

**A Novel Synthesis Method of Medium- and Long-Chain Triglyceride Lipids
from Rubber Seed Oil Catalyzed by Enzymatic Interesterification and Its
Metabolism Mechanism**

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The GC graph of MLCT was shown in Fig.S1, the contents of MLCT yields were calculated by area normalization.

Table S1-6 correspond to the original data of A-B Fig.2, respectively.

Table S7 correspond to the original data of Fig.3.

Table S7-9 correspond to the original data of Fig.4

Table S10 correspond to the original data of Fig.5

Table S11 correspond to the original data of Fig.6.

Table S12 correspond to the original data of Fig.7.

Table S13 correspond to the original data of Fig.8.

Figure legends:

Fig. S1 The GC graph of MLCT.

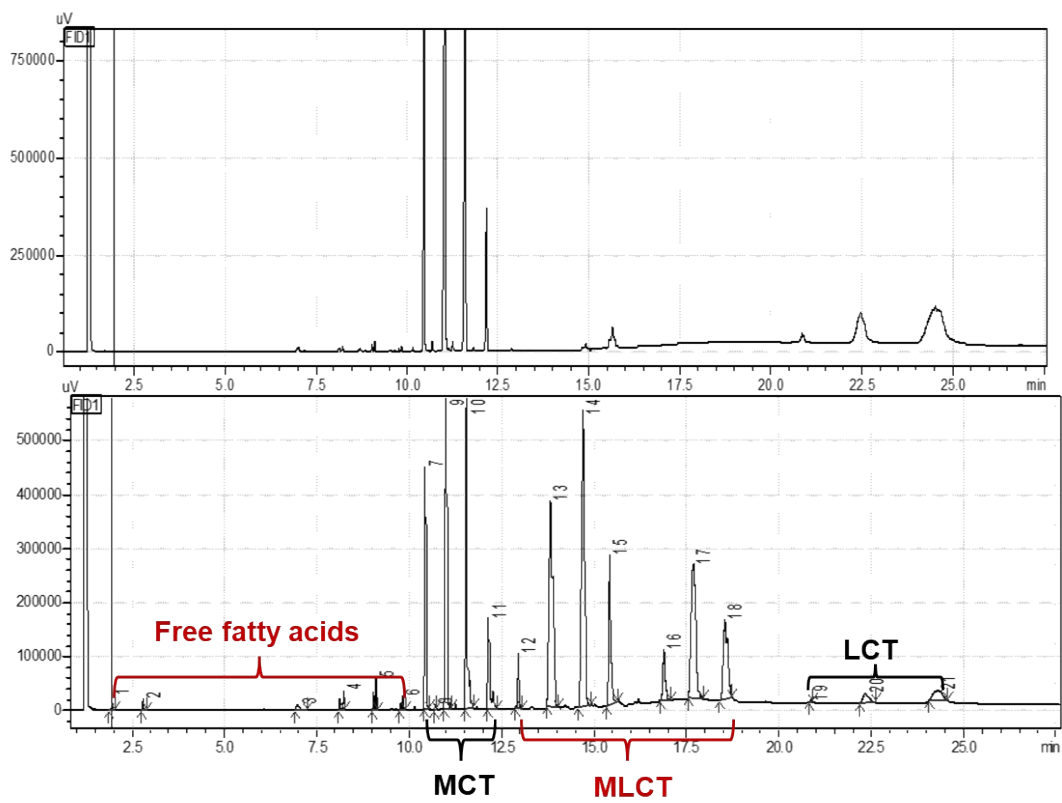


Fig. S1 The GC graph of MLCT

Table legends:

Table S1 The effect of substrate ratio (RSO : MCT) on the yield (%) of MLCT. (n=3)

Table S2 The effect of lipase on the yield (%) of MLCT (n=3)

Table S3 The effect of lipase loading on the yield (%) of MLCT (n=3)

Table S4 The effect of temperature on the yield (%) of MLCT (n=3)

Table S5 The effect of water content on the yield (%) of MLCT (n=3)

Table S6 The effect of reusability on the yield (%) of MLCT (n=3)

Table S7 The hydrolytic properties of MCT/LCT and MLCT during simulated gastrointestinal tract (GIT) digestion. (n=3)

Table S8 Level of postprandial FFAs in the blood of MCT/LCT(n=3)

Table S9 Level of postprandial FFAs in the blood of MLCT (n=3)

Table S10 Effects of different lipids on body weight gain of rats. (n=5)

Table S11 Analysis of TG, TC, HDL-C, LDL-C levels related to the postprandial blood lipid. (n = 5)

Table S11 Effect of different lipids on organ indexes changes. (A)TG of livers. (B) TC of livers. (C) TG of kidneys. (D) TC of kidneys (n=5)

Table S1 The effect of substrate ratio (RSO : MCT) on the yield (%) of MLCT. (n=3)

The effect of substrate ratio (RSO : MCT) on the yield (%) of MLCT															
Time	1:0.6			1:0.7			1:0.8			1:0.9			1:1		
0 h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 h	46.53	48.50	51.47	57.21	56.52	51.67	49.21	48.52	52.98	51.21	54.25	48.26	47.83	51.95	49.88
8 h	51.20	53.11	56.60	59.26	61.85	65.32	55.90	61.14	56.99	54.12	59.25	55.25	58.25	52.12	55.25
12 h	65.54	66.88	60.58	72.56	70.53	65.25	65.20	62.12	68.85	61.25	63.56	67.85	60.10	64.12	56.17
24 h	70.21	70.23	64.52	67.74	72.53	73.64	64.59	72.12	70.69	32.25	68.31	67.94	61.22	60.85	67.24

Table S2 The effect of lipase on the yield (%) of MLCT (n=3)

The effect of lipase on the yield (%) of MLCT												
	Novozym 435			Novozym 40086			Lipozyme			Novozym 435		
24 h	61.57	56.14	54.75	76.14	69.47	68.57	63.12	67.51	59.57	72.52	69.05	64.17

Table S3 The effect of lipase loading on the yield (%) of MLCT (n=3)

The effect of lipase loading on the yield (%) of MLCT												
	1%			3%			5%			7%		
0 h	0	0	0	0	0	0	0	0	0	0	0	0
4 h	27.82	30.35	29.03	37.92	42.05	40.72	40.45	48.52	52.98	48.65	51.20	53.84
8 h	41.01	37.85	41.75	45.15	43.35	40.85	45.12	47.81	50.45	59.25	59.31	64.26
12 h	44.09	43.74	47.85	53.12	58.35	54.15	65.88	61.72	68.05	67.12	70.30	73.58
24 h	54.36	52.15	49.68	60.60	63.12	66.84	66.85	70.40	73.69	70.12	70.83	70.51

Table S4 The effect of temperature on the yield (%) of MLCT (n=3)

The effect of temperature on the yield (%) of MLCT												
	30°C			40°C			50°C			60°C		
0h	0	0	0	0	0	0	0	0	0	0	0	0
2h	27.15	26.62	25.14	35.30	31.74	33.25	38.21	36.51	34.62	39.56	38.55	42.24
4h	32.12	33.51	35.01	39.56	43.62	40.85	42.94	42.85	46.98	46.52	44.14	48.98
8h	42.12	40.15	37.13	54.12	58.35	58.62	62.14	57.32	56.39	60.25	64.85	58.74
12h	48.41	50.58	54.68	62.12	64.23	68.84	71.42	68.08	74.74	70.42	78.68	77.05

Table S5 The effect of water content on the yield (%) of MLCT (n=3)

The effect of water content on the yield (%) of MLCT															
Time	The effect of water content on the FFAs (%) in MLCT														
	1%			3%			5%			7%			10%		
0h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4h	12.87	12.5	12.13	11.93	11.53	11.14	13.28	13.61	13.92	14.11	14.15	13.85	17.88	23.01	20.41
8h	7.52	7.29	7.69	9.21	9.05	9.51	15.35	14.62	15.04	23.04	21.99	22.47	17.74	23.04	20.89
12h	6.41	6.25	6.09	7.05	7.32	7.05	7.25	7.15	6.91	16.75	17.54	17.05	16.89	21.47	22.02
24h	6.52	6.72	6.37	6.88	7.25	7.02	7.05	6.92	6.74	17.55	16.92	16.64	17.88	23.01	20.41
The effect of water content on the yield (%) of MLCT															
24h	70.14	71.02	78.81	72.06	69.85	78.61	75.2	74.4	66.85	65.8	74.40	70.15	67.12	71.30	62.21

Table S6 The effect of reusability on the yield (%) of MLCT (n=3)

The effect of reusability on the yield (%) of MLCT																			
		1			2			3			4			5			6		
24h	73.91	75.17	71.75	72.98	76.65	73.14	72.01	70.74	73.62	68.58	73.24	70.14	57.85	59.6	61.21	49.15	51.34	50.12	

Table S7 The hydrolytic properties of MCT/LCT and MLCT during simulated gastrointestinal tract (GIT) digestion. (n=3)

	Time	MCFA release from MLCT (%)			LCFA release from MLCT (%)			MCFA release from MCT/LCT (%)			LCFA release from MCT/LCT (%)		
Mouth	30	1.480	1.36	1.282	0.826	0.906	0.872	0	0	0	0	0	0
Stomach	150	5.174	5.425	5.123	2.602	2.384	2.544	1.207	1.334	1.275	0.000	0.000	0.000
	160	10.158	10.564	9.950	7.021	7.158	7.245	16.321	18.123	17.232	4.452	4.096	4.306
	170	13.556	13.215	13.221	12.887	13.554	14.025	26.875	29.856	28.331	7.865	6.865	7.201
	180	15.982	15.556	15.147	19.265	19.341	20.524	39.052	44.652	42.052	7.995	7.356	7.265
	190	25.332	24.126	23.214	23.875	22.652	22.447	40.152	44.356	42.132	8.652	8.265	8.064
Small intestine	200	30.154	28.978	29.554	26.652	27.957	25.295	41.350	45.826	43.421	12.785	11.864	11.865
	210	34.487	35.125	33.125	31.588	33.104	29.952	43.685	48.264	45.652	17.032	15.452	16.165
	240	40.124	39.218	41.568	40.862	42.765	38.693	44.256	48.269	46.265	29.865	28.532	28.365
	270	50.002	48.887	51.126	46.935	49.277	44.584	45.632	50.435	47.765	38.889	36.368	36.398
	330	50.070	48.890	51.256	47.900	50.190	45.410	50.263	50.963	50.321	47.652	46.563	47.066

Table S11 Effects of different lipids on body weight gain of rats. (n=5)

Time	Blank group					MLCT group				
	0 week	1 week	2 week	3 week	4 week	0 week	1 week	2 week	3 week	4 week
1	170.5	200.5	190.7	230.5	254.1	155.5	183.5	221.5	234.5	264.2
2	140.5	160.5	234.5	264.5	284.1	170.6	179.6	219.5	249.8	278.5
3	150.2	157.2	190.5	248.5	268.2	130.6	180.6	225.6	273.5	301.2
4	135.2	186.6	223.5	263.4	288.2	155.5	183.5	219.8	248.8	281.4
5	145.2	190.5	241.2	284.1	305.5	140.2	198.2	247.5	278.1	305.1
		MCT/LCT group					LCT group			
1	148.5	160.5	210.2	270.2	342.5	168.5	198.5	257.1	297.1	338.5
2	145.3	185.5	236.9	288.9	370.5	167.6	197.6	258.8	298.6	337.6
3	155.3	175.2	234.1	287.5	362.2	132.3	162.3	214.8	265.2	340.3
4	156.7	183.5	243.5	287.5	360.5	138.9	168.9	215.6	257.6	328.9
5	145.3	193.2	245.6	297.5	370.2	153.5	183.5	236.6	281.6	359.5

Table S12 Analysis of TG, TC, HDL-C, LDL-C levels related to the postprandial blood lipid. (n=5)

Group	TG				TC			
	Blank	MLCT	MCT/LCT	LCT	Blank	MLCT	MCT/LCT	LCT
1	2.68	3.12	3.97	4.4	254.1	155.5	183.5	221.5
2	2.81	3.07	3.85	4	284.1	170.6	179.6	219.5
3	2.62	2.98	3.87	4.25	268.2	130.6	180.6	225.6
4	2.68	3.35	3.79	4.2	288.2	155.5	183.5	219.8
5	2.6	3.12	4	4.58	305.5	140.2	198.2	247.5

Group	HDL-C				LDL-C			
	blank	MLCT	MCT/LCT	LCT	blank	MLCT	MCT/LCT	LCT
1	2.58	2.68	3	3.21	0.4	0.48	0.45	0.5
2	2.61	2.78	3.1	3.5	0.2	0.45	0.47	0.49
3	2.58	2.59	3.12	3.52	0.35	0.46	0.46	0.56
4	2.48	2.49	3.25	3.55	0.36	0.5	0.41	0.45
5	2.4	2.56	3.35	3.56	0.37	0.42	0.55	0.46

Table S13 Effect of different lipids on organ indexes changes. (A)TG of livers. (B) TC of livers. (C) TG of kidneys. (D) TC of kidneys (n=5)

Liver								
Group	TG				TC			
	blank	MLCT	MCT/LCT	LCT	blank	MLCT	MCT/LCT	LCT
1	50	55	115	140	50	55	115	140
2	54	54	125	130	54	54	125	130
3	52	53	120	160	52	53	120	160
4	40	54	110	145	40	54	110	145
5	55	58	120	142	55	58	120	142
Kidney								
Group	TG				TC			
	blank	MLCT	MCT/LCT	LCT	blank	MLCT	MCT/LCT	LCT
1	21	29	32	36	55.2	60	62.5	56.8
2	23	27	34	37	53.6	70	55.8	57.8
3	25	30	35	30	54.9	80	58.7	59.5
4	14	25	27	40	51.6	50	57.5	54.8
5	21	28	29	31	56.8	40	59.6	56.9