University Press, Surabaya

Sitti Sarah. 2015. *Kualitas Organoleptik Susu Pasteurisasi Sari Buak Sirsak (Annona murucata L) Dengan Penambahan Kayu Secang (Caesalpinia sappan L) Dan Sukrosa Pada Konsentrasi Berbeda*. Fakultas Peternakan Universitas Hasanuddin . Makassar

Tiwari, Kumar, Kaur Mandeep, Kaur Gurpreet & Kaur Harleem. 2011 *Phytochemical Screening and Extraction*: *A Review*, Sceincia Vol, 1: issue 1. Internasionale Pharmaceutical

Tjitrosoepomo, G. 1991. *Taksonomi Tumbuhan*. Penerbit UGM Press, Yogyakarta.

Todar, K. (1998) *Bacteriology 330 Lecture Topics: Staphylococcus*. Kenneth Todar University of Wisconsin Department of Bacteriology, Wisconsin, USA

Trihendrokesowo, 1988, *Penyakit Infeksi Akibat Pangan*, Universitas Gajah Mada, Yogyakarta.

WHO, 2009, *WHO Guidelines on Hand Hygiene in Health Care*: a Summary

Winarti, C. dan Sembiring B.S. 1998. *Pengaruh cara dan lama ekstraksi terhadap kadar tanin ekstrak kayu secang (Caesalpinia sappan L)*. Balitro Bogor. Warta Tumbuhan Obat Indonesia 1998. 4: 17-18.

Winda Jumara. 2018. *Pengaruh Kondisi pH dan Perbandingan Rempah Terhadap Karakteristik Minuman Serbuk Secang (Caesalpinia sappan L).* FAKULTAS TEKNIK UNIVERSITAS PASUNDAN BANDUNG

Voigt R. 1994. *Buku Pelajaran Teknologi Farmasi. Edisi ke – 5*. Diterjemahkan oleh Soewandhi, S.N. dan Widianto, M.B. Edisi V. Gadjah Mada University Press. Yogyakarta. Hlm 311-370, 560-567.

LAMPIRAN

Lampiran 1. Hasil Determinasi

KEMENTERIAN RISET, TEKNOLOGI DAN PENDIDIKAN TINGGI
UNIVERSITAS SEBELAS MARET
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM

LAB. PROGRAM STUDI BIOLOGI

Jl. Ir. Sutami 36A Kentingan Surakarta 57126 Telp. (0271) 663375 Fax (0271) 663375
http://www.biology.mipa.uns.ac.id, E-mail biologi @ mipa.uns.ac.id

Nomor	: 225/UN27.9.6.4/Lab/2018
H a l	: Hasil Determinasi Tumbuhan
Lampiran	: -

Nama Pemesan	: Fahmi Rizki
NIM	: 21154481A
Alamat	: Program Studi S1 Farmasi Fakultas Farmasi Universitas Setia Budi Surakarta

HASIL DETERMINASI TUMBUHAN

Nama Sampel : *Caesalpinia sappan* L.
Familia : Caesalpiniaceae

Hasil Determinasi menurut C.A. Backer & R.C. Bakhuizen van den Brink, Jr. (1963) :
1b-2b-3b-4b-12b-13b-14b-17b-18b-19b-20b-21b-22b-23b-24b-25b-26b-27a-28b-29b-30b-31a-32a-33a-34a-35a-36d-37b-38b-39b-41b-42b-44b-45b-46e-50b-51b-53b-54b-56b-57b-58b-59a-60b-64b-66b-67b-69b .... **106. Caesalpiniaceae**
1a-2b-3b-4a-5b-6a-7b .... **28. *Caesalpinia***
1a-2b-3b-5b-7b-8a .... *Caesalpinia sappan* L.

Deskripsi Tumbuhan :
Habitus : semak atau pohon kecil, menahun, tinggi 5-10 m. Akar : tunggang, bercabang, putih kotor atau putih kekuningan hingga coklat kekuningan. Batang : tegak, bercabang banyak dan panjang, berbentuk bulat, berkayu, mempunyai lentisel, permukaan berduri, bentuk duri bengkok, tersebar, kulit batang berwarna merah. Daun : majemuk menyirip, panjang 25-40 cm, terdiri atas 9-16 pasang sirip, panjang sirip 6.5-17 cm, setiap sirip mempunyai 10-20 pasang anak daun yang berhadapan; anak daun tidak bertangkai, bentuk oval atau oval memanjang, panjang 10-25 mm, lebar 6-11 mm. pangkal anak daun hampir rata, ujung anak daun bundar, tepi anak daun rata, pertulangan anak daun menyirip; panjang daun penumpu 3-4.5 cm. Bunga : tersusun dalam bunga majemuk/perbungaan berupa tandan, terdapat di ujung, panjang tandan 10-40 cm, panjang ibu tangkai bunga 15-20 cm, panjang tangkai bunga 1.5-2.5 cm; pinggir kelopak bunga berambut, panjang daun kelopak yang terbawah ±10 mm, lebar ±4 mm; mahkota bunga memencar, berwarna kuning terang, helaian bendera membundar bergaris tengah 4-6 mm, 4 helai daun mahkota bunga lainnya juga membundar dan bergaris tengah ±10 mm; panjang benang sari ±15 mm; panjang putik ±18 mm. Buah : berupa buah polong, berwarna hitam ketika masak dan hijau ketika masih mentah/muda, berbentuk oval atau oval memanjang, pipih, panjang 6.5-9.5 cm, lebar 2.5-4 cm, berisi 2-4 biji. Biji : panjang biji 15-18 mm, lebar 8-11 mm, tebal 5-7 mm.

Surakarta, 30 November 2018

Kepala Lab. Program Studi Biologi

Dr. Tetri Widiyani, M.Si.
NIP. 19711224 200003 2 001

Penanggungjawab
Determinasi Tumbuhan

Suratman, S.Si., M.Si.
NIP. 19800705 200212 1 002

Mengetahui
Kepala Program Studi Biologi FMIPA UNS

Dr. Ratna Setyaningsih, M.Si.
NIP. 19660714 199903 2 001

Lampiran 2. Tanaman Kayu secang

Tanaman Kayu Secang

Kayu Pohon Secang

Serutan Kayu Secang

Kayu Secang Kering

Serbuk Kayu Secang

Lampiran 3. Perhitungan prosentase bobot kering terhadap bobot basah

Bobot basah (g)	Bobot kering (g)	Rendemen (%)
1300	1000	76,92 %

% rendemen bobot kering $= \dfrac{1000 \ (g)}{1300 \ (g)}$ x 100 %

$= 76,92 \ \%$

Lampiran 4. Perhitungan prosentase berat serbuk terhadap berat kering

Bobot kering (g)	Bobot serbuk (g)	Rendemen (%)
1000	880	88 %

% rendemen berat serbul $= \dfrac{880 \ (g)}{1000 \ (g)}$ x 100 %

$= 88 \ \%$

Lampiran 5. Perhitungan prosentase rendemen hasil ekstrak etanol

Bobot serbuk (g)	Bobot ekstrak kental (g)	Rendemen (%)
800	73,45	9,18125 %

% rendemen ekstrak kental $= \dfrac{73,45 \ (g)}{800 \ (g)}$ x 100 %

$= 9,18125 \ \%$

Lampiran 6. Foto proses masersi dan ektrak etanol

Proses Maserasi Dan Penyaringan

Proses Pengentalan Ekstrak

Ekstrak Kental Kayu Secang

Lampiran 7. Foto hasil uji bebas etanol dan uji kandungan kimia ektrak kayu secang (*Caesalpinia sappa* Linn)

Uji Flavonoid

Uji Bebas Etanol
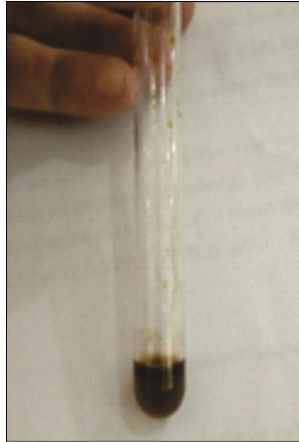
| **Uji Terpenoid** | **Uji Tanin** |

Lampiran 8. Foto hasil isolasi dan identifikasi bakteri *Staphylococcus aureus* ATCC 25923

| **Identifikasi Secara Isolasi** | **Identifikasi Secara Pewarnaan Gram** |

| **Identifikasi Secara Katalase** | **Identifikasi Secara Koagulase** |
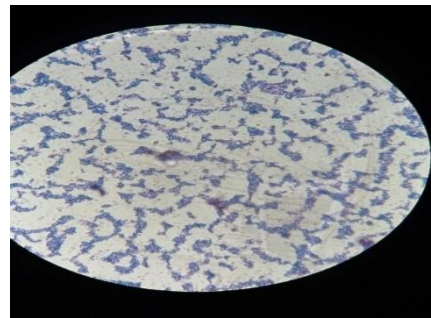
Lampiran 9. Hasil uji aktivitas antibakteri ekstrak etanol kayu secang metode difusi menggunakan cakram
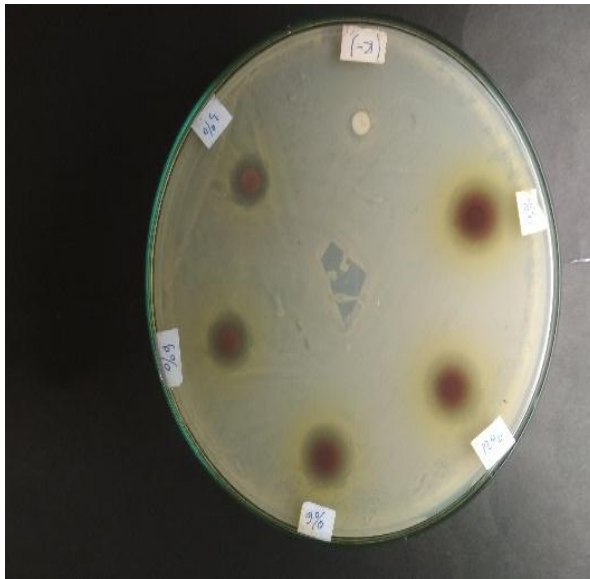
Replikasi 1
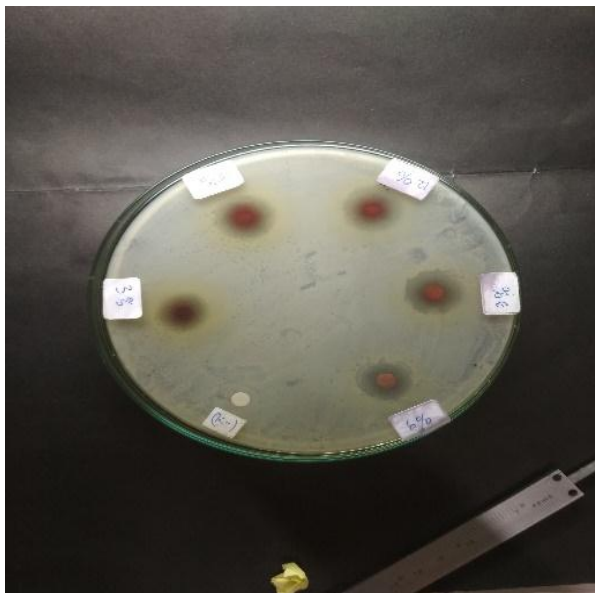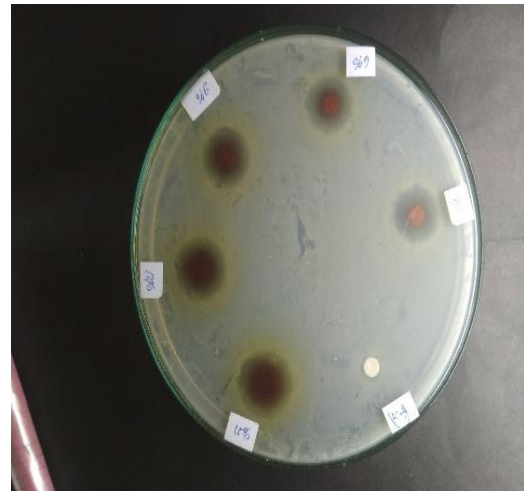
Replikasi 2

Replikasi 3

Lampiran 10. Hasil uji aktivitas antibakteri gel *hand sanitizer* ekstrak etanol kayu secang metode difusi menggunakan cakram
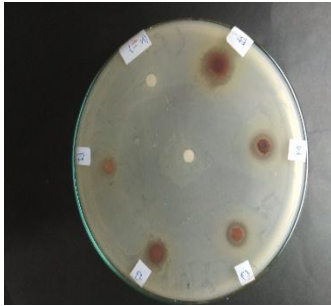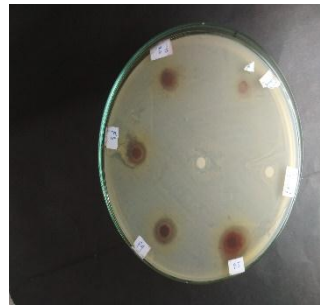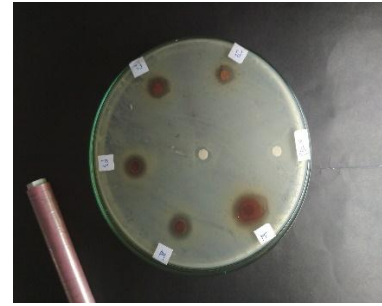
| **Replikasi 1** | **Replikasi 2** | **Replikasi 3** |

Lampiran 11. Alat penelitian

Moisture Balance

Evaporator

Oven

Vorteks

Incubator   **Uji Homogenitas**
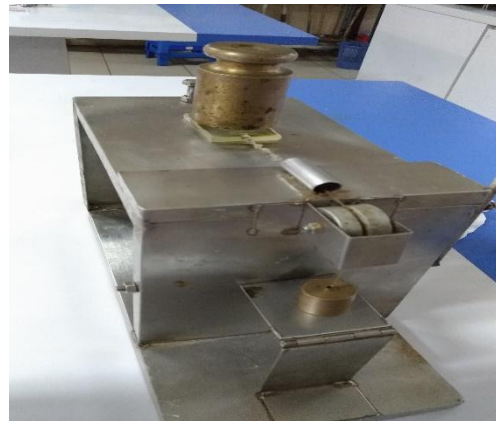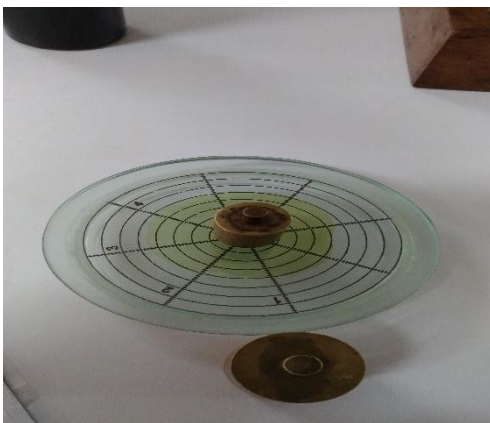
Uji Viskositas   **Uji Daya Lekat**

Uji Daya Sebar   **Uji pH Meter**

Lampiran 12. Formulasi dan pembuatan media

a. Formulasi dan pembuatan *Brain Heart Infusion* (BHI)

Infus dari otak sapi.. 12,5 g

Infus dari hati sapi... 5 g

Protease peptone... 10 g

Glukosa.. 2 g

Sodium chloride.. 5 g

Disodium fosfat... 2,5 g

Ph.. $7,4 \pm 0,1$

Cara : Reagen di atas ditimbang 37 gram dilarutkan dalam aquadest sebanyak 1000 ml dipanaskan sampai larut sempurna, dituang ke dalam tabung reaksi steril kemudian disterilkan dengan autoclave pada suhu 121^oC selama 15 menit.

b. Formulasi dan pembuatan *Muller Hinton Agar* (MHA)

Meat infusion... 300 g

Amilum.. 1,5 g

Kasein hydrolysate... 17,5 g

Agar-agar.. 17 g

pH.. $7,3 \pm 0,1$

Cara : Reagen di atas ditimbang 38 gram dilarutkan dalam aquadest sebanyak 1000 ml dipanaskan sampai larut sempurna, dituang ke dalam tabung reaksi steril kemudian disterilkan dengan autoclave pada suhu 121^oC selama 15 menit.

c. Formulasi dan pembuatan *Vogel Jhonson Agar* (VJA)

Peptone from casein ....10 g

Yeast extract ………...5 g

di-potasium hydrogen phosphate...10 g

D(-)mannitol ....10 g

Lithium chloride ....5 g

Glycine..10 g

Phenol red...0,025 g

Agar……………………………………………………………13,0g

Cara : Reagen-reagen diatas dilarutkan dalam aquadest sebanyak 1000 ml, dipanaskan sampai larut sempurna, kemudian disterilkan dengan autoklaf pada suhu 121^oC selama 15 menit dan dituangkan dalam cawan petri pH 7,2.

Lampiran 13. Uji Statistika

13.1 Uji statistik Kolmogorov-Smirnov, analisis two way anova daya sebar sediaan *hand sanitizer* ekstrak kayu secang dengan variasi konsentrasi *gelling agent*

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
daya sebar	216	8.1054	1.53299	4.83	11.00

One-Sample Kolmogorov-Smirnov Test

		daya sebar
N		216
Normal Parameters[a,b]	Mean	8.1054
	Std. Deviation	1.53299
Most Extreme Differences	Absolute	.086
	Positive	.086
	Negative	-.086
Kolmogorov-Smirnov Z		1.260
Asymp. Sig. (2-tailed)		.084

a. Test distribution is Normal.

b. Calculated from data.

Between-Subjects Factors

		Value Label	N
formula	1	formula 1	36
	2	formula 2	36
	3	formula 3	36
	4	formula 4	36
	5	formula 5	36
	6	formula 6	36
waktu	1	minggu 1	54
	2	minggu 2	54

	3	minggu 3	54
	4	freezethaw	54
beban	1	50 gr	72
	2	100 gr	72
	3	150 gr	72

Descriptive Statistics

Dependent Variable:daya sebar

formula	waktu	beban	Mean	Std. Deviation	N
formula 1	minggu 1	50 gr	7.9367	.76134	3
		100 gr	9.1367	.76429	3
		150 gr	9.6300	.83899	3
		Total	8.9011	1.01772	9
	minggu 2	50 gr	8.4700	1.18672	3
		100 gr	8.9033	1.29311	3
		150 gr	9.1633	1.15578	3
		Total	8.8456	1.09365	9
	minggu 3	50 gr	7.6933	.92500	3
		100 gr	8.3533	.81648	3
		150 gr	8.7767	.90589	3
		Total	8.2744	.89960	9
	freezethaw	50 gr	10.8333	.05774	3
		100 gr	11.0000	.00000	3
		150 gr	11.0000	.00000	3
		Total	10.9444	.08819	9
	Total	50 gr	8.7333	1.48571	12
		100 gr	9.3483	1.26952	12
		150 gr	9.6425	1.13568	12
		Total	9.2414	1.32408	36
formula 2	minggu 1	50 gr	8.4600	.64133	3
		100 gr	9.4433	.51782	3

		150 gr	10.0767	.52310	3
		Total	9.3267	.85789	9
	minggu 2	50 gr	7.5767	.28042	3
		100 gr	8.4100	.35679	3
		150 gr	8.9467	.55076	3
		Total	8.3111	.69623	9
	minggu 3	50 gr	6.9333	.60069	3
		100 gr	7.5933	.58705	3
		150 gr	8.4767	.63571	3
		Total	7.6678	.85271	9
	freezethaw	50 gr	10.9000	.00000	3
		100 gr	11.0000	.00000	3
		150 gr	11.0000	.00000	3
		Total	10.9667	.05000	9
	Total	50 gr	8.4675	1.62074	12
		100 gr	9.1117	1.37842	12
		150 gr	9.6250	1.11120	12
		Total	9.0681	1.42879	36
formula 3	minggu 1	50 gr	6.6600	.16523	3
		100 gr	7.3867	.22279	3
		150 gr	7.7167	.23629	3
		Total	7.2544	.50237	9
	minggu 2	50 gr	7.1100	.45530	3
		100 gr	7.8867	.37634	3
		150 gr	8.6533	.31005	3
		Total	7.8833	.74691	9
	minggu 3	50 gr	6.1467	.22546	3
		100 gr	6.7600	.35539	3
		150 gr	7.1467	.46188	3
		Total	6.6844	.53696	9
	freezethaw	50 gr	6.6433	.48439	3
		100 gr	7.3533	.58535	3

		150 gr	8.1933	.64933	3
		Total	7.3967	.83741	9
	Total	50 gr	6.6400	.47042	12
		100 gr	7.3467	.54211	12
		150 gr	7.9275	.69602	12
		Total	7.3047	.77410	36
formula 4	minggu 1	50 gr	7.4833	.48583	3
		100 gr	8.5767	.25423	3
		150 gr	9.4167	.45369	3
		Total	8.4922	.91185	9
	minggu 2	50 gr	7.8933	.66531	3
		100 gr	8.7633	.31754	3
		150 gr	9.3933	.30925	3
		Total	8.6833	.76502	9
	minggu 3	50 gr	11.0000	.00000	3
		100 gr	11.0000	.00000	3
		150 gr	11.0000	.00000	3
		Total	11.0000	.00000	9
	freezethaw	50 gr	7.0533	.64081	3
		100 gr	7.7267	.58705	3
		150 gr	8.4333	.58381	3
		Total	7.7378	.79446	9
	Total	50 gr	8.3575	1.68330	12
		100 gr	9.0167	1.29988	12
		150 gr	9.5608	1.02063	12
		Total	8.9783	1.41349	36
formula 5	minggu 1	50 gr	6.8033	.38553	3
		100 gr	7.6267	.36074	3
		150 gr	8.3200	.47885	3
		Total	7.5833	.74791	9
	minggu 2	50 gr	7.1267	.40204	3
		100 gr	7.8433	.36828	3

		150 gr	8.6267	.26102	3
		Total	7.8656	.71659	9
	minggu 3	50 gr	6.6267	.35233	3
		100 gr	7.2833	.29297	3
		150 gr	8.0300	.42720	3
		Total	7.3133	.68401	9
	freezethaw	50 gr	7.1367	.24007	3
		100 gr	8.0933	.12503	3
		150 gr	8.5500	.18028	3
		Total	7.9267	.64545	9
	Total	50 gr	6.9233	.37560	12
		100 gr	7.7117	.40402	12
		150 gr	8.3817	.38991	12
		Total	7.6722	.71331	36
formula 6	minggu 1	50 gr	5.4867	.56977	3
		100 gr	6.0367	.61330	3
		150 gr	6.4767	.60385	3
		Total	6.0000	.67147	9
	minggu 2	50 gr	6.3700	.25159	3
		100 gr	6.9433	.29939	3
		150 gr	7.4300	.26458	3
		Total	6.9144	.51660	9
	minggu 3	50 gr	6.1933	.32347	3
		100 gr	6.6533	.42442	3
		150 gr	7.2700	.47466	3
		Total	6.7056	.58856	9
	freezethaw	50 gr	5.3600	.41388	3
		100 gr	5.8767	.34588	3
		150 gr	6.3167	.27538	3
		Total	5.8511	.51348	9
	Total	50 gr	5.8525	.57278	12
		100 gr	6.3775	.58936	12

		150 gr	6.8733	.62340	12
		Total	6.3678	.71632	36
Total	minggu 1	50 gr	7.1383	1.08930	18
		100 gr	8.0344	1.26394	18
		150 gr	8.6061	1.36106	18
		Total	7.9263	1.36345	54
	minggu 2	50 gr	7.4244	.86196	18
		100 gr	8.1250	.85458	18
		150 gr	8.7022	.80689	18
		Total	8.0839	.97954	54
	minggu 3	50 gr	7.4322	1.77631	18
		100 gr	7.9406	1.57570	18
		150 gr	8.4500	1.40008	18
		Total	7.9409	1.61651	54
	freezethaw	50 gr	7.9878	2.20188	18
		100 gr	8.5083	1.97073	18
		150 gr	8.9156	1.72758	18
		Total	8.4706	1.97612	54
	Total	50 gr	7.4957	1.57303	72
		100 gr	8.1521	1.45911	72
		150 gr	8.6685	1.34620	72
		Total	8.1054	1.53299	216

Levene's Test of Equality of Error Variances[a]

Dependent Variable:daya sebar

F	df1	df2	Sig.
3.038	71	144	.236

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

a. Design: Intercept + formula + waktu + beban +
formula * waktu + formula * beban + waktu *
beban + formula * waktu * beban

Homogeneous subsrats

daya sebar

Tukey HSD[a,,b]

formula	N	Subset			
		1	2	3	4
formula 6	36	6.3678			
formula 3	36		7.3047		
formula 5	36			7.6722	
formula 4	36				8.9783
formula 2	36				9.0681
formula 1	36				9.2414
Sig.		1.000	1.000	1.000	.256

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = .263.

a. Uses Harmonic Mean Sample Size = 36.000.

b. Alpha = .05.

13.2 Uji statistik Kolmogorov-Smirnov, analisis two way anova pH sediaan
hand sanitizer* ekstrak kayu secang dengan variasi konsentrasi *gelling
agent

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
pH	72	6.4858	.49650	5.35	7.54

One-Sample Kolmogorov-Smirnov Test

		pH
N		72
Normal Parameters[a,b]	Mean	6.4858
	Std. Deviation	.49650
Most Extreme Differences	Absolute	.117
	Positive	.117
	Negative	-.084
Kolmogorov-Smirnov Z		.997
Asymp. Sig. (2-tailed)		.273

a. Test distribution is Normal.

b. Calculated from data.

Between-Subjects Factors

		Value Label	N
formula	1	formula 1	12
	2	formula 2	12
	3	formula 3	12
	4	formula 4	12

5	formula 5		12
6	formula 6		12
waktu	1	minggu 1	18
	2	minggu 2	18
	3	minggu 3	18
	4	freezethaw	18

Descriptive Statistics

Dependent Variable:pH

formula	waktu	Mean	Std. Deviation	N
formula 1	minggu 1	6.0067	.56924	3
	minggu 2	6.1800	.01000	3
	minggu 3	6.7600	.01000	3
	freezethaw	6.3933	.02517	3
	Total	6.3350	.38106	12
formula 2	minggu 1	6.1567	.03786	3
	minggu 2	5.9103	.01002	3
	minggu 3	6.6767	.00577	3
	freezethaw	6.3633	.01528	3
	Total	6.2767	.29418	12
formula 3	minggu 1	6.4800	.14000	3
	minggu 2	5.9200	.07937	3
	minggu 3	6.6967	.00577	3
	freezethaw	6.5333	.02517	3
	Total	6.4075	.31337	12
formula 4	minggu 1	6.3133	.03055	3
	minggu 2	5.6467	.02309	3
	minggu 3	6.5867	.00577	3
	freezethaw	6.6000	.01732	3
	Total	6.2867	.40442	12
formula 5	minggu 1	6.3667	.03215	3

	minggu 2	5.6100	.05568	3
	minggu 3	6.6833	.01528	3
	freezethaw	6.6700	.04000	3
	Total	6.3325	.45651	12
formula 6	minggu 1	7.2933	.15567	3
	minggu 2	6.9167	.01528	3
	minggu 3	7.3767	.00577	3
	freezethaw	7.5200	.02000	3
	Total	7.2767	.24254	12
Total	minggu 1	6.4361	.47279	18
	minggu 2	6.0306	.45349	18
	minggu 3	6.7967	.27205	18
	freezethaw	6.6800	.40262	18
	Total	6.4858	.49650	72

Levene's Test of Equality of Error Variances[a]

Dependent Variable:pH

F	df1	df2	Sig.
11.654	23	48	.137

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

a. Design: Intercept + formula + waktu + formula *
waktu

Homogeneous subsets

pH

Tukey HSD[a,,b]

waktu	N	Subset 1	Subset 2	Subset 3	Subset 4
		1	2	3	4
minggu 2	18	6.0306			
minggu 1	18		6.4361		
freezethaw	18			6.6800	
minggu 3	18				6.7967
Sig.		1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = .016.

a. Uses Harmonic Mean Sample Size = 18.000.

b. Alpha = .05.

13.3 Uji statistik Kolmogorov-Smirnov, analisis two way anova viskositas sediaan *hand sanitizer* ekstrak kayu secang dengan variasi konsentrasi *gelling agent*

	N	Mean	Std. Deviation	Minimum	Maximum
viskositas	24	8.4583	10.57199	3.50	50.00

One-Sample Kolmogorov-Smirnov Test

		viskositas
N		24
Normal Parameters[a,,b]	Mean	8.4583
	Std. Deviation	10.57199
Most Extreme Differences	Absolute	.447
	Positive	.447

Negative		-.320
Kolmogorov-Smirnov Z		2.191
Asymp. Sig. (2-tailed)		.000

a. Test distribution is Normal.

b. Calculated from data.

Between-Subjects Factors

		Value Label	N
formula	1	formula 1	4
	2	formula 2	4
	3	formula 3	4
	4	formula 4	4
	5	formula 5	4
	6	formula 6	4
waktu	1	minggu 1	6
	2	minggu 2	6
	3	minggu 3	6
	4	freezethaw	6

Descriptive Statistics

Dependent Variable:viskositas

formula	waktu	Mean	Std. Deviation	N
formula 1	minggu 1	4.0000	.	1
	minggu 2	4.0000	.	1
	minggu 3	3.8000	.	1
	freezethaw	3.5000	.	1
	Total	3.8250	.23629	4
formula 2	minggu 1	4.4000	.	1
	minggu 2	4.8000	.	1
	minggu 3	3.9000	.	1

	freezethaw	3.6000	.	1
	Total	4.1750	.53151	4
formula 3	minggu 1	4.6000	.	1
	minggu 2	4.8000	.	1
	minggu 3	4.4000	.	1
	freezethaw	4.1000	.	1
	Total	4.4750	.29861	4
formula 4	minggu 1	5.2000	.	1
	minggu 2	5.0000	.	1
	minggu 3	4.4000	.	1
	freezethaw	4.5000	.	1
	Total	4.7750	.38622	4
formula 5	minggu 1	5.4000	.	1
	minggu 2	5.2000	.	1
	minggu 3	4.8000	.	1
	freezethaw	4.6000	.	1
	Total	5.0000	.36515	4
formula 6	minggu 1	50.0000	.	1
	minggu 2	25.0000	.	1
	minggu 3	20.0000	.	1
	freezethaw	19.0000	.	1
	Total	28.5000	14.57166	4
Total	minggu 1	12.2667	18.49267	6
	minggu 2	8.1333	8.27301	6
	minggu 3	6.8833	6.43628	6
	freezethaw	6.5500	6.11580	6
	Total	8.4583	10.57199	24

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
viskositas	24	8.4583	10.57199	2.15800

One-Sample Test

	Test Value = 0					
					75% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
viskositas	3.920	23	.001	8.45833	5.9116	11.0051

13.4 Uji statistik Kolmogorov-Smirnov, analisis one anova zona hambat ekstrak kayu secang

Descriptives

Diameter zona hambat

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	17.2633	1.95275	1.12742	12.4124	22.1142	15.06	18.78
formula 2	3	18.4167	.67144	.38766	16.7487	20.0846	17.65	18.90
formula 3	3	19.7700	.62266	.35949	18.2232	21.3168	19.25	20.46
formula 4	3	21.1967	.61712	.35629	19.6637	22.7297	20.68	21.88
formula 5	3	22.6767	.77203	.44573	20.7588	24.5945	21.79	23.20
kontrol negatif	3	.0000	.00000	.00000	.0000	.0000	.00	.00
Total	18	16.5539	7.87189	1.85542	12.6393	20.4685	.00	23.20

Diameter Zona Hambat Ekstrak

Test of Homogeneity of Variances

Diameter zona hambat

Levene Statistic	df1	df2	Sig.
4.933	5	12	.061

Diameter zona hambat

	Sum of Squares	df	Mean Square	F	
Between Groups	1042.175	5	208.435	222.187	
Within Groups	11.257	12	.938		
Total	1053.432	17			

Multiple Comparisons

Dependent Variable:Diameter zona hambat

(I) Formua	(J) Formua	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
formula 1	formula 2	-1.15333	.79082	.694	-3.8097	1.5030
	formula 3	-2.50667	.79082	.069	-5.1630	.1497
	formula 4	-3.93333*	.79082	.003	-6.5897	-1.2770
	formula 5	-5.41333*	.79082	.000	-8.0697	-2.7570
	kontrol negatif	17.26333*	.79082	.000	14.6070	19.9197
formula 2	formula 1	1.15333	.79082	.694	-1.5030	3.8097
	formula 3	-1.35333	.79082	.550	-4.0097	1.3030
	formula 4	-2.78000*	.79082	.038	-5.4363	-.1237
	formula 5	-4.26000*	.79082	.002	-6.9163	-1.6037
	kontrol negatif	18.41667*	.79082	.000	15.7603	21.0730
formula 3	formula 1	2.50667	.79082	.069	-.1497	5.1630
	formula 2	1.35333	.79082	.550	-1.3030	4.0097
	formula 4	-1.42667	.79082	.498	-4.0830	1.2297
	formula 5	-2.90667*	.79082	.029	-5.5630	-.2503
	kontrol negatif	19.77000*	.79082	.000	17.1137	22.4263
formula 4	formula 1	3.93333*	.79082	.003	1.2770	6.5897
	formula 2	2.78000*	.79082	.038	.1237	5.4363
	formula 3	1.42667	.79082	.498	-1.2297	4.0830
	formula 5	-1.48000	.79082	.461	-4.1363	1.1763
	kontrol negatif	21.19667*	.79082	.000	18.5403	23.8530
formula 5	formula 1	5.41333*	.79082	.000	2.7570	8.0697
	formula 2	4.26000*	.79082	.002	1.6037	6.9163
	formula 3	2.90667*	.79082	.029	.2503	5.5630
	formula 4	1.48000	.79082	.461	-1.1763	4.1363
	kontrol negatif	22.67667*	.79082	.000	20.0203	25.3330
kontrol negatif	formula 1	-17.26333*	.79082	.000	-19.9197	-14.6070
	formula 2	-18.41667*	.79082	.000	-21.0730	-15.7603
	formula 3	-19.77000*	.79082	.000	-22.4263	-17.1137
	formula 4	-21.19667*	.79082	.000	-23.8530	-18.5403
	formula 5	-22.67667*	.79082	.000	-25.3330	-20.0203
formula 1	formula 2	-1.15333	.79082	1.000	-4.0390	1.7323
	formula 3	-2.50667	.79082	.121	-5.3923	.3790

r f e r		formula 4	-3.93333*	.79082	.005	-6.8190	-1.0477
		formula 5	-5.41333*	.79082	.000	-8.2990	-2.5277
		kontrol negatif	17.26333*	.79082	.000	14.3777	20.1490
r c r i	formula 2	formula 1	1.15333	.79082	1.000	-1.7323	4.0390
		formula 3	-1.35333	.79082	1.000	-4.2390	1.5323
		formula 4	-2.78000	.79082	.064	-5.6656	.1056
		formula 5	-4.26000*	.79082	.002	-7.1456	-1.3744
		kontrol negatif	18.41667*	.79082	.000	15.5310	21.3023
	formula 3	formula 1	2.50667	.79082	.121	-.3790	5.3923
		formula 2	1.35333	.79082	1.000	-1.5323	4.2390
		formula 4	-1.42667	.79082	1.000	-4.3123	1.4590
		formula 5	-2.90667*	.79082	.048	-5.7923	-.0210
		kontrol negatif	19.77000*	.79082	.000	16.8844	22.6556
	formula 4	formula 1	3.93333*	.79082	.005	1.0477	6.8190
		formula 2	2.78000	.79082	.064	-.1056	5.6656
		formula 3	1.42667	.79082	1.000	-1.4590	4.3123
		formula 5	-1.48000	.79082	1.000	-4.3656	1.4056
		kontrol negatif	21.19667*	.79082	.000	18.3110	24.0823
	formula 5	formula 1	5.41333*	.79082	.000	2.5277	8.2990
		formula 2	4.26000*	.79082	.002	1.3744	7.1456
		formula 3	2.90667*	.79082	.048	.0210	5.7923
		formula 4	1.48000	.79082	1.000	-1.4056	4.3656
		kontrol negatif	22.67667*	.79082	.000	19.7910	25.5623
	kontrol negatif	formula 1	-17.26333*	.79082	.000	-20.1490	-14.3777
		formula 2	-18.41667*	.79082	.000	-21.3023	-15.5310
		formula 3	-19.77000*	.79082	.000	-22.6556	-16.8844
		formula 4	-21.19667*	.79082	.000	-24.0823	-18.3110
		formula 5	-22.67667*	.79082	.000	-25.5623	-19.7910
C a r e	formula 1	formula 2	-1.15333	1.19221	.900	-9.1136	6.8069
		formula 3	-2.50667	1.18335	.474	-10.6032	5.5899
		formula 4	-3.93333	1.18238	.228	-12.0456	4.1789
		formula 5	-5.41333	1.21233	.114	-13.1102	2.2835

s		kontrol negatif	17.26333*	1.12742	.015	7.9087	26.6180
formula 2	formula 1	1.15333	1.19221	.900	-6.8069	9.1136
	formula 3	-1.35333	.52869	.287	-3.8681	1.1614
	formula 4	-2.78000*	.52652	.035	-5.2863	-.2737
	formula 5	-4.26000*	.59072	.012	-7.0903	-1.4297
	kontrol negatif	18.41667*	.38766	.002	15.2001	21.6332
formula 3	formula 1	2.50667	1.18335	.474	-5.5899	10.6032
	formula 2	1.35333	.52869	.287	-1.1614	3.8681
	formula 4	-1.42667	.50614	.229	-3.8270	.9736
	formula 5	-2.90667*	.57264	.043	-5.6882	-.1251
	kontrol negatif	19.77000*	.35949	.001	16.7872	22.7528
formula 4	formula 1	3.93333	1.18238	.228	-4.1789	12.0456
	formula 2	2.78000*	.52652	.035	.2737	5.2863
	formula 3	1.42667	.50614	.229	-.9736	3.8270
	formula 5	-1.48000	.57063	.284	-4.2573	1.2973
	kontrol negatif	21.19667*	.35629	.001	18.2404	24.1530
formula 5	formula 1	5.41333	1.21233	.114	-2.2835	13.1102
	formula 2	4.26000*	.59072	.012	1.4297	7.0903
	formula 3	2.90667*	.57264	.043	.1251	5.6882
	formula 4	1.48000	.57063	.284	-1.2973	4.2573
	kontrol negatif	22.67667*	.44573	.001	18.9782	26.3751
kontrol negatif	formula 1	-17.26333*	1.12742	.015	-26.6180	-7.9087
	formula 2	-18.41667*	.38766	.002	-21.6332	-15.2001
	formula 3	-19.77000*	.35949	.001	-22.7528	-16.7872
	formula 4	-21.19667*	.35629	.001	-24.1530	-18.2404
	formula 5	-22.67667*	.44573	.001	-26.3751	-18.9782

*. The mean difference is significant at the 0.05 level.

13.5 Uji statistik Kolmogorov-Smirnov, analisis one anova zona hambat sediaan Gel *hand sanitizer* ekstrak kayu secang

Descriptives

Diameter zona hambat

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
formula 1	3	12.9500	.53675	.30989	11.6166	14.2834	12.34	13.35
formula 2	3	13.7167	.37859	.21858	12.7762	14.6571	13.45	14.15
formula 3	3	14.9800	.41581	.24007	13.9471	16.0129	14.73	15.46
formula 4	3	17.9400	.94398	.54501	15.5950	20.2850	16.95	18.83
formula 5	3	23.7933	1.86886	1.07899	19.1508	28.4358	22.65	25.95
kontrol negatif	3	.0000	.00000	.00000	.0000	.0000	.00	.00
kontrol positif	3	9.6833	1.52998	.88333	5.8827	13.4840	8.80	11.45
Total	21	13.2948	7.03151	1.53440	10.0941	16.4955	.00	25.95

Test of Homogeneity of Variances

Diameter zona hambat

Levene Statistic	df1	df2	Sig.
5.829	6	14	.083

ANOVA

Diameter zona hambat

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	974.185	6	162.364	155.078	.000
Within Groups	14.658	14	1.047		
Total	988.843	20			

Multiple Comparisons

Dependent Variable:Diameter zona hambat

	(I) Formua	(J) Formua	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Tukey HSD	formula 1	formula 2	-.76667	.83546	.963	-3.6194	2.0861
		formula 3	-2.03000	.83546	.256	-4.8827	.8227
		formula 4	-4.99000*	.83546	.001	-7.8427	-2.1373
		formula 5	-10.84333*	.83546	.000	-13.6961	-7.9906
		kontrol negatif	12.95000*	.83546	.000	10.0973	15.8027
		kontrol positif	3.26667*	.83546	.020	.4139	6.1194
	formula 2	formula 1	.76667	.83546	.963	-2.0861	3.6194
		formula 3	-1.26333	.83546	.734	-4.1161	1.5894
		formula 4	-4.22333*	.83546	.003	-7.0761	-1.3706
		formula 5	-10.07667*	.83546	.000	-12.9294	-7.2239
		kontrol negatif	13.71667*	.83546	.000	10.8639	16.5694
		kontrol positif	4.03333*	.83546	.004	1.1806	6.8861
	formula 3	formula 1	2.03000	.83546	.256	-.8227	4.8827
		formula 2	1.26333	.83546	.734	-1.5894	4.1161
		formula 4	-2.96000*	.83546	.040	-5.8127	-.1073
		formula 5	-8.81333*	.83546	.000	-11.6661	-5.9606
		kontrol negatif	14.98000*	.83546	.000	12.1273	17.8327
		kontrol positif	5.29667*	.83546	.000	2.4439	8.1494
	formula 4	formula 1	4.99000*	.83546	.001	2.1373	7.8427
		formula 2	4.22333*	.83546	.003	1.3706	7.0761
		formula 3	2.96000*	.83546	.040	.1073	5.8127
		formula 5	-5.85333*	.83546	.000	-8.7061	-3.0006
		kontrol negatif	17.94000*	.83546	.000	15.0873	20.7927
		kontrol positif	8.25667*	.83546	.000	5.4039	11.1094
	formula 5	formula 1	10.84333*	.83546	.000	7.9906	13.6961
		formula 2	10.07667*	.83546	.000	7.2239	12.9294
		formula 3	8.81333*	.83546	.000	5.9606	11.6661
		formula 4	5.85333*	.83546	.000	3.0006	8.7061
		kontrol negatif	23.79333*	.83546	.000	20.9406	26.6461
		kontrol positif	14.11000*	.83546	.000	11.2573	16.9627
	kontrol negatif	formula 1	-12.95000*	.83546	.000	-15.8027	-10.0973
		formula 2	-13.71667*	.83546	.000	-16.5694	-10.8639

			Mean Difference	Std. Error	Sig.	Lower Bound	Upper Bound
		formula 3	-14.98000*	.83546	.000	-17.8327	-12.1273
		formula 4	-17.94000*	.83546	.000	-20.7927	-15.0873
		formula 5	-23.79333*	.83546	.000	-26.6461	-20.9406
		kontrol positif	-9.68333*	.83546	.000	-12.5361	-6.8306
	kontrol positif	formula 1	-3.26667*	.83546	.020	-6.1194	-.4139
		formula 2	-4.03333*	.83546	.004	-6.8861	-1.1806
		formula 3	-5.29667*	.83546	.000	-8.1494	-2.4439
		formula 4	-8.25667*	.83546	.000	-11.1094	-5.4039
		formula 5	-14.11000*	.83546	.000	-16.9627	-11.2573
		kontrol negatif	9.68333*	.83546	.000	6.8306	12.5361
Bonferroni	formula 1	formula 2	-.76667	.83546	1.000	-3.8572	2.3239
		formula 3	-2.03000	.83546	.612	-5.1206	1.0606
		formula 4	-4.99000*	.83546	.001	-8.0806	-1.8994
		formula 5	-10.84333*	.83546	.000	-13.9339	-7.7528
		kontrol negatif	12.95000*	.83546	.000	9.8594	16.0406
		kontrol positif	3.26667*	.83546	.033	.1761	6.3572
	formula 2	formula 1	.76667	.83546	1.000	-2.3239	3.8572
		formula 3	-1.26333	.83546	1.000	-4.3539	1.8272
		formula 4	-4.22333*	.83546	.004	-7.3139	-1.1328
		formula 5	-10.07667*	.83546	.000	-13.1672	-6.9861
		kontrol negatif	13.71667*	.83546	.000	10.6261	16.8072
		kontrol positif	4.03333*	.83546	.006	.9428	7.1239
	formula 3	formula 1	2.03000	.83546	.612	-1.0606	5.1206
		formula 2	1.26333	.83546	1.000	-1.8272	4.3539
		formula 4	-2.96000	.83546	.068	-6.0506	.1306
		formula 5	-8.81333*	.83546	.000	-11.9039	-5.7228
		kontrol negatif	14.98000*	.83546	.000	11.8894	18.0706
		kontrol positif	5.29667*	.83546	.000	2.2061	8.3872
	formula 4	formula 1	4.99000*	.83546	.001	1.8994	8.0806
		formula 2	4.22333*	.83546	.004	1.1328	7.3139
		formula 3	2.96000	.83546	.068	-.1306	6.0506

	formula 5	-5.85333*	.83546	.000	-8.9439	-2.7628
	kontrol negatif	17.94000*	.83546	.000	14.8494	21.0306
	kontrol positif	8.25667*	.83546	.000	5.1661	11.3472
formula 5	formula 1	10.84333*	.83546	.000	7.7528	13.9339
	formula 2	10.07667*	.83546	.000	6.9861	13.1672
	formula 3	8.81333*	.83546	.000	5.7228	11.9039
	formula 4	5.85333*	.83546	.000	2.7628	8.9439
	kontrol negatif	23.79333*	.83546	.000	20.7028	26.8839
	kontrol positif	14.11000*	.83546	.000	11.0194	17.2006
kontrol negatif	formula 1	-12.95000*	.83546	.000	-16.0406	-9.8594
	formula 2	-13.71667*	.83546	.000	-16.8072	-10.6261
	formula 3	-14.98000*	.83546	.000	-18.0706	-11.8894
	formula 4	-17.94000*	.83546	.000	-21.0306	-14.8494
	formula 5	-23.79333*	.83546	.000	-26.8839	-20.7028
	kontrol positif	-9.68333*	.83546	.000	-12.7739	-6.5928
kontrol positif	formula 1	-3.26667*	.83546	.033	-6.3572	-.1761
	formula 2	-4.03333*	.83546	.006	-7.1239	-.9428
	formula 3	-5.29667*	.83546	.000	-8.3872	-2.2061
	formula 4	-8.25667*	.83546	.000	-11.3472	-5.1661
	formula 5	-14.11000*	.83546	.000	-17.2006	-11.0194
	kontrol negatif	9.68333*	.83546	.000	6.5928	12.7739
Games-Howell formula 1	formula 2	-.76667	.37922	.518	-2.7781	1.2447
	formula 3	-2.03000*	.39200	.049	-4.0527	-.0073
	formula 4	-4.99000*	.62695	.019	-8.6009	-1.3791
	formula 5	-10.84333*	1.12261	.028	-19.2203	-2.4664
	kontrol negatif	12.95000*	.30989	.002	10.2252	15.6748
	kontrol positif	3.26667	.93611	.226	-3.2957	9.8290
formula 2	formula 1	.76667	.37922	.518	-1.2447	2.7781
	formula 3	-1.26333	.32467	.111	-2.8902	.3635
	formula 4	-4.22333*	.58721	.042	-8.1402	-.3065
	formula 5	-10.07667*	1.10090	.038	-18.9352	-1.2181
	kontrol negatif	13.71667*	.21858	.001	11.7947	15.6386

	kontrol positif	4.03333	.90998	.157	-3.0134	11.0800
formula 3	formula 1	2.03000*	.39200	.049	.0073	4.0527
	formula 2	1.26333	.32467	.111	-.3635	2.8902
	formula 4	-2.96000	.59554	.094	-6.7846	.8646
	formula 5	-8.81333*	1.10537	.049	-17.5625	-.0641
	kontrol negatif	14.98000*	.24007	.001	12.8691	17.0909
	kontrol positif	5.29667	.91537	.089	-1.6347	12.2281
formula 4	formula 1	4.99000*	.62695	.019	1.3791	8.6009
	formula 2	4.22333*	.58721	.042	.3065	8.1402
	formula 3	2.96000	.59554	.094	-.8646	6.7846
	formula 5	-5.85333	1.20882	.090	-13.1772	1.4706
	kontrol negatif	17.94000*	.54501	.004	13.1478	22.7322
	kontrol positif	8.25667*	1.03794	.017	2.4756	14.0378
formula 5	formula 1	10.84333*	1.12261	.028	2.4664	19.2203
	formula 2	10.07667*	1.10090	.038	1.2181	18.9352
	formula 3	8.81333*	1.10537	.049	.0641	17.5625
	formula 4	5.85333	1.20882	.090	-1.4706	13.1772
	kontrol negatif	23.79333*	1.07899	.008	14.3060	33.2807
	kontrol positif	14.11000*	1.39445	.004	7.0065	21.2135
kontrol negatif	formula 1	-12.95000*	.30989	.002	-15.6748	-10.2252
	formula 2	-13.71667*	.21858	.001	-15.6386	-11.7947
	formula 3	-14.98000*	.24007	.001	-17.0909	-12.8691
	formula 4	-17.94000*	.54501	.004	-22.7322	-13.1478
	formula 5	-23.79333*	1.07899	.008	-33.2807	-14.3060
	kontrol positif	-9.68333*	.88333	.033	-17.4503	-1.9163
kontrol positif	formula 1	-3.26667	.93611	.226	-9.8290	3.2957
	formula 2	-4.03333	.90998	.157	-11.0800	3.0134
	formula 3	-5.29667	.91537	.089	-12.2281	1.6347
	formula 4	-8.25667*	1.03794	.017	-14.0378	-2.4756
	formula 5	-14.11000*	1.39445	.004	-21.2135	-7.0065
	kontrol negatif	9.68333*	.88333	.033	1.9163	17.4503

*. The mean difference is significant at the 0.05 level.

Diameter zona hambat

	Formua	N	Subset for alpha = 0.05				
			1	2	3	4	5
Tukey HSD[a]	kontrol negatif	3	.0000				
	kontrol positif	3		9.6833			
	formula 1	3			12.9500		
	formula 2	3			13.7167		
	formula 3	3			14.9800		
	formula 4	3				17.9400	
	formula 5	3					23.7933
	Sig.		1.000	1.000	.256	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.