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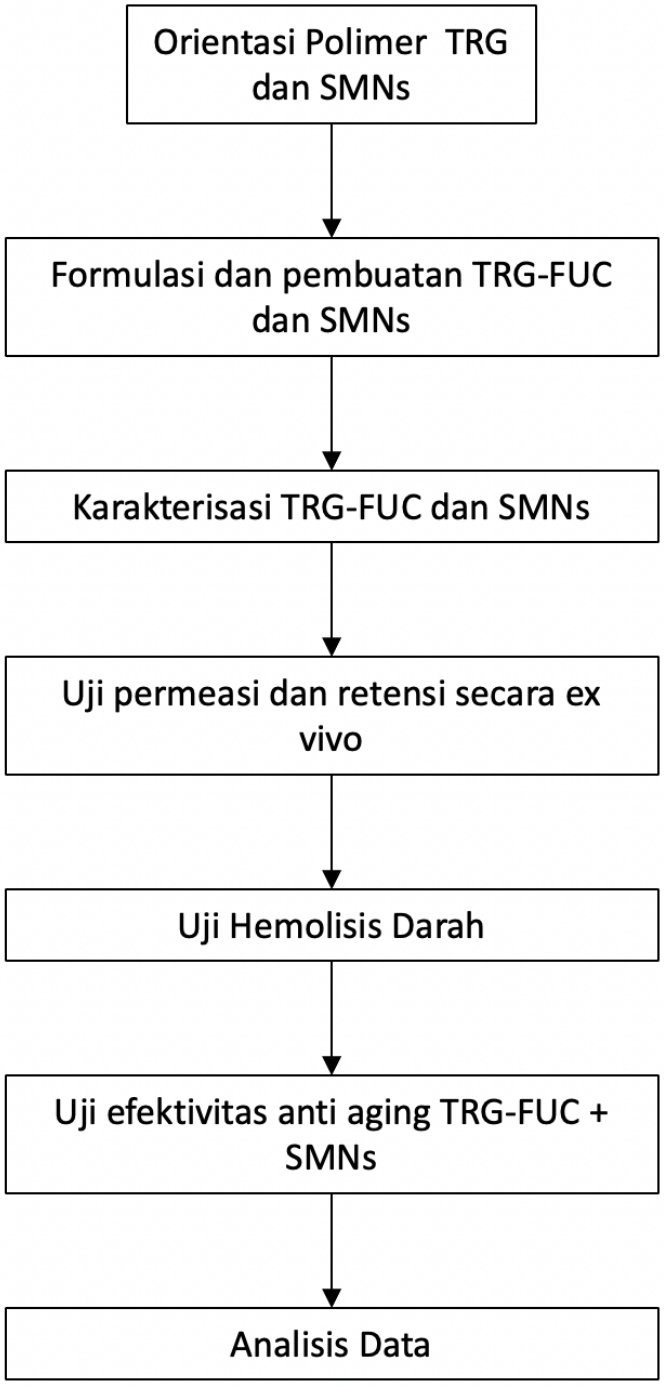
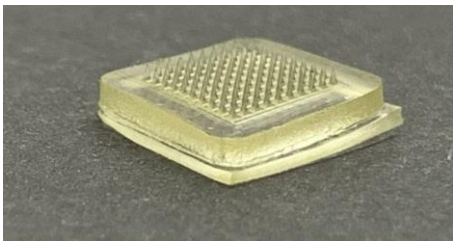
LAMPIRAN

Lampiran 1: Skema Kerja Penelitian



Lampiran 2: Dokumentasi Penelitian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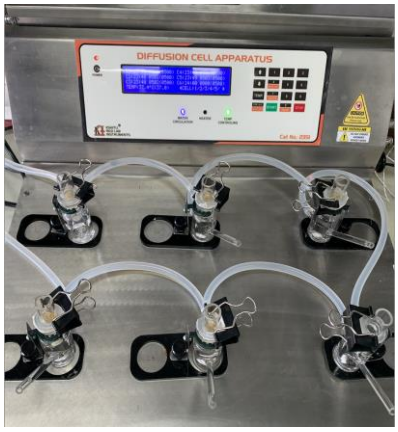
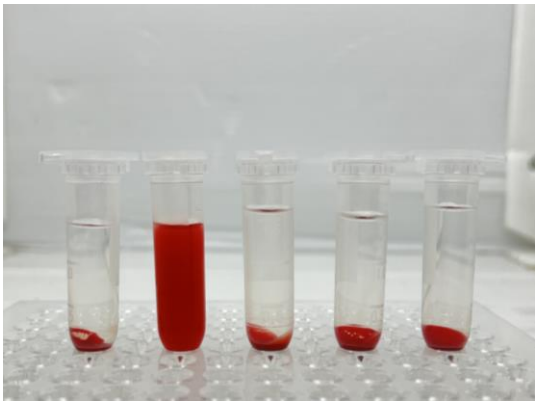
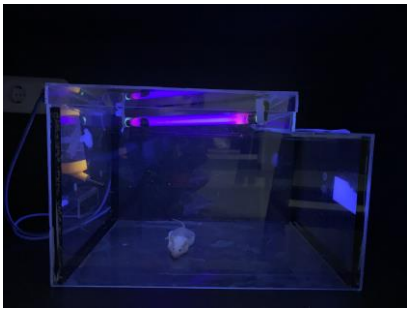
	
Uji permease dan retensi secara *ex vivo*	Uji hemolisis darah
	
Induksi sinar UV	Treatment hewan coba

Lampiran 3: Analisis Statistik

Suhu gelasi

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Gelasi	G1	.385	3	.	.750	3	.000
	G2	.385	3	.	.750	3	.000
	G3	.385	3	.	.750	3	.000
	G4	.385	3	.	.750	3	.000
	G5	.385	3	.	.750	3	.000

a. Lilliefors Significance Correction

Test Statistics[a,b]

	Gelasi
Kruskal-Wallis H	13.622
df	4
Asymp. Sig.	.009

a. Kruskal Wallis Test

b. Grouping Variable: Formula

pH

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
pH	G1	.175	3	.	1.000	3	1.000
	G2	.343	3	.	.842	3	.220
	G3	.298	3	.	.916	3	.439
	G4	.333	3	.	.862	3	.274
	G5	.219	3	.	.987	3	.780

a. Lilliefors Significance Correction

ANOVA

pH

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.103	4	.026	2.185	.144
Within Groups	.118	10	.012		
Total	.220	14			

Viskositas

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Viskositas 37	G1	.253	3	.	.964	3	.637
	G2	.385	3	.	.750	3	.000
	G3	.385	3	.	.750	3	.000
	G4	.385	3	.	.750	3	.000
	G5	.385	3	.	.750	3	.000

a. Lilliefors Significance Correction

ANOVA

Viskositas 37

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.017E+9	4	504228127	5197.871	.000
Within Groups	970066.667	10	97006.667		
Total	2.018E+9	14			

Daya sebar

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Daya sebar	G1	.320	3	.	.883	3	.334
	G2	.215	3	.	.989	3	.798
	G3	.322	3	.	.881	3	.327
	G4	.229	3	.	.981	3	.739
	G5	.318	3	.	.887	3	.344

a. Lilliefors Significance Correction

ANOVA

Daya sebar

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17020.624	4	4255.156	4180.573	.000
Within Groups	10.178	10	1.018		
Total	17030.802	14			

Ekstrudabilitas

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Ekstrudability	G1	.177	3	.	1.000	3	.964
	G2	.175	3	.	1.000	3	1.000
	G3	.219	3	.	.987	3	.780
	G4	.214	3	.	.989	3	.804
	G5	.302	3	.	.910	3	.419

a. Lilliefors Significance Correction

ANOVA

Ekstrudability

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1754.524	4	438.631	107.192	.000
Within Groups	40.920	10	4.092		
Total	1795.444	14			

Kekuatan Bioadesive

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Mucoadhesive	G1	.219	3	.	.987	3	.780
	G2	.175	3	.	1.000	3	1.000
	G3	.328	3	.	.871	3	.298
	G4	.253	3	.	.964	3	.637
	G5	.276	3	.	.942	3	.537

a. Lilliefors Significance Correction

ANOVA

Mucoadhesive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	679492456	4	169873114	509.421	.000
Within Groups	3334630.89	10	333463.089		
Total	682827087	14			

Height reduction

Tests of Normality

	Formula	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Height Reduction	F1	.226	3	.	.983	3	.751
	F2	.296	3	.	.918	3	.446
	F3	.321	3	.	.881	3	.328
	F4	.284	3	.	.933	3	.501
	F5	.367	3	.	.794	3	.100

a. Lilliefors Significance Correction

ANOVA

Height Reduction

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.259	4	2.815	53.979	.000
Within Groups	.521	10	.052		
Total	11.780	14			

Swelling

Tests of Normality

	Formula	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Gel Swelling	F1	.301	3	.	.911	3	.422
	F2	.216	3	.	.988	3	.794
	F3	.236	3	.	.977	3	.712
	F4	.200	3	.	.995	3	.861
	F5	.377	3	.	.771	3	.046

a. Lilliefors Significance Correction

ANOVA

Gel Swelling

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	186804.399	4	46701.100	3282.905	.000
Within Groups	142.255	10	14.226		
Total	186946.655	14			

Fraksi Gel

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Gel fraction	F1	.318	3	.	.887	3	.345
	F2	.347	3	.	.836	3	.203
	F3	.350	3	.	.829	3	.186
	F4	.346	3	.	.838	3	.208
	F5	.271	3	.	.947	3	.558

a. Lilliefors Significance Correction

ANOVA

Gel fraction

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	49.898	4	12.474	20.496	.000
Within Groups	6.086	10	.609		
Total	55.984	14			

Water Vapor transmission

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
WVT	F1	.343	3	.	.842	3	.220
	F2	.264	3	.	.954	3	.588
	F3	.204	3	.	.993	3	.845
	F4	.217	3	.	.988	3	.792
	F5	.245	3	.	.971	3	.670

a. Lilliefors Significance Correction

ANOVA

WVT

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.791	4	.198	9.291	.002
Within Groups	.213	10	.021		
Total	1.004	14			

Uji permeasi

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Formula	Statistic	df	Sig.	Statistic	df	Sig.
Ex Vivo	G1	.318	3	.	.886	3	.342
	G2	.230	3	.	.981	3	.733
	G3	.379	3	.	.765	3	.034
	G4	.299	3	.	.915	3	.434
	G5	.190	3	.	.997	3	.903

a. Lilliefors Significance Correction

ANOVA

Ex Vivo

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4214.617	4	1053.654	34.837	.000
Within Groups	302.449	10	30.245		
Total	4517.066	14			

Multiple Comparisons

Dependent Variable: Ex Vivo

Tukey HSD

		Mean Difference (I-J)			95% Confidence Interval	
(I) Formula	(J) Formula		Std. Error	Sig.	Lower Bound	Upper Bound
G1	G2	11.14597	4.49035	.171	-3.6322	25.9241
	G3	12.04139	4.49035	.127	-2.7367	26.8195
	G4	37.41275*	4.49035	.000	22.6346	52.1909
	G5	43.74251*	4.49035	.000	28.9644	58.5206
G2	G1	-11.14597	4.49035	.171	-25.9241	3.6322
	G3	.89542	4.49035	1.000	-13.8827	15.6735
	G4	26.26678*	4.49035	.001	11.4887	41.0449
	G5	32.59654*	4.49035	.000	17.8184	47.3747
G3	G1	-12.04139	4.49035	.127	-26.8195	2.7367
	G2	-.89542	4.49035	1.000	-15.6735	13.8827
	G4	25.37136*	4.49035	.002	10.5932	40.1495
	G5	31.70111*	4.49035	.000	16.9230	46.4792
G4	G1	-37.41275*	4.49035	.000	-52.1909	-22.6346
	G2	-26.26678*	4.49035	.001	-41.0449	-11.4887
	G3	-25.37136*	4.49035	.002	-40.1495	-10.5932
	G5	6.32975	4.49035	.636	-8.4484	21.1079
G5	G1	-43.74251*	4.49035	.000	-58.5206	-28.9644
	G2	-32.59654*	4.49035	.000	-47.3747	-17.8184
	G3	-31.70111*	4.49035	.000	-46.4792	-16.9230
	G4	-6.32975	4.49035	.636	-21.1079	8.4484

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

Lampiran 4: Perhitungan

1. Perhitungan bahan TRG-FUC
   G1 dibuat dalam 50 mL, berikut perhitungan untuk mengetahui jumlah bahan:
   - Pluronic® F127: 17% jadi : $\frac{17}{100}$ 50 g = 8,5 g
   - Pluronic® F68: 9% jadi : $\frac{9}{100}$ 50g = 4,5 g
   - Fucoidan: 1%, jadi : $\frac{1}{100}$ 50g = 0,5 g
   - Aquadest ad : 50 g
2. Perhitungan bahan Solid Microneedle
   Untuk 1 MN= 1 gram formula, berikut perhitungan untuk mengetahui jumlah bahan:
   - PVA 5% : $\frac{5}{100}$ 1g = 0,05g
   - PVP 15% : $\frac{15}{100}$ 1g = 0,15g
   - Asam sitrat 1% : $\frac{1}{100}$ 1g = 0,01g
   - Asam tartrat 1% : $\frac{1}{100}$ 1g = 0,01 g
   - Akuadest ad : 1 gram
3. Contoh perhitungan % Swelling
   Penentuan nilai swelling ditentukan berdasarkan rumus berikut:

   % *Swelling* = $\frac{(Wt-W0)}{W0}$x 100%

   Dimana:

   W_t = Bobot *microneedle* pada 24 jam (g)

   W_0 = bobot *microneedle* yang kering (g)

   Jika diketahui W0 adalah 0.0796 g , Wt adalah 0.4002. Maka, persentasi *swelling* yaitu:

   % *Swelling* = $\frac{(0,4002-0,0796)}{0,0796}$x 100% = 402,76%

4. Contoh perhitungan % fraksi gel
   % Fraksi Gel = $\frac{We}{W0}$ x 100%
   Dimana:
   We = Bobot gel microneedle kering yang tidak larut (g).
   W0 = bobot awal microneedle (g).
   Jika diketahui W0 adalah 0,1375 g , We adalah 0,1127. Maka, persentasi *swelling* yaitu:
   % Fraksi Gel = $\frac{0,1127}{0,1375}$ x 100% = 81,96%

Lampiran 5: Tabel data

profil permeasi ex vivo G1

GEL 1											
Time	**Dilution factor**	**Abs**	**Concentration (µg/ml)**	**13 ml (mg)**	**Correction factor**	**FUC permeated (mg)**	**Average**	**SD**	**% permeated**	**Average (%)**	**SD**
0.25	1	0.128	5.948	0.077	0.000	0.077	0.144	0.110	7.732	14.359	11.041
		0.134	6.340	0.082	0.000	0.082			8.242		
		0.356	20.850	0.271	0.000	0.271			27.105		
1	1	0.352	20.588	0.268	0.006	0.274	0.276	0.005	27.359	27.558	0.541
		0.349	20.392	0.265	0.006	0.271			27.144		
		0.344	20.065	0.261	0.021	0.282			28.170		
1	1	0.384	22.680	0.295	0.027	0.321	0.447	0.109	32.137	44.745	10.942
		0.598	36.667	0.477	0.027	0.503			50.340		
		0.598	36.667	0.477	0.041	0.518			51.758		
1	1	0.627	38.562	0.501	0.049	0.551	0.575	0.030	55.052	57.547	2.991
		0.630	38.758	0.504	0.063	0.567			56.725		
		0.662	40.850	0.531	0.078	0.609			60.863		
2	1	0.673	41.569	0.540	0.088	0.628	0.631	0.014	62.817	63.129	1.421
		0.678	41.895	0.545	0.102	0.647			64.680		
		0.626	38.497	0.500	0.118	0.619			61.889		
3	1	0.666	41.111	0.534	0.129	0.664	0.675	0.015	66.379	67.477	1.453

		0.681	42.092	0.547	0.144	0.691			69.124		
		0.640	39.412	0.512	0.157	0.669			66.928		
		0.624	38.366	0.499	0.170	0.669			66.922		
4	1	0.689	42.614	0.554	0.186	0.740	0.723	0.048	74.013	72.329	4.793
		0.701	43.399	0.564	0.196	0.761			76.052		
		0.638	39.281	0.511	0.209	0.719			71.948		
5	1	0.702	43.464	0.565	0.229	0.794	0.773	0.047	79.379	77.325	4.699
		0.704	43.595	0.567	0.240	0.806			80.647		
		0.657	40.523	0.527	0.248	0.775			77.490		
6	1	0.708	43.856	0.570	0.272	0.842	0.825	0.044	84.235	82.499	4.405
		0.713	44.183	0.574	0.283	0.858			85.771		
		0.670	41.373	0.538	0.289	0.826			82.647		
7	1	0.727	45.098	0.586	0.316	0.902	0.885	0.052	90.235	88.484	5.188
		0.741	46.013	0.598	0.328	0.926			92.569		
		0.688	42.549	0.553	0.330	0.883			88.314		
8	1	0.728	45.163	0.587	0.361	0.948	0.922	0.034	94.830	92.163	3.415
		0.696	43.072	0.560	0.374	0.933			93.346		
		0.689	42.614	0.554	0.373	0.927			92.654		
24	1	0.701	43.399	0.564	0.406	0.971	0.959	0.029	97.052	95.928	2.882
		0.701	43.399	0.564	0.417	0.981			98.078		

A. profil permeasi ex vivo G2

GEL 2											
Time	**Dilution factor**	**Abs**	**Concentration (µg/ml)**	**13 ml (mg)**	**Correction factor**	**FUC permeated (mg)**	**Average**	**SD**	**% permeated**	**Average (%)**	**SD**
0.25	1	0.231	12.680	0.165	0.000	0.165	0.187	0.047	16.484	18.721	4.708
		0.220	11.961	0.155	0.000	0.155			15.549		
		0.321	18.562	0.241	0.000	0.241			24.131		
0.5	1	0.328	19.020	0.247	0.013	0.260	0.265	0.011	25.993	26.505	1.103
		0.326	18.889	0.246	0.012	0.258			25.752		
		0.342	19.935	0.259	0.019	0.278			27.771		
0.75	1	0.339	19.739	0.257	0.032	0.288	0.326	0.057	28.830	32.597	5.664
		0.461	27.712	0.360	0.031	0.391			39.111		
		0.343	20.000	0.260	0.038	0.298			29.850		
1	1	0.476	28.693	0.373	0.051	0.424	0.425	0.013	42.444	42.549	1.323
		0.485	29.281	0.381	0.059	0.439			43.922		
		0.454	27.255	0.354	0.058	0.413			41.281		
2	1	0.569	34.771	0.452	0.080	0.532	0.522	0.043	53.216	52.187	4.322
		0.492	29.739	0.387	0.088	0.474			47.444		
		0.594	36.405	0.473	0.086	0.559			55.902		
3	1	0.572	34.967	0.455	0.115	0.569	0.573	0.008	56.948	57.336	0.782

		0.584	35.752	0.465	0.118	0.582			58.235		
		0.562	34.314	0.446	0.122	0.568			56.824		
		0.575	35.163	0.457	0.150	0.607			60.699		
4	1	0.564	34.444	0.448	0.153	0.601	0.606	0.005	60.111	60.638	0.500
		0.572	34.967	0.455	0.156	0.611			61.105		
		0.547	33.333	0.433	0.185	0.618			61.837		
5	1	0.602	36.928	0.480	0.188	0.668	0.647	0.025	66.784	64.662	2.548
		0.581	35.556	0.462	0.191	0.654			65.366		
		0.593	36.340	0.472	0.218	0.691			69.078		
6	1	0.607	37.255	0.484	0.225	0.709	0.675	0.043	70.902	67.538	4.344
		0.507	30.719	0.399	0.227	0.626			62.634		
		0.604	37.059	0.482	0.255	0.736			73.647		
7	1	0.584	35.752	0.465	0.262	0.727	0.736	0.009	72.673	73.593	0.893
		0.610	37.451	0.487	0.258	0.745			74.458		
		0.651	40.131	0.522	0.292	0.813			81.346		
8	1	0.601	36.863	0.479	0.298	0.777	0.782	0.029	77.693	78.203	2.922
		0.579	35.425	0.461	0.295	0.756			75.569		
		0.623	38.301	0.498	0.332	0.830			82.980		
24	1	0.666	41.111	0.534	0.335	0.869	0.848	0.020	86.902	84.782	1.980
		0.642	39.542	0.514	0.331	0.845			84.464		

B. Profil permeasi ex vivo G3

GEL 3											
Time	**Dilution factor**	**Absorbance**	**Concentration (µg/ml)**	**13 ml (mg)**	**Correction factor**	**FUC permeated (mg)**	**Average (mg)**	**SD**	**% permeated**	**Average (%)**	**SD**
0.25	1	0.255	14.248	0.185	0.000	0.185	0.248	0.106	18.523	24.754	10.645
		0.473	28.497	0.370	0.000	0.370			37.046		
		0.257	14.379	0.187	0.000	0.187			18.693		
0.5	1	0.277	15.686	0.204	0.014	0.218	0.271	0.058	21.817	27.054	5.755
		0.311	17.908	0.233	0.028	0.261			26.131		
		0.411	24.444	0.318	0.014	0.332			33.216		
0.75	1	0.356	20.850	0.271	0.030	0.301	0.320	0.018	30.098	32.020	1.781
		0.378	22.288	0.290	0.046	0.336			33.614		
		0.372	21.895	0.285	0.039	0.323			32.346		
1	1	0.446	26.732	0.348	0.051	0.398	0.417	0.030	39.830	41.721	2.980
		0.429	25.621	0.333	0.069	0.402			40.176		
		0.497	30.065	0.391	0.061	0.452			45.157		
2	1	0.579	35.425	0.461	0.078	0.538	0.501	0.076	53.804	50.133	7.626
		0.576	35.229	0.458	0.094	0.552			55.229		
		0.417	24.837	0.323	0.091	0.414			41.366		
3	1	0.582	35.621	0.463	0.113	0.576	0.573	0.018	57.601	57.281	1.822
		0.578	35.359	0.460	0.130	0.589			58.922		

		0.552	33.660	0.438	0.116	0.553			55.320		
4	1	0.554	33.791	0.439	0.149	0.588	0.595	0.022	58.784	59.523	2.153
		0.572	34.967	0.455	0.165	0.619			61.948		
		0.542	33.007	0.429	0.149	0.578			57.837		
5	1	0.511	30.980	0.403	0.182	0.585	0.633	0.062	58.510	63.283	6.198
		0.629	38.693	0.503	0.200	0.703			70.288		
		0.541	32.941	0.428	0.182	0.611			61.052		
6	1	0.551	33.595	0.437	0.213	0.650	0.661	0.051	65.007	66.081	5.076
		0.599	36.732	0.478	0.239	0.716			71.608		
		0.509	30.850	0.401	0.215	0.616			61.627		
7	1	0.614	37.712	0.490	0.247	0.737	0.721	0.046	73.719	72.059	4.621
		0.603	36.993	0.481	0.275	0.756			75.621		
		0.534	32.484	0.422	0.246	0.668			66.837		
8	1	0.495	29.935	0.389	0.285	0.674	0.743	0.060	67.379	74.272	5.970
		0.584	35.752	0.465	0.312	0.777			77.706		
		0.624	38.366	0.499	0.279	0.777			77.732		
24	1	0.588	36.013	0.468	0.315	0.783	0.839	0.100	78.275	83.887	10.034
		0.751	46.667	0.607	0.348	0.955			95.471		
		0.581	35.556	0.462	0.317	0.779			77.915		

C. Profil permeasi ex vivo G4

GEL 4											
Time	**Dilution factor**	**Absorbance**	**Concentration (µg/ml)**	**13 (µg/ml)**	**Correction factor**	**FUC permeated (mg)**	**Average (mg)**	**SD**	**% permeated**	**Average (%)**	**SD**
0.25	1	0.185	9.673	0.126	0.000	0.126	0.229	0.089	12.575	22.856	8.904
		0.366	21.503	0.280	0.000	0.280			27.954		
		0.367	21.569	0.280	0.000	0.280			28.039		
0.5	1	0.347	20.261	0.263	0.000	0.264	0.247	0.034	26.352	24.720	3.447
		0.281	15.948	0.207	0.000	0.208			20.760		
		0.355	20.784	0.270	0.000	0.270			27.048		
0.75	1	0.430	25.686	0.334	0.000	0.334	0.305	0.059	33.431	30.466	5.902
		0.315	18.170	0.236	0.000	0.237			23.670		
		0.440	26.340	0.342	0.001	0.343			34.297		
1	1	0.443	26.536	0.345	0.001	0.346	0.343	0.003	34.569	34.348	0.262
		0.437	26.144	0.340	0.001	0.341			34.059		
		0.441	26.405	0.343	0.001	0.344			34.416		
2	1	0.457	27.451	0.357	0.001	0.358	0.376	0.028	35.793	37.583	2.811
		0.461	27.712	0.360	0.001	0.361			36.132		
		0.516	31.307	0.407	0.001	0.408			40.823		
3	1	0.534	32.484	0.422	0.001	0.424	0.397	0.043	42.371	39.716	4.326
		0.444	26.601	0.346	0.001	0.347			34.724		

		0.530	32.222	0.419	0.002	0.421			42.053		
4	1	0.583	35.686	0.464	0.002	0.466	0.448	0.033	46.577	44.825	3.325
		0.587	35.948	0.467	0.002	0.469			46.909		
		0.517	31.373	0.408	0.002	0.410			40.991		
5	1	0.588	36.013	0.468	0.002	0.470	0.533	0.056	47.048	53.254	5.603
		0.679	41.961	0.545	0.002	0.548			54.773		
		0.716	44.379	0.577	0.002	0.579			57.940		
6	1	0.662	40.850	0.531	0.003	0.534	0.551	0.020	53.383	55.119	1.953
		0.678	41.895	0.545	0.003	0.547			54.742		
		0.707	43.791	0.569	0.003	0.572			57.233		
7	1	0.688	42.549	0.553	0.003	0.556	0.563	0.046	55.645	56.335	4.557
		0.647	39.869	0.518	0.003	0.522			52.163		
		0.753	46.797	0.608	0.004	0.612			61.198		
8	1	0.759	47.190	0.613	0.004	0.617	0.570	0.046	61.733	56.986	4.597
		0.651	40.131	0.522	0.004	0.526			52.554		
		0.699	43.268	0.562	0.004	0.567			56.671		
24	1	0.794	49.477	0.643	0.004	0.648	0.577	0.066	64.768	57.666	6.650
		0.639	39.346	0.512	0.004	0.516			51.587		
		0.698	43.203	0.562	0.005	0.566			56.642		

D. Profil permeasi ex vivo G5

G5											
Time	**Dilution factor**	**Absorbance**	**Concentration (µg/ml)**	**13 (µg/ml)**	**Correction factor**	**FUC permeated (mg)**	**Average (mg)**	**SD**	**% permeated**	**Average (%)**	**SD**
0.25	1	0.185	9.673	0.126	0.000	0.126	0.180	0.097	12.575	18.041	9.689
		0.381	22.484	0.292	0.000	0.292			29.229		
		0.182	9.477	0.123	0.000	0.123			12.320		
0.5	1	0.349	20.392	0.265	0.000	0.265	0.265	0.001	26.522	26.500	0.137
		0.350	20.458	0.266	0.000	0.266			26.624		
		0.347	20.261	0.263	0.000	0.264			26.352		
0.75	1	0.408	24.248	0.315	0.000	0.316	0.317	0.002	31.562	31.737	0.170
		0.410	24.379	0.317	0.001	0.317			31.749		
		0.412	24.510	0.319	0.000	0.319			31.901		
1	1	0.417	24.837	0.323	0.001	0.324	0.320	0.003	32.358	32.024	0.340
		0.413	24.575	0.319	0.001	0.320			32.035		
		0.409	24.314	0.316	0.001	0.317			31.678		
2	1	0.487	29.412	0.382	0.001	0.383	0.401	0.016	38.338	40.128	1.580
		0.522	31.699	0.412	0.001	0.413			41.329		
		0.515	31.242	0.406	0.001	0.407			40.717		
3	1	0.576	35.229	0.458	0.001	0.459	0.435	0.037	45.939	43.538	3.726
		0.497	30.065	0.391	0.002	0.392			39.246		

		0.570	34.837	0.453	0.001	0.454			45.430		
4	1	0.601	36.863	0.479	0.002	0.481	0.484	0.004	48.108	48.368	0.377
		0.609	37.386	0.486	0.002	0.488			48.801		
		0.602	36.928	0.480	0.002	0.482			48.195		
5	1	0.574	35.098	0.456	0.002	0.459	0.479	0.041	45.862	47.906	4.054
		0.567	34.641	0.450	0.002	0.453			45.281		
		0.653	40.261	0.523	0.002	0.526			52.576		
6	1	0.632	38.889	0.506	0.003	0.508	0.500	0.054	50.836	49.965	5.361
		0.554	33.791	0.439	0.003	0.442			44.221		
		0.679	41.961	0.545	0.003	0.548			54.837		
7	1	0.588	36.013	0.468	0.003	0.471	0.521	0.049	47.148	52.082	4.892
		0.647	39.869	0.518	0.003	0.522			52.167		
		0.703	43.529	0.566	0.003	0.569			56.931		
8	1	0.659	40.654	0.528	0.004	0.532	0.520	0.013	53.228	52.049	1.278
		0.629	38.693	0.503	0.004	0.507			50.690		
		0.647	39.869	0.518	0.004	0.522			52.230		
24	1	0.615	37.778	0.491	0.004	0.495	0.522	0.027	49.542	52.186	2.727
		0.679	41.961	0.545	0.004	0.550			54.988		
		0.644	39.673	0.516	0.005	0.520			52.027		

Lampiran 6: Izin Etik Hewan Coba

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET DAN TEKNOLOGI
UNIVERSITAS HASANUDDIN FAKULTAS KEDOKTERAN
KOMITE ETIK PENELITIAN UNIVERSITAS HASANUDDIN
RSPTN UNIVERSITAS HASANUDDIN
RSUP Dr. WAHIDIN SUDIROHUSODO MAKASSAR
Sekretariat : Lantai 2 Gedung Laboratorium Terpadu
JL.PERINTIS KEMERDEKAAN KAMPUS TAMALANREA KM.10 MAKASSAR 90245.
Contact Person: dr. Agussalim Bukhari.,MMed.PhD, SpGK TELP. 081241850858, 0411 5780103, Fax : 0411-581431

REKOMENDASI PERSETUJUAN ETIK

Nomor : 344/UN4.6.4.5.31/ PP36/ 2023

Tanggal: 25 Mei 2023

Dengan ini Menyatakan bahwa Protokol dan Dokumen yang Berhubungan Dengan Protokol berikut ini telah mendapatkan Persetujuan Etik :

No Protokol	UH23050270	No Sponsor	
Peneliti Utama	**apt. Frederika Tangdilintin, S.Si**	Sponsor	
Judul Peneliti	UJI EFEKTIVITAS ANTI-AGING FUCOIDAN DALAM PENGEMBANGAN SEDIAAN TRANSDERMAL MENGGUNAKAN KOMBINASI SOLID MICRONEEDLES BERBASIS POLIMER DAN GEL THERMORESPONSIVE.		
No Versi Protokol	**1**	Tanggal Versi	**2 Mei 2023**
No Versi PSP		Tanggal Versi	
Tempat Penelitian	Laboratorium Fakultas Farmasi Universitas Hasanuddin Makassar		
Jenis Review	[ ] Exempted [x] Expedited [ ] Fullboard Tanggal	Masa Berlaku **25 Mei 2023** sampai **25 Mei 2024**	Frekuensi review lanjutan
Ketua KEP Universitas Hasanuddin	Nama **Prof.Dr.dr. Suryani As'ad, M.Sc.,Sp.GK (K)**	Tanda tangan	
Sekretaris KEP Universitas Hasanuddin	Nama **dr. Agussalim Bukhari, M.Med.,Ph.D.,Sp.GK (K)**	Tanda tangan	

Kewajiban Peneliti Utama:

- Menyerahkan Amandemen Protokol untuk persetujuan sebelum di implementasikan
- Menyerahkan Laporan SAE ke Komisi Etik dalam 24 Jam dan dilengkapi dalam 7 hari dan Lapor SUSAR dalam 72 Jam setelah Peneliti Utama menerima laporan
- Menyerahkan Laporan Kemajuan (progress report) setiap 6 bulan untuk penelitian resiko tinggi dan setiap setahun untuk penelitian resiko rendah
- Menyerahkan laporan akhir setelah Penelitian berakhir
- Melaporkan penyimpangan dari prokol yang disetujui (protocol deviation / violation)
- Mematuhi semua peraturan yang ditentukan