BAB V

KESIMPULAN DAN SARAN

A. Kesimpulan

Berdasarkan hasil penelitian ini dapat disimpulkan bahwa:

Pertama, ekstrak etanol 70 % herba*Euphorbia heterophylla* L. dapat menurunkan kadar kolesterol total dan trigliserida serum darah tikus putih jantan yang diberi diet lemak tinggi.

Kedua, ekstrak etanol 70 % herba*Euphorbia heterophylla* L. pada dosis 800mg/200BB mempunyai pengaruh paling efektif menurunkan kadar kolesterol total dan trigliserida serum darah tikus pada uji kolesterol total setara dengan kontrol positif simvastatin dan pada trigliserida tidak setara dengan kontrol positif

B. Saran

Saran yang dapat diberikan untuk penelitian yang lebih lanjut herba Euphorbia heterophylla L. terhadap penurunan kadar kolesterol total dan trigliserida sebagai berikut :

Pertama, perlu adanya penelitian lebih lanjut mengenai herba Euphorbia heterophylla L. dan kandungan kimia di dalam *Euphorbia heterophylla* L. dengan melakukan isolasi zat aktif murni yang dilanjutkan dengan pengujian aktivitas terhadap efek hiperkolesterolemia dan hipertrigliserida dalam pengujian kadar normal setelah perlakuan herba *Euphorbia heterophylla* L. dilakukan hari ke-30.

Kedua, perlu adanya penelitian lebih lanjut untuk mengetahui toksisitas senyawa yang terdapat pada ekstrak etanolik herba Euphorbia heterophylla L.

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Lampiran 1. Surat keterangan determinasi tanaman

UNIVERSITAS SETIA BUDI
UPT- LABORATORIUM

No : 060/DET/UPT-LAB/08/IV/2013
Hal : Surat Keterangan Determinasi Tumbuhan

Menerangkan bahwa :
Nama : Widita Dilah Pramesti
NIM : 15092794 A
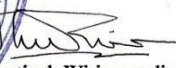Fakultas : Farmasi Universitas Setia Budi

Telah mendeterminasikan tumbuhan : **Katemas (*Euphorbia heterophylla* L)**

Determinasi berdasarkan Backer : Flora of Java
1b – 2b – 3b – 4b – 12b – 13b – 14b – 17b – 18b – 19b – 20b – 21b – 22b – 23b -24b – 25b – 26b – 27a – 28b – 29b – 30b – 31b – 32b – 74a – 75b – 76a – 77a – 78a – 79b – 80a – 81b – 86b – 87b – 97a – 98b – 99b – 100b – 143b – 147b – 156a. 99. Familia Euphorbiaceae. 1a – 2b – 59. *Euphorbia.* 1b – 6a – 7a – 8a. *Euphorbia heterophylla* L.

Deskripsi:

Habitus : Semak, tinggi dapat mencapai 1 meter.

Batang : Bulat, berwarna hijau, masif, beruas-ruas.

Daun : Tunggal, tersebar, bentuk jorong, ujung meruncing, pangkal meruncing, tepi rata, panjang 5,5 – 9 cm, lebar 1,9 – 2,6 cm, tangkai daun pipih & berwarna hijau, panjang ± 1,5 cm, permukaan atas halus, permukaan bawah kasar, tulang daun menyirip, berwarna hijau.

Bunga : Majemuk, bentuk payung, terletak di ujung batang, tangkai silindris, panjang 1 – 2 cm, berwarna hijau, mahkota berwarna kuning.

Akar : Tunggang, berwarna putih kotor.

Pustaka : Backer C.A. & Brink R.C.B. (1965): *Flora of Java* (Spermatophytes only). N.V.P. Noordhoff – Groningen – The Netherlands.

Surakarta, 08 April 2013
Tim determinasi

Dra. Kartinah Wirjosoendjojo, SU.

Jl. Let.jen Sutoyo, Mojosongo-Solo 57127 Telp.0271-852518, Fax.0271-853275
Homepage : www.setiabudi.ac.id, e-mail : usbsolo@yahoo.com

Lampiran 2. Surat Keterangan Pembelian Hewan Uji

"ABIMANYU FARM"

√ Mencit putih jantan   √ Tikus Wistar √ Swis Webster   √ Cacing   √ Mencit Jepang   √ Kelinci New Zaeland
Ngampon RT 04 / RW 04. Mojosongo Kec. Jebres Surakarta. Phone 085 629 994 33 / Lab USB Ska

Menerangkan dengan sebenarnya bahwa Tikus Wistar yang dibeli oleh:

Nama	: Widita Dilah P
Alamat	: Universitas Setia Budi Surakarta
Fakultas	: Farmasi
Nim	: 15092794 A
Keperluan	: Praktikum Penelitian
Tanggal	: 16 April 2013
Jenis	: Tikus Wistar
Kelamin	: Tikus Wistar Jantan
Umur	: ± 3 - 4 bulan
Jumlah	: 56 ekor jantan

Atas kerja samanya, kami mengucapkan terima kasih dan mohon maaf jika dalam pelayanannya banyak kekurangan.

Surakarta, 23 Mei 2013
Hormat kami

ABIMANYU FARM
Sigit Pramono

Lampiran 3. Foto tanaman dan serbuk *Euphorbia heterophylla* L.

Gamabar 5a. Foto tanaman *Euphorbia heterophylla* L.

Gambar 5b. Foto serbuk herba *Euphorbia heterophylla* L.

Lampiran 4. Foto Alat – alat Penyerbukan

Gambar 6a.penggiling serbuk

Gambar 6. Foto ayakan

Lampiran 5. Alat-alat dan hasil ekstral etanol 70 % herba *Euphorbia*

heterophylla **L.**

Gambar 7a.Botol maserasi

Gambar 7b.*corong Buchner*

Gambar 7c.Foto alat *evaporator*

Gambar 7d. Foto timbangan elektrik

Gambar 7e. Foto *moisture balance* Gambar 7f. Foto Penetapan kadar air

Gambar 7g. Foto Hasil maserasi herba *Euphorbia heterophylla* L.

Gambar 7h. Foto suspensi herba *Euphorbia heterophylla* L.

Lampiran 6. **Pemberian suspensi herba*Euphorbia heterophylla* L. dan pengambilan darah.**

Gambar 8a. Hewan uji

Gambar 8b. Pemberian Suspensi herba *Euphorbia heterophylla* L.

Gambar 8c.Pengambilan darah   **Gambar 8d. Serum darah**

Lampiran 7. Alat-alat, bahan dan Uji Kolesterol total dan Trigliserida

Gambar 9a. Foto *Centrifuge***Gambar gb. Foto** *fotometer star dust*

Gambar 9c.Foto mikropipetGambar 9d. Foto Reagen kolesterol kit

Gambar 9e. Foto reagen trigliserida kit

Lampiran 8. Hasil identifikasi herba *Euphorbia heterophylla* L.

Gambar 10a.tannin

Gambar 10b. flavonoid

Gamabr 10c.alkaloid

Gambar 10d. saponin

Lampiran 9. Hasil berat kering terhadap berat basah herba *Euphorbia*

heterophylla L.

Dari hasil penelitian diperoleh data sebagai berikut :

NO	Berat basah (gram)	Berat Kering (gram)	Rendemen (%)
1	15.000	3650	24,3

Perhitungan % rendemen berat kering terhadap berat basah :

% Rendemen $= \dfrac{Bobot kering\ (g)}{Bobot basah\ (g)} X\ 100\%$

$= \dfrac{3650\ g}{15000\ g}$ x 100%

$= 24,3\ \%$

Jadi rendemen berat kering terhadap berat basah herba *Euphorbia heterophylla*

L.adalah 24,3 %

Lampiran 10.Hasil Presentase berat serbuk terhadap berat kering herba

Euphorbia heterophylla **L.**

NO	Berat Kering (gram)	Berat serbuk (gram)	Rendemen (%)
1	3650	2400	65,75

Perhitungan % rendemen berat serbuk terhadap berat kering :

$$\% \text{ Rendemen } = \frac{Bobotserbuk\ (g)}{Bobotkering\ (g)} X\ 100\%$$

$$= \frac{2400\ g}{3650\ g} \text{ x } 100\%$$

$$= 65,75\ \%$$

Jadi rendemen berat serbuk terhadap berat kering herba *Euphorbia heterophylla*

L.adalah 65,75 %

Lampiran11. Hasil penetapan kadar air ekstrak etanol 70% herba
Euphorbia heterophylla **L**

NO	Berat awal (gram)	Berat akhir(gram)	Rendemen(%)
1	1,99 g	1,91 g	1 %
2	2,03 g	2,00 g	1,5 %
3	5,74 g	5,73 g	0,2 %
	Rata-rata		0,9

Hasil perhitungan kadar air ekstrak etanol 70% herba *Euphorbia heterophylla* L. diatas terdapat satu data yang menyimpang yaitu 0,2 %, jika dibanding dengan dua data yang lain, sehingga patut dicurigai.

Lampiran12. Perhitungan volume pemberian

tikus	Berat Badan	Dosis	Volume Pemberian
1	199,20 gram	100 mg/ 200g BB	0,996 ml
2	199,40 gram	200 mg/ 200g BB	0,997 ml
3	199,00 gram	400 mg/ 200 g BB	0,995 ml
4	200,00 gram	600 mg/ 200 g BB	1ml
5	199,00 gram	800 mg/ 200 g BB	0,995 ml

Dosis simvistatin

Dosis simvistatin pada manusia adalah 10 mg/kg BB

Sehingga dosis simvistatin dikonversikan ke tikus dengan konversi 0,018

$$20 \text{ mg X } 0,018 = \frac{36 \, mg}{200 gram} \text{ BB tikus}$$

Pengambilan bahan

Rata-rata berat tablet simvastatin adalah 0,199 gram

$$\frac{0,36}{20} X \text{ @ bobot tablet}$$

$$\frac{0,36}{20} X \, 0,199 \, gram$$

$$\frac{0,36}{20} X \, 199 \text{ mg}$$

$$= 3,582 \text{ mg}$$

$$= 3,6 \text{ mg}$$

Untuk pembuatan larutan stock Pengambilan simvastatin sebenyak 3,6 mg

Pembuatan larutan stock 0,036 %

$$\text{Larutan stock} = \frac{0,36 \, mg}{ml}$$

$$= {}^{36\,mg}\!/_{100ml}$$

$$= {}^{0,036\,gram}\!/_{100\,ml}$$

$$= 0,036\,\%$$

Volume yang dioralkan $= \dfrac{0,36}{0,36}$ X 1 ml

$$= 1\text{ ml}$$

Lampiran 13. Peningkatan kolesterol dan total trigliserida

Descriptives

KOLESTEROL TOTAL SELISIH NORMAL DENGAN HIPERLIPIDEMIA

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
kolesterol total	32	1	99	52.59	23.051
Valid N (listwise)	32				

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
kolesterol total	32	51.97	22.291	1	99

One-Sample Kolmogorov-Smirnov Test

		kolesterol total
N		32
Normal Parameters[a]	Mean	51.97
	Std. Deviation	22.291
Most Extreme Differences	Absolute	.211
	Positive	.119
	Negative	-.211
Kolmogorov-Smirnov Z		1.191
Asymp. Sig. (2-tailed)		.117
a. Test distribution is Normal.		

Oneway

Descriptives

kolesterol total

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
kontrol normal	5	2.75	1.708	.854	.03	5.47	1	5
kontrol negatif	5	66.50	22.279	11.139	31.05	101.95	52	99
kontrol positif	5	48.00	7.874	3.937	35.47	60.53	40	57
dosis 100 mg	5	53.00	8.718	4.359	39.13	66.87	48	66
dosis 200 mg	5	62.00	11.165	5.583	44.23	79.77	50	75
dosis 400 mg	5	64.25	10.145	5.072	48.11	80.39	50	74
dosis 600 mg	5	53.50	9.950	4.975	37.67	69.33	42	66
dosis 800 mg	5	65.75	6.702	3.351	55.09	76.41	56	71
Total	40	51.97	22.291	3.940	43.93	60.01	1	99

Test of Homogeneity of Variances

kolesterol total

Levene Statistic	df1	df2	Sig.
2.154	7	24	.076

Post Hoc Tests

Homogeneous Subsets

kolesterol total

Duncan

kelompok perlakuan	N	Subset for alpha = 0.05	
		1	2
kontrol normal	5	2.75	
kontrol positif	5		48.00
dosis 100 mg	5		53.00
dosis 600 mg	5		53.50
dosis 200 mg	5		62.00
dosis 400 mg	5		64.25
dosis 800 mg	5		65.75
kontrol negatif	5		66.50
Sig.		1.000	.051

Means for groups in homogeneous subsets are displayed.

Descriptives

TRIGLISERIDA SELISIH NORMAL DENGAN HIPERLIPIDEMIA

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
trigliserida	32	4	86	58.41	21.909
Valid N (listwise)	32				

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
trigliserida	32	58.41	21.909	4	86

One-Sample Kolmogorov-Smirnov Test

		trigliserida
N		32
Normal Parameters[a]	Mean	58.41
	Std. Deviation	21.909
Most Extreme Differences	Absolute	.206
	Positive	.123
	Negative	-.206
Kolmogorov-Smirnov Z		1.167
Asymp. Sig. (2-tailed)		.131
a. Test distribution is Normal.		

Oneway

Descriptives

trigliserida								
					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
kontrol normal	5	8.00	4.082	2.041	1.50	14.50	4	12
kontrol negatif	5	70.25	7.042	3.521	59.05	81.45	60	76
kontrol positif	5	58.00	6.377	3.189	47.85	68.15	52	67
dosis 100 mg	5	60.50	16.543	8.271	34.18	86.82	50	85
dosis 200 mg	5	65.50	3.512	1.756	59.91	71.09	62	69
dosis 400 mg	5	63.50	17.059	8.529	36.36	90.64	38	74
dosis 600 mg	5	68.50	4.726	2.363	60.98	76.02	62	72
dosis 800 mg	5	73.00	12.302	6.151	53.43	92.57	57	86
Total	40	58.41	21.909	3.873	50.51	66.31	4	86

Test of Homogeneity of Variances

trigliserida

Levene Statistic	df1	df2	Sig.
2.309	7	24	.060

ANOVA

trigliserida					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	12306.969	7	1758.138	16.401	.000
Within Groups	2572.750	24	107.198		
Total	14879.719	31			

Post Hoc Tests

Homogeneous Subsets

Trigliserida

Duncan

kelompok perlakuan	N	Subset for alpha = 0.05	
		1	2
kontrol normal	5	8.00	
kontrol positif	5		58.00
dosis 100 mg	5		60.50
dosis 400 mg	5		63.50
dosis 200 mg	5		65.50
dosis 600 mg	5		68.50
kontrol negatif	5		70.25
dosis 800 mg	5		73.00
Sig.		1.000	.085

Means for groups in homogeneous subsets are

displayed.

Lampiran 14. Penurunan kadar trigliserida

Descriptives

TRIGLISERIDA SELISIH HIPERLIPIDEMIA DENGAN PERLAKUAN

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Trigliserida	28	15	102	51.61	26.792
Valid N (listwise)	28				

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
trigliserida	28	51.61	26.792	15	102

One-Sample Kolmogorov-Smirnov Test

		trigliserida
N		28
Normal Parameters[a]	Mean	51.61
	Std. Deviation	26.792
Most Extreme Differences	Absolute	.123
	Positive	.123
	Negative	-.086
Kolmogorov-Smirnov Z		.653
Asymp. Sig. (2-tailed)		.788
a. Test distribution is Normal.		

Oneway

Descriptives

triglyserida

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
kontrol negatif	5	18.00	2.582	1.291	13.89	22.11	15	21
kontrol positif	5	42.25	17.783	8.892	13.95	70.55	20	62
dosis 100 mg	5	54.25	10.210	5.105	38.00	70.50	40	64
dosis 200 mg	5	54.00	30.011	15.006	6.25	101.75	20	93
dosis 400 mg	5	52.50	26.602	13.301	10.17	94.83	15	75
dosis 600 mg	5	64.25	27.729	13.865	20.13	108.37	29	91
dosis 800 mg	5	76.00	31.760	15.880	25.46	126.54	31	102
Total	35	51.61	26.792	5.063	41.22	62.00	15	102

Test of Homogeneity of Variances

trigliserida

Levene Statistic	df1	df2	Sig.
1.411	6	21	.257

ANOVA

trigliserida

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	7941.429	6	1323.571	2.430	.061
Within Groups	11439.250	21	544.726		
Total	19380.679	27			

Post Hoc Tests

Homogeneous Subsets

Trigliserida

Duncan

kelompok perlakuaan	N	Subset for alpha = 0.05	
		1	2
kontrol negatif	5	18.00	
kontrol positif	5	42.25	42.25
dosis 400 mg	5	52.50	52.50
dosis 200 mg	5	54.00	54.00
dosis 100 mg	5	54.25	54.25
dosis 600 mg	5		64.25
dosis 800 mg	5		76.00
Sig.		.060	.083

Means for groups in homogeneous subsets are displayed.

Lampiran 15. Penurunan kadar kolesterol total

Descriptives

KOLESTEROL TOTAL SELISIH HIPERLIPIDEMIA DENGAN
PERLAKUAN

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
kolesterol total	28	13	151	61.89	32.850
Valid N (listwise)	28				

NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
kolesterol total	28	61.89	32.850	13	151

One-Sample Kolmogorov-Smirnov Test

		kolesterol total
N		28
Normal Parameters[a]	Mean	61.89
	Std. Deviation	32.850
Most Extreme Differences	Absolute	.129
	Positive	.129
	Negative	-.084
Kolmogorov-Smirnov Z		.682
Asymp. Sig. (2-tailed)		.741
a. Test distribution is Normal.		

Oneway

Descriptives

kolesterol total

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
kontrol negatif	5	16.75	2.986	1.493	12.00	21.50	13	20
kontrol positif	5	52.50	9.327	4.664	37.66	67.34	40	61
dosis 100 mg	5	56.50	9.747	4.873	40.99	72.01	43	66
dosis 200 mg	5	80.00	31.432	15.716	29.98	130.02	51	117
dosis 400 mg	5	54.75	25.474	12.737	14.22	95.28	19	78
dosis 600 mg	5	65.75	26.912	13.456	22.93	108.57	32	94
dosis 800 mg	5	107.00	32.383	16.192	55.47	158.53	74	151
Total	35	61.89	32.850	6.208	49.15	74.63	13	151

Test of Homogeneity of Variances

kolesterol total

Levene Statistic	df1	df2	Sig.
2.559	6	21	.051

ANOVA

kolesterol total

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	18334.429	6	3055.738	5.940	.001
Within Groups	10802.250	21	514.393		
Total	29136.679	27			

Post Hoc Tests

Homogeneous Subsets

kolesterol total

Duncan

kelompok perlakuaan	N	Subset for alpha = 0.05		
		1	2	3
kontrol negatif	5	16.75		
kontrol positif	5		52.50	
dosis 400 mg	5		54.75	
dosis 100 mg	5		56.50	
dosis 600 mg	5		65.75	
dosis 200 mg	5		80.00	80.00
dosis 800 mg	5			107.00
Sig.		1.000	.138	.107

Means for groups in homogeneous subsets are displayed.

Lampiran16. Cara kerja kit kolesterol dyasis

$C \in$

Cholesterol FS*

Diagnostic reagent for quantitative in vitro determination of cholesterol in serum or plasma on photometric systems

Order Information

Cat. No.		Kit size			
1 1300 99 83 021	R	5 x	25 mL	+ 1 x	3 mL Standard
1 1300 99 83 026	R	6 x	100 mL		
1 1300 99 83 023	R	1 x	1000 mL		
1 1300 99 83 704	R	8 x	50 mL		
1 1300 99 83 917	R	10 x	60 mL		
1 1300 99 83 192	R	4 x	60 mL		
1 1300 99 83 314	R	12 x	25 mL		
1 1300 99 83 030		6 x	3 mL	Standard	

Summary

Cholesterol is a component of cell membranes and a precursor for steroid hormones and bile acids synthesized by body cells and absorbed with food [1]. Cholesterol is transported in plasma via lipoproteins, namely complexes between lipids and apolipoproteins [1]. There are four classes of lipoproteins: high density lipoproteins (HDL), low density lipoproteins (LDL), very low density lipoproteins (VLDL) and chylomicrons. While LDL is involved in the cholesterol transport to the peripheral cells, HDL is responsible for the cholesterol uptake from the cells. The four different lipoprotein classes show distinct relationship to coronary atherosclerosis [1]. LDL-cholesterol (LDL-C) contributes to atherosclerotic plaque formation within the arterial intima and is strongly associated with coronary heart disease (CHD) and related mortality. Even with total cholesterol within the normal range an increased concentration of LDL-C indicates high risk. HDL-C has a protective effect impeding plaque formation and shows an inverse relationship to CHD prevalence. In fact, low HDL-C values constitute an independent risk factor. The determination of the individual total cholesterol (TC) level is used for screening purposes while for a better risk assessment it is necessary to measure additionally HDL-C and LDL-C.
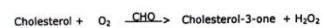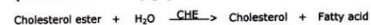
In the last few years several controlled clinical trials using diet, life style changes and / or different drugs (especially HMG CoA reductase inhibitors [statins]) have demonstrated that lowering total cholesterol and LDL-C levels reduce drastically CHD risk [2].

Method

"CHOD-PAP": enzymatic photometric test

Principle

Determination of cholesterol after enzymatic hydrolysis and oxidation [3,4]. The colorimetric indicator is quinoneimine which is generated from 4-aminoantipyrine and phenol by hydrogen peroxide under the catalytic action of peroxidase (Trinder's reaction) [3].

Cholesterol ester + H_2O $\xrightarrow{CHE}$ Cholesterol + Fatty acid

Cholesterol + O_2 $\xrightarrow{CHO}$ Cholesterol-3-one + H_2O_2

$2 H_2O_2$ + 4-Aminoantipyrine + Phenol $\xrightarrow{POD}$ Quinoneimine + $4 H_2O$

Reagents

Components and Concentrations

N.B. Concentrations are those in the final test mixture.

Reagent:

Good's buffer	pH 6.7	50 mmol/L
Phenol		5 mmol/L
4-Aminoantipyrine		0.3 mmol/L
Cholesterol esterase	(CHE)	≥ 200 U/L
Cholesterol oxidase	(CHO)	≥ 50 U/L
Peroxidase	(POD)	≥ 3 kU/L
Standard:		200 mg/dL (5.2 mmol/L)

Storage Instructions and Reagent Stability

The reagent is stable up to the end of the indicated month of expiry, if stored at 2 – 8 °C, protected from light and contamination is avoided. Do not freeze the reagents!
The standard is stable up to the end of the indicated month of expiry, if stored at 2 – 25 °C.
Note: It has to be mentioned, that the measurement is not influenced by occasionally occurring color changes, as long as the absorbance of the reagent is < 0.3 at 546 nm.

Warnings and Precautions

1. The reagent contains sodium azide (0.95 g/L) as preservative. Do not swallow! Avoid contact with skin and mucous membranes.
2. Take the necessary precautions for the use of laboratory reagents.

Waste Management

Please refer to local legal requirements.

Reagent Preparation

The reagent and the standard are ready-to-use.

Materials required but not provided

NaCl solution 9 g/L.
General laboratory equipment.

Specimen

Serum, heparin plasma or EDTA plasma.

Stability(6):	7 days	at	20 - 25°C
	7 days	at	4 - 8°C
	3 months	at	-20°C

Discard contaminated specimens.

Assay Procedure

Application sheets for automated systems are available on request.

Wavelength	500 nm, Hg 546 nm
Optical path	1 cm
Temperature	20 - 25 °C / 37 °C
Measurement	Against reagent blank

	Blank	Sample or standard
Sample or standard	-	10 µL
Dist. water	10 µL	-
Reagent	1000 µL	1000 µL

Mix, incubate for 20 min. at 20 – 25 °C or for 10 min. at 37 °C. Read absorbance within 60 min against reagent blank.

* fluid stable

Calculation

With standard or calibrator.

$$\text{Cholesterol [mg / dl]} = \frac{\Delta A \text{ Sample}}{\Delta A \text{ Std / Cal}} \times \text{Conc. Std / Cal [mg / dl]}$$

Conversion factor

Cholesterol [mg/dL] x 0.02586 = Cholesterol [mmol/L]

Calibrators and Controls

For the calibration of automated photometric systems the TruCal U calibrator is recommended. For internal quality control TruLab N and P or TruLab L controls should be assayed with each batch of samples.

	Cat. No.	Kit size
TruCal U	5 9100 99 83 063	20 x 3 mL
	5 9100 99 83 064	6 x 3 mL
TruLab N	5 9000 99 83 062	20 x 5 mL
	5 9000 99 83 061	6 x 5 mL
TruLab P	5 9050 99 83 062	20 x 5 mL
	5 9050 99 83 061	6 x 5 mL
TruLab L	5 9020 99 83 065	3 x 3 mL

Performance Characteristics

Measuring range

The test has been developed to determine cholesterol concentrations within a measuring range from 3 - 750 mg/DL (0.08 – 19.4 mmol/L). When values exceed this range samples should be diluted 1 + 4 with NaCl solution (9 g/L) and the result multiplied by 5.

Specificity / Interferences

No interference was observed by ascorbic acid up to 5 mg/dL, bilirubin up to 20 mg/dL, hemoglobin up to 200 mg/dL and lipemia up to 2,000 mg/dL triglycerides.

Sensitivity / Limit of Detection

The lower limit of detection is 3 mg/dL (0.08 mmol/L).

Precision (at 37°C)

Intra-assay precision n = 20	Mean [mg/dL]	SD [mg/dL]	CV [%]
Sample 1	108	1.76	1.62
Sample 2	236	1.45	0.61
Sample 3	254	1.57	0.62

Inter-assay precision n = 20	Mean [mg/dL]	SD [mg/dL]	CV [%]
Sample 1	104	1.19	1.14
Sample 2	211	2.57	1.22
Sample 3	245	2.28	0.93

Method Comparison

A comparison between Cholesterol FS (y) and a commercially available test (x) using 78 samples gave following results: y = 1.00 x – 2.50 mg/dL; r= 0.995.

Reference Range [5]

Desirable	≤ 200 mg/dL (5.2 mmol/L)
Borderline high risk	200 – 240 mg/dL (5.2 – 6.2 mmol/L)
High risk	> 240 mg/dL (> 6.2 mmol/L)

Clinical Interpretation

The European Task Force on Coronary Prevention recommends to lower TC concentration to less than 190 mg/dL (5.0 mmol/L) and LDL-cholesterol to less than 115 mg/dL (3.0 mmol/L) [2].

Literature

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Manufacturer