

CHAPTER III

RESULTS

Figure 5 indicated the standard curve of salicylic acid solutions, at the concentrations range 0.001-0.005%.

Figure 6 and Table 1, 2, 3 indicated that beeswax ointment base provided regular releasing rate of Me. Sal. on three concentrations, in vitro.

Figure 7 and Table 1, 2, 3 indicated that banana wax ointment base provided almost regular releasing rate of Me. Sal. after 15 - minutes from the two concentrations Me. Sal. O. 25% and 50% w/w, but indicated irregular releasing rate during 15 to 30 minutes from the 75% w/w Me. Sal. O.

Figure 8 and Table 1, 2, 3 indicated that carnauba wax gave similar result as that obtained from banana wax.

Figure 9 and Table 1, 2, 3 indicated relatively regular result of Me. Sal. released from 25% and 50% w/w Me. Sal. ricebran wax ointment but for the 75% w/w Me. Sal. O., it indicated increasing rate of Me. Sal. releasing in the first three 15 minutes intervals and decreasing rate in the last three 15 minutes intervals

Figure 10 and Table 1, 2, 3 indicated regularly increased, releasing rate of Me. Sal. from the sugarcane ointment 25% w/w, 50% w/w and 75% w/w Me. Sal., in which the degree of increasing rate of 75% w/w Me. Sal. containing ointment was much higher than those of 25% w/w and 50% w/w Me. Sal. O.

Figure 11 and Table 1, 2, 3 indicated that the theobroma oil ointment provided regular releasing rate of Me. Sal. from the ointment containing 25% w/w Me. Sal., but irregular released of Me. Sal. from the theobroma oil ointment containing 75% w/w Me. Sal.


It will be clearly seen that waxes under this study could provide regular release of Me. Sal. when the ointments contained the Me. Sal. between 25% and 50% w/w; but if they contained Me. Sal. at higher concentration, as at 75% w/w, only the beeswax was found to provide regular releasing rate, in all cases of 75% w/w, Me. Sal. O. it appeared that increasing rate of release occurred in the first 45 minutes; and the decrease of releasing rate occurred after 45 minutes.

Figure 12 and Table 4, indicated that the urinary excretion, in vivo test, obtained from 75% w/w Me. Sal. O., all the waxes under this study provided high urinary excretion rate, with in the first 4 to 6 hours significantly, prolong urinary excretion over 6 hours up to 8 hours was obtained from sugarcane wax and ricebran wax.

Table 5 was made to compile and compare the result of Me. Sal. release from the ointments, starting from ointment bases provided highest salicylate release to the lowest salicylate release, respectively. It will be clearly seen that ointments made of sugarcane wax, theobroma oil and ricebran wax provided higher salicylate release than that of the beeswax. The result also indicated that the sugarcane wax provided the highest rate of urinary salicylate excretion, followed by theobroma oil and ricebran wax, respectively.

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The result, in vitro test, Figures 13, 14, 15 and Table 5 also confirmed that theobroma oil, ricebran wax, sugarcane wax and banana wax provided higher salicylate release to the physiological fluid than those obtained by beeswax ointments under the same experiments. The exception was that, the ricebran wax ointment of 75% w/w Me. Sal. provided lower salicylate release than that obtained with the beeswax ointment.



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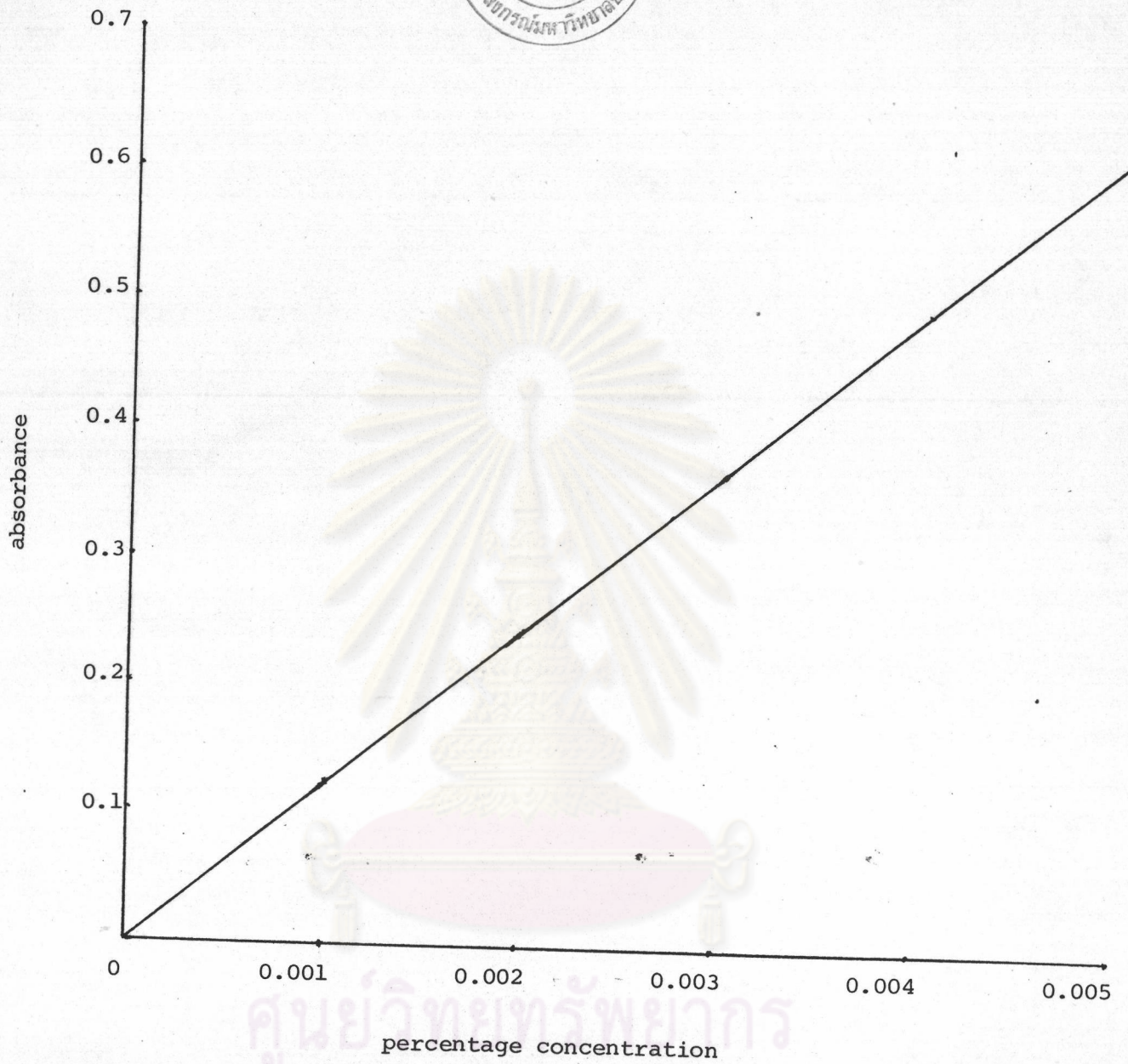


Figure 5 Standard curve of salicylic acid solutions, at the concentration range 0.001-0.005%

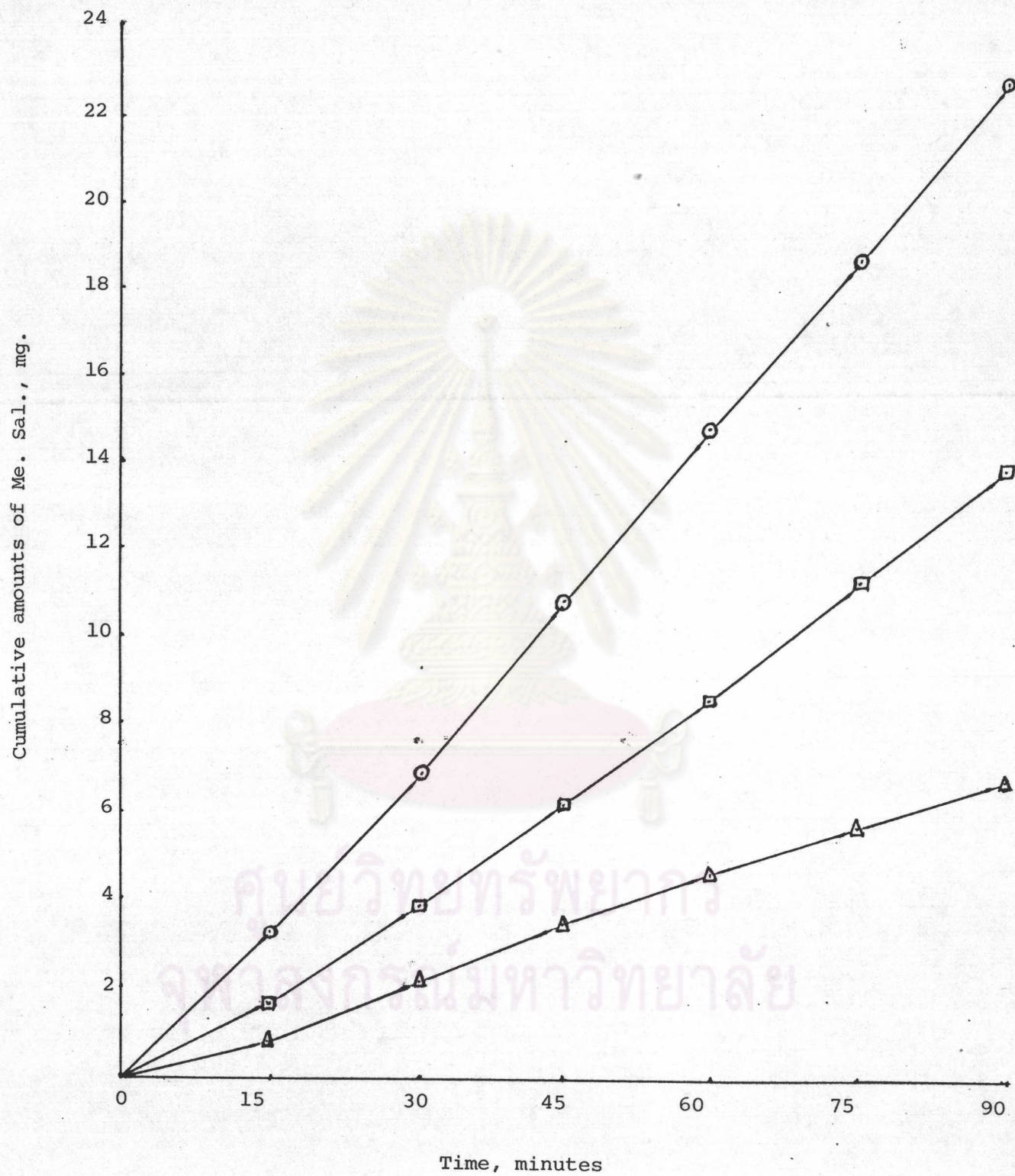


Figure 6 In vitro, Cumulative amounts of Me. Sal. released from various concentration Me. Sal. - beeswax ointments.

Key : Δ 25% ; \square 50% ; \circ 75%

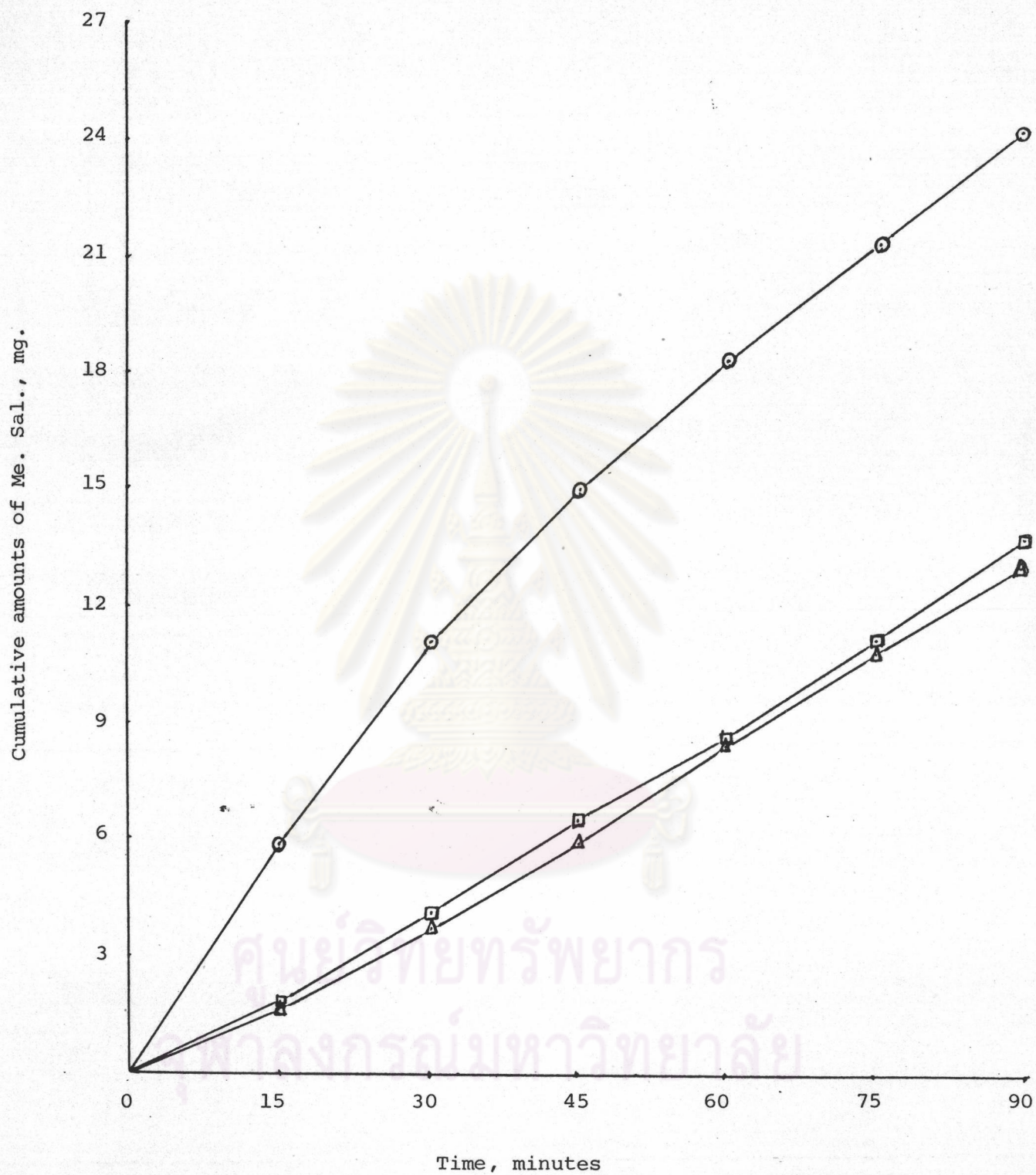


Figure 7 In vitro, Cumulative amounts of Me. Sal. released from various concentration Me. Sal.-banana wax ointments.

Key : Δ 25% ; \square 50% ; \circ 75%

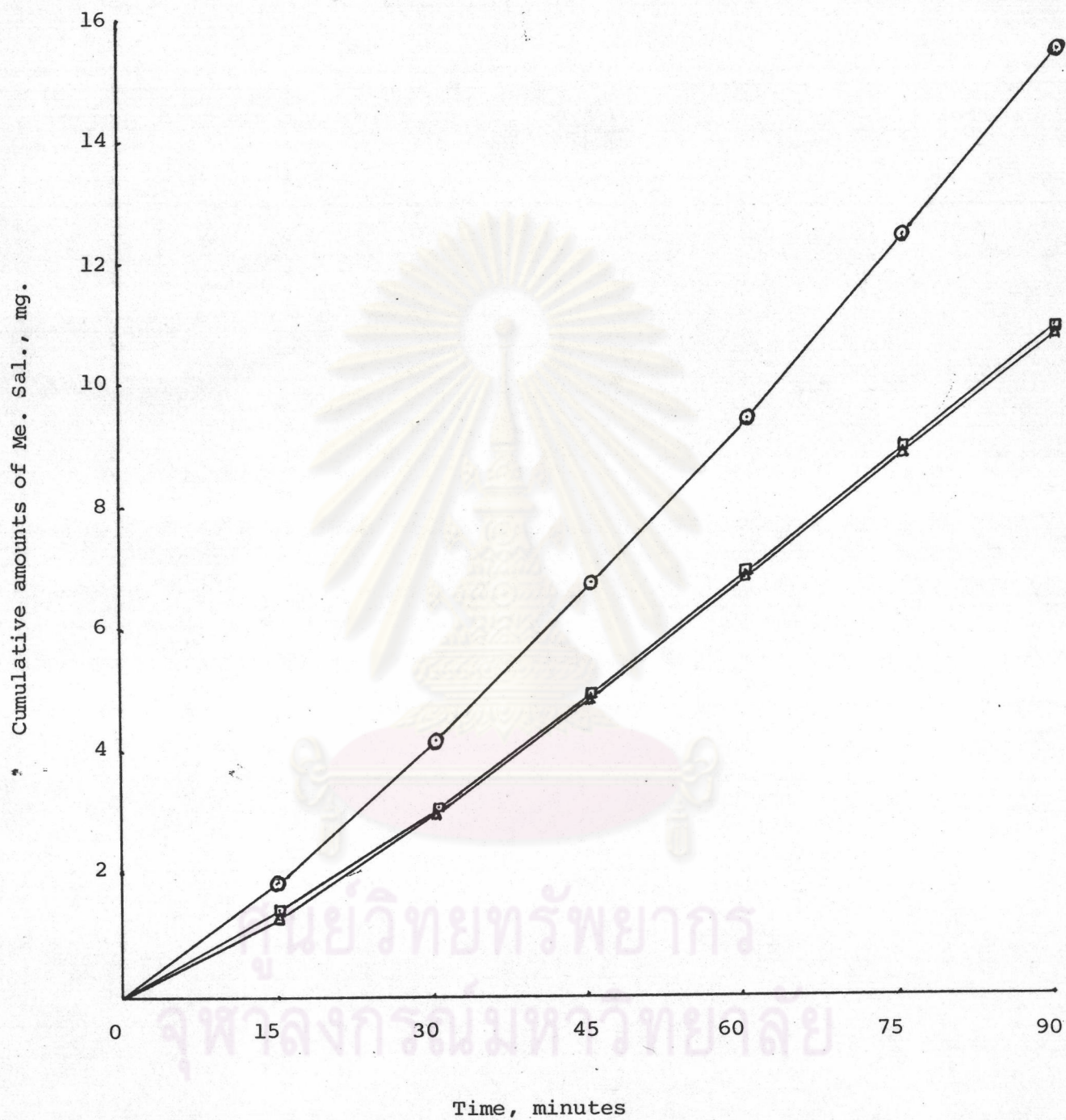


Figure 8 In vitro, Cumulative amounts of Me. Sal. released from various concentration Me. Sal. - carnauba wax ointments.

Key : Δ 25% ; \square 50% ; \circ 75%

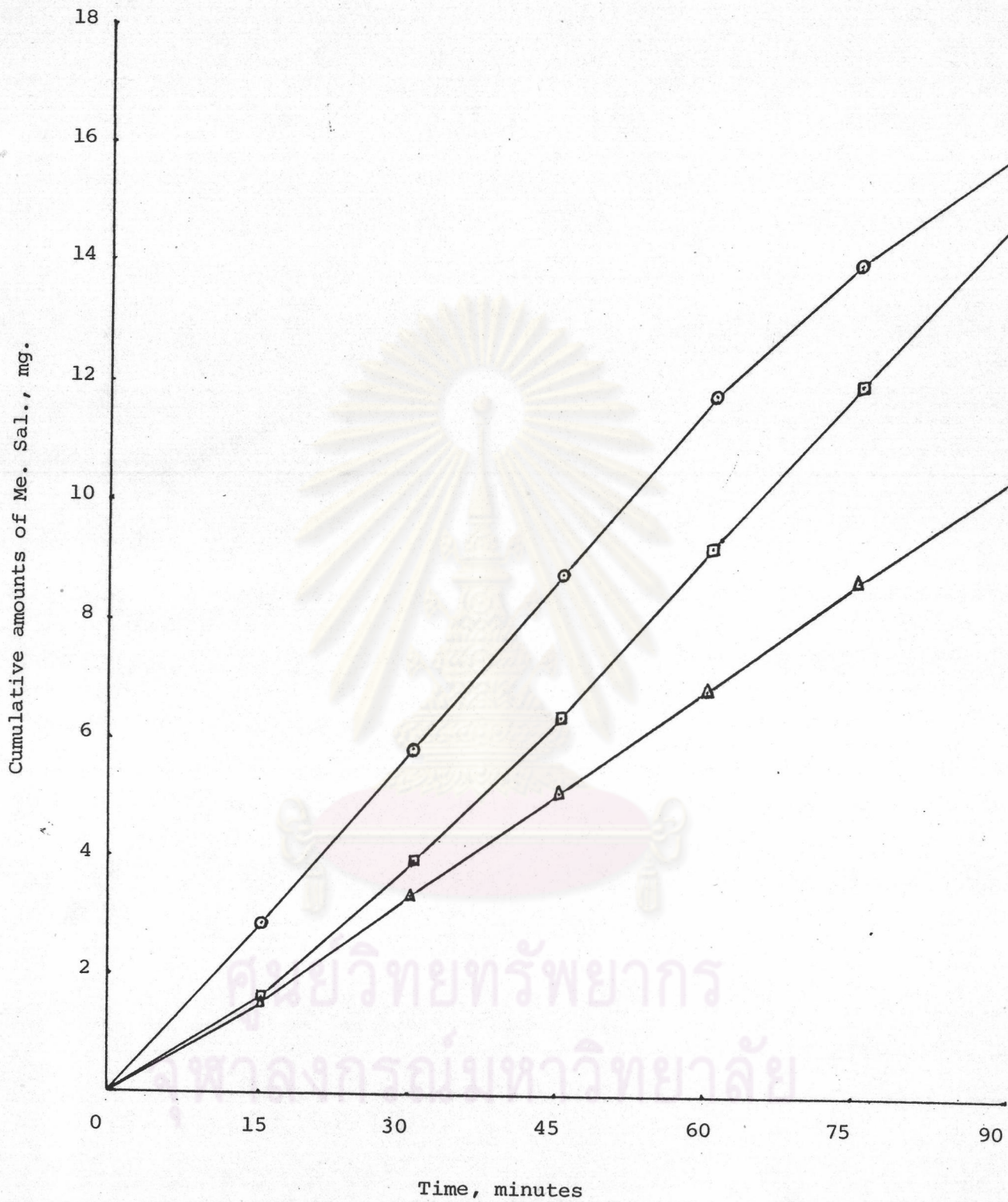


Figure 9 In vitro, Cumulative amounts of Me. Sal., released from various concentration Me. Sal. - ricebran wax ointments.

Key : Δ 25% ; \square 50% ; \circ 75%

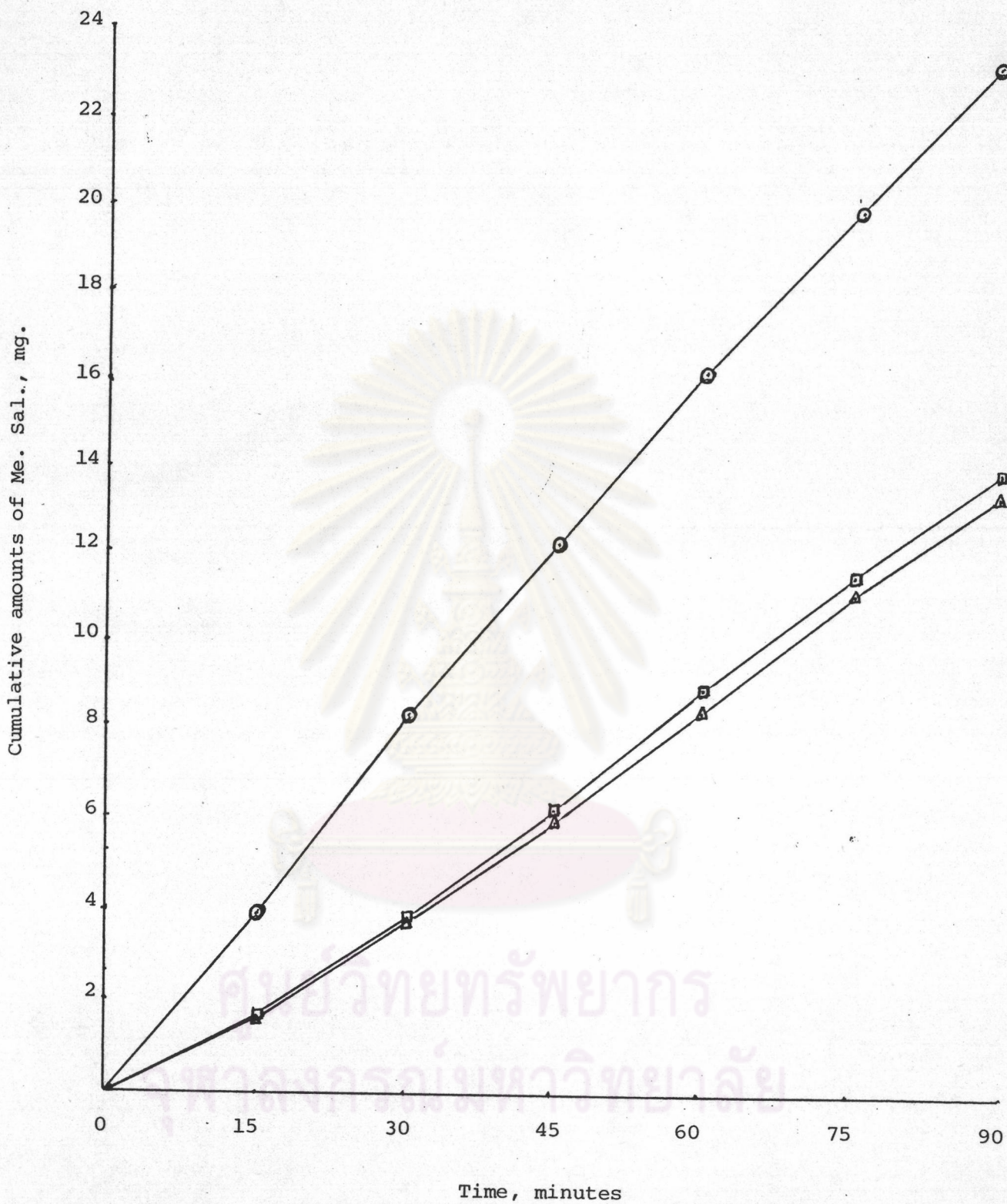


Figure 10 In vitro, Cumulative amounts of Me. Sal. released from various concentration Me. Sal. - sugarcane wax ointments.

Key : Δ 25% ; \square 50% ; \circ 75%

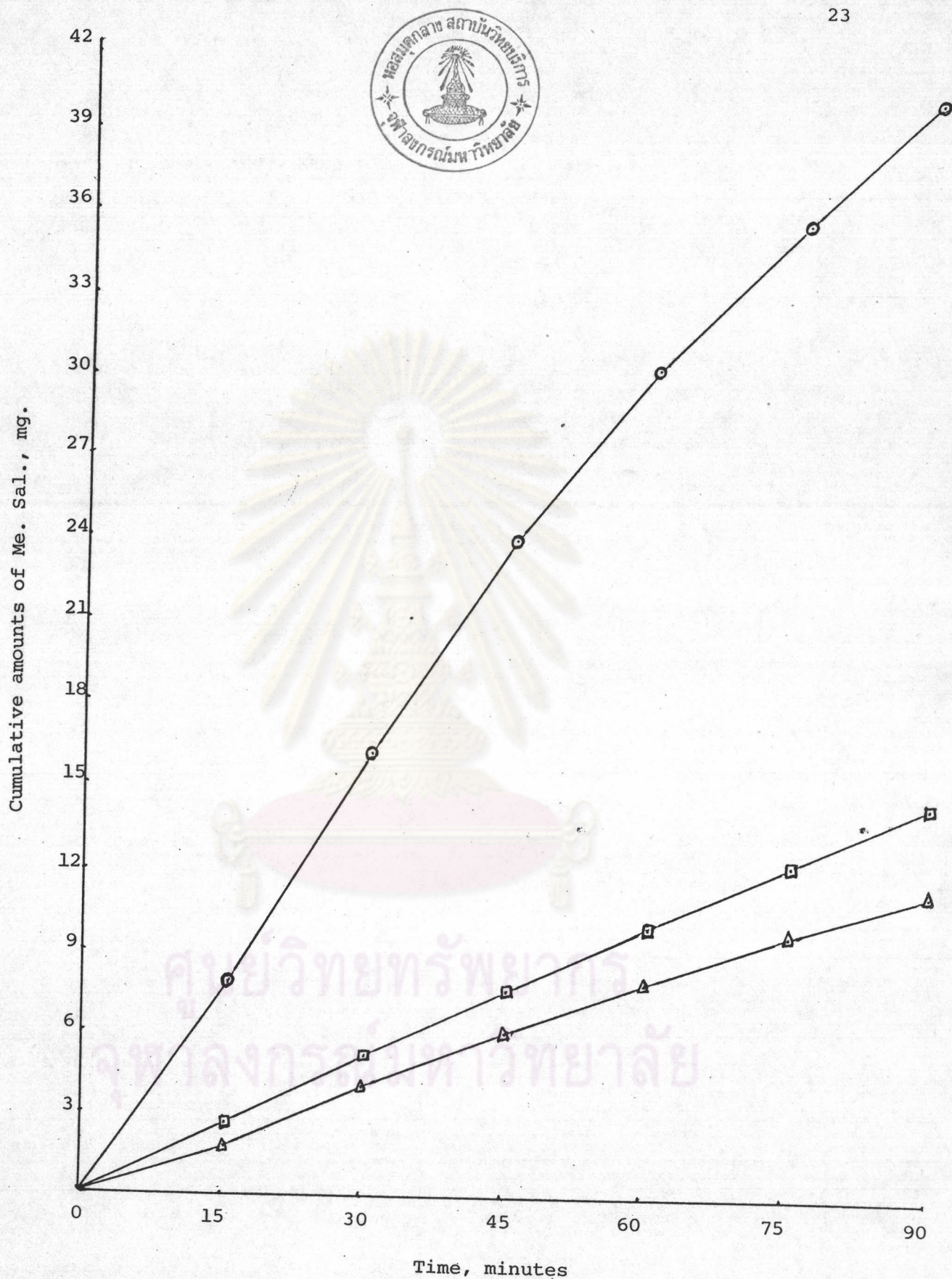


Figure 11 In vitro, Cumulative amounts of Me. Sal. released from various concentration Me. Sal. - theobroma oil ointments.

Key : Δ 25% ; \square 50% ; \circ 75%

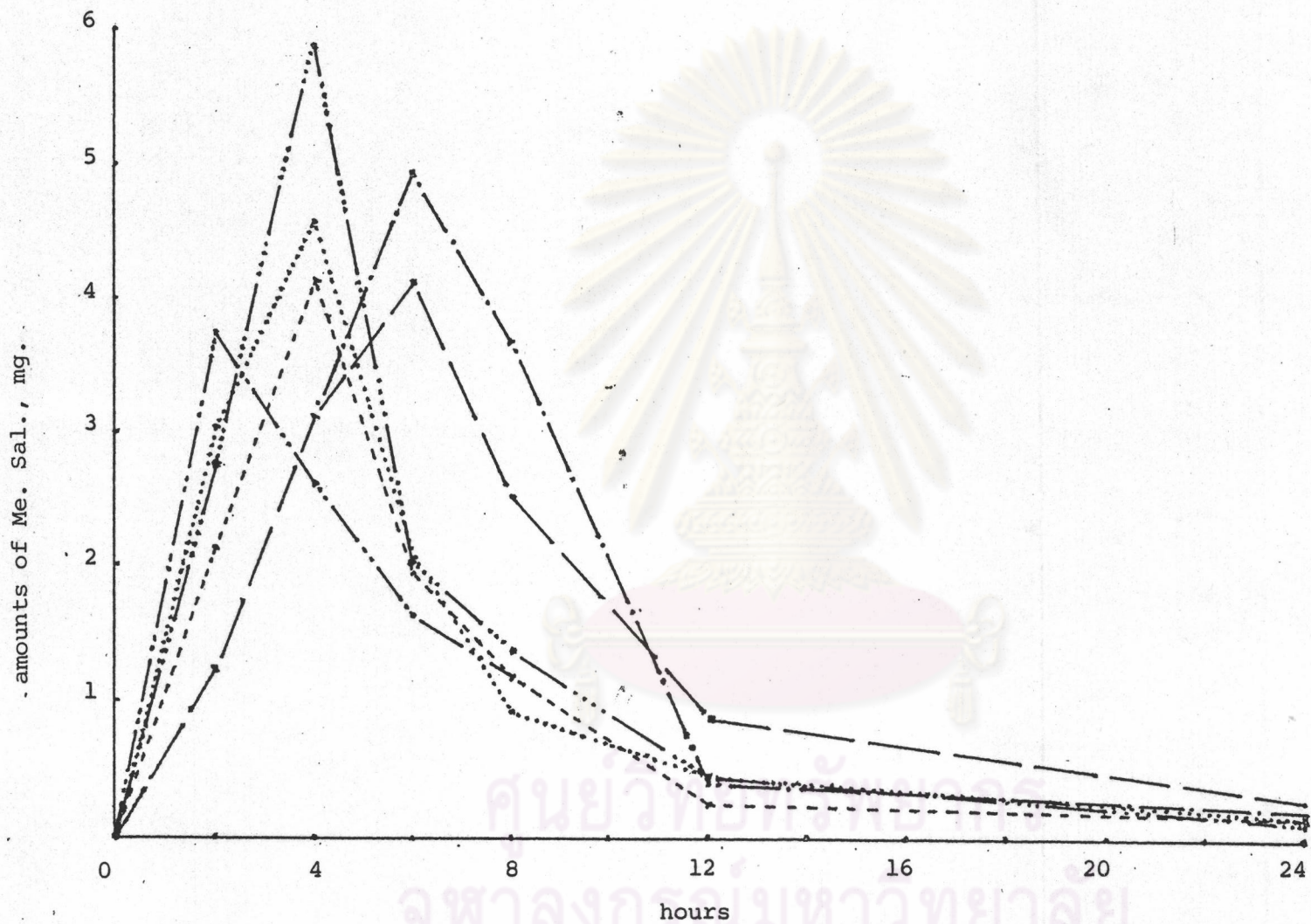


Figure 12 In vivo, average amounts of urinary salicylate excreted from 75% w/w Me. Sal. - natural waxes ointments.

Key : - - - - - beeswax; - · - · - · - banana wax
 ·········· Carnauba wax; — — — — — ricebran wax
 - - - - - sugarcane wax; - ······ - Theobroma oil

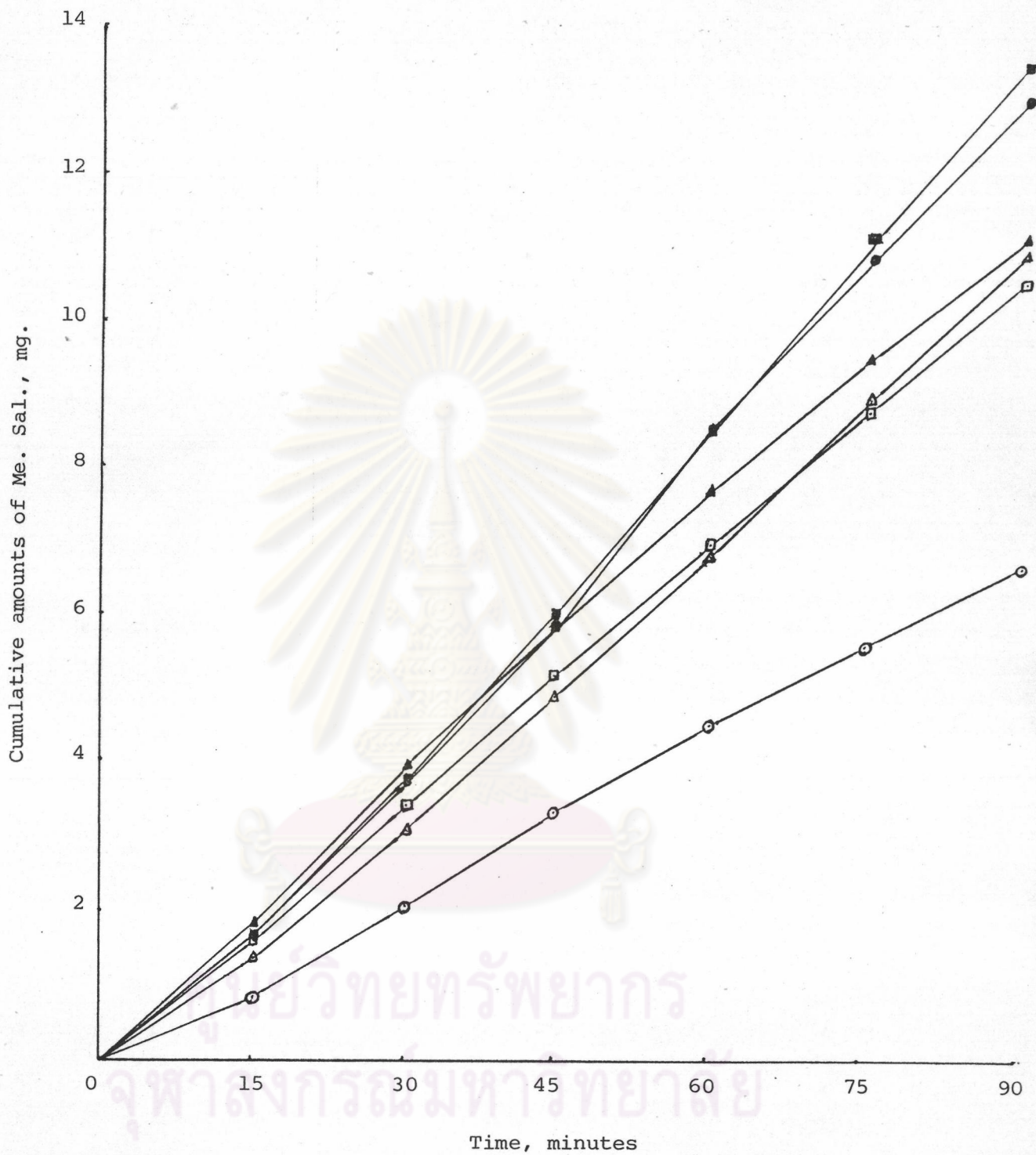


Figure 13 In vitro, cumulative amounts of Me. Sal. released from 25% w/w Me. Sal. - natural waxes ointments.

Key : ○ Beeswax ● Banana wax
 △ Carnauba wax ◻ Ricebran wax
 ■ Sugarcane wax ▲ Theobroma oil

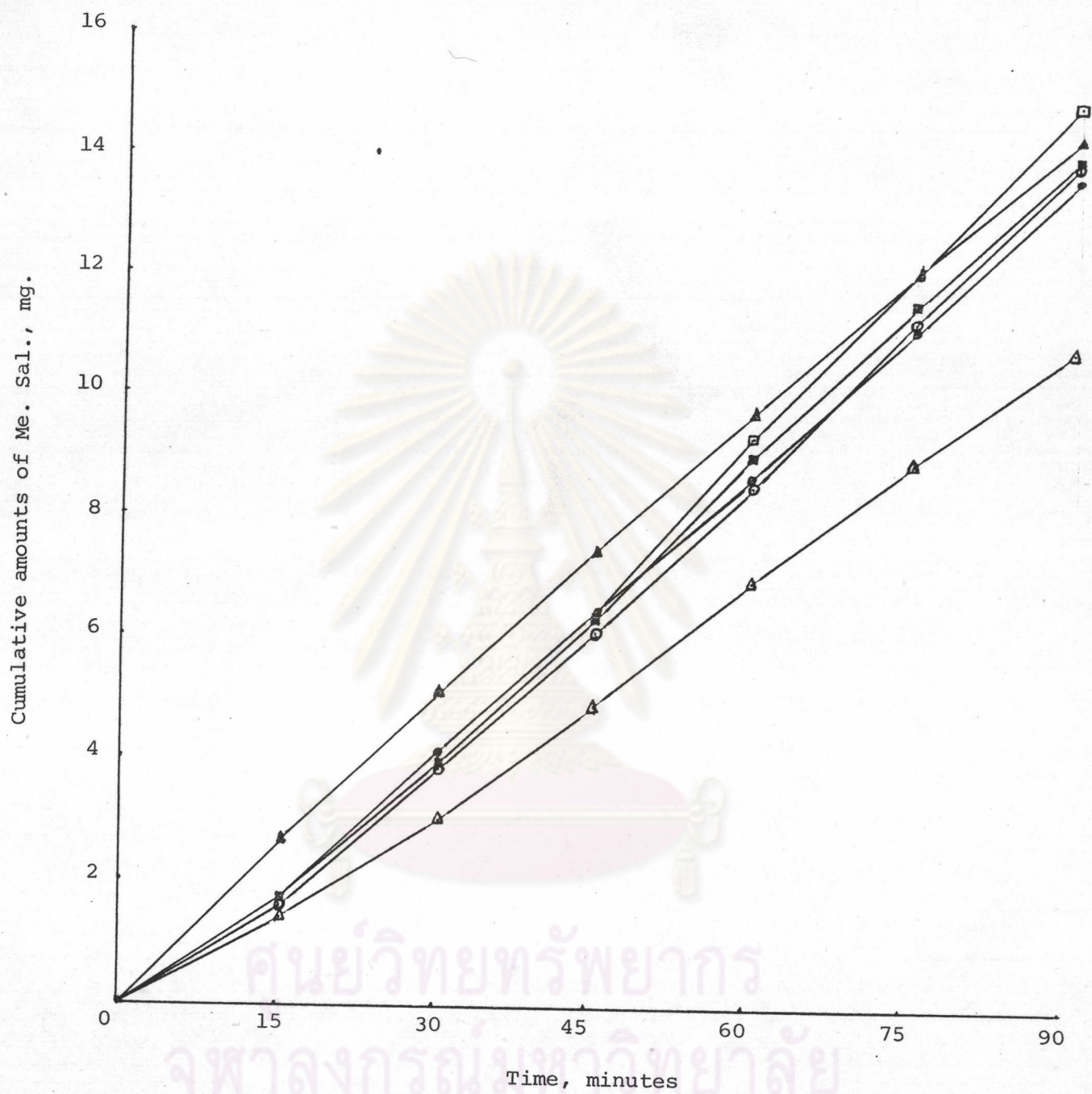


Figure 14 In vitro, cumulative amounts of Me. Sal. released from 50% w/w Me. Sal. - natural waxes ointments.

Key : ○ Beeswax ● Banana wax
 △ Carnauba □ Ricebran wax
 ■ Sugarcane wax ▲ Theobroma oil

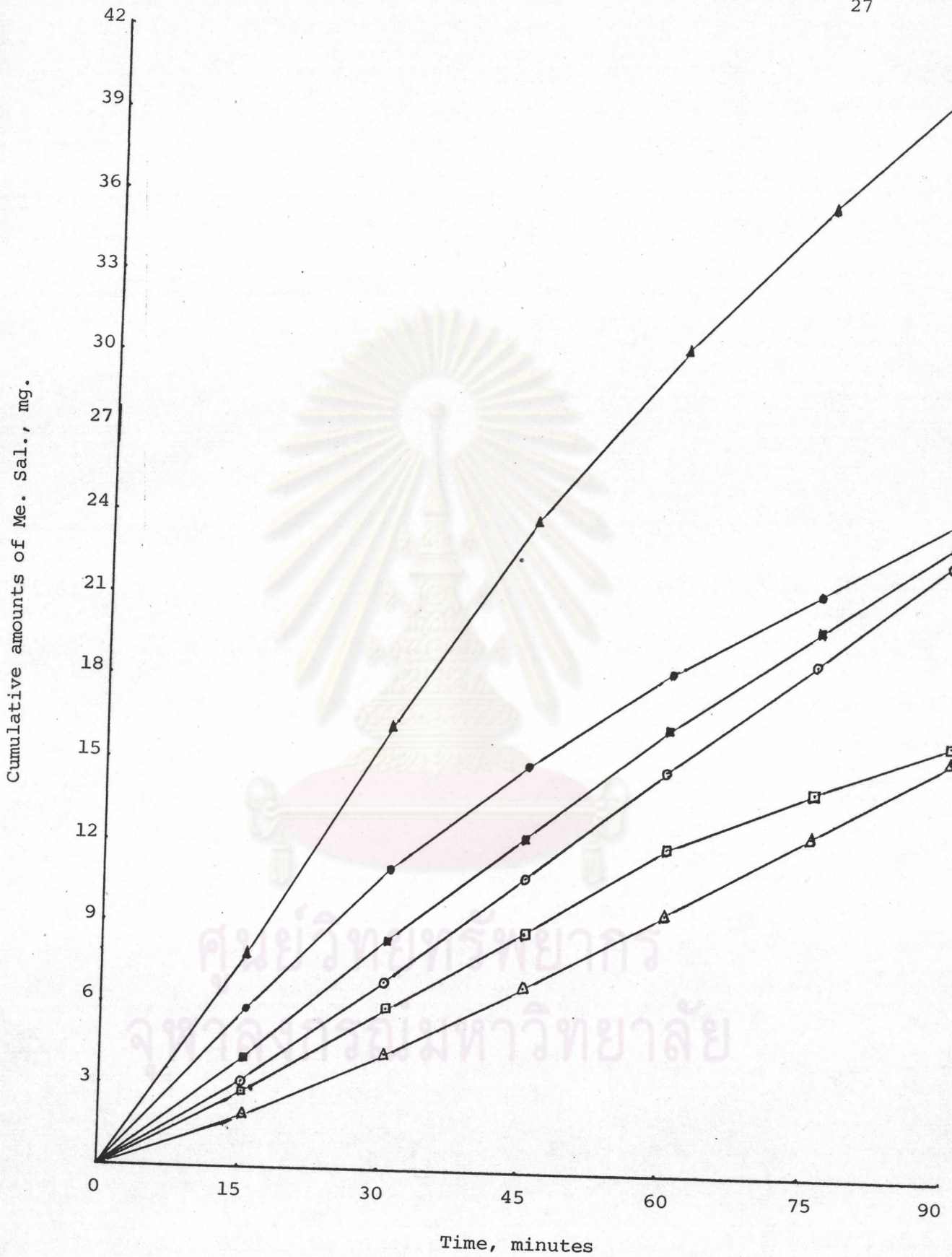


Figure 15 In vitro, cumulative amounts of Me. Sal. released from 75% w/w Me. Sal. - natural waxes ointments.

Key : ○ Beeswax ● Banana wax
 △ Carnauba wax ◻ Ricebran wax
 ■ Sugarcane wax ▲ Theobroma oil

Table 1. In vitro, amounts of Me. Sal. released from 25% w/w
Me. Sal. - natural waxes ointments (mg/15 minutes).

Time min	beeswax	banana wax	carnauba wax	ricebran wax	sugarcane wax	theobroma oil
15	0.84	1.73	1.37	1.58	1.69	1.80
30	1.31	2.46	1.73	1.86	2.13	2.19
45	1.26	2.35	1.90	1.81	2.28	1.94
60	1.20	2.21	1.93	1.79	2.46	1.83
75	1.06	2.16	2.04	1.78	2.60	1.77
90	1.03	2.15	1.99	1.75	2.34	1.63
Total	6.70	13.06	10.96	10.57	13.50	11.16

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Table 2. In vitro, amounts of Me. Sal. released from 50% w/w
Me. Sal. - natural waxes ointments (mg/15 minutes).

Time min	beeswax	banana wax	carnauba wax	ricebran wax	sugarcane wax	theobroma oil
15	1.65	1.70	1.44	1.64	1.70	2.66
30	2.23	2.06	1.64	2.33	2.29	2.50
45	2.35	2.21	1.90	2.56	2.46	2.36
60	2.43	2.62	2.07	2.63	2.65	2.30
75	2.64	2.64	1.94	2.69	2.58	2.28
90	2.62	2.49	1.83	2.76	2.35	2.27
Total	13.92	13.72	10.82	14.61	14.03	14.37

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Table 3. In vitro, amounts of Me. Sal. released from 75% w/w
Me. Sal. - natural waxes ointments (mg/15 minutes).

Time min	beeswax	banana wax	carnauba wax	ricebran wax	sugarcane wax	theobroma oil
15	3.23	5.93	1.89	2.89	4.08	7.75
30	3.76	5.24	2.36	3.04	4.40	8.49
45	3.92	3.92	2.56	3.00	3.96	7.74
60	3.98	3.27	2.69	2.97	3.89	6.29
75	3.94	3.00	2.98	2.18	3.65	5.33
90	3.92	2.82	3.00	1.93	3.38	4.68
Total	22.75	24.18	15.48	16.01	23.36	40.28

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Table 4. In vivo, average amounts (mg) of urinary salicylate excreted from 75% w/w Me. Sal. - natural waxes ointments.

Time hr.	Beeswax	Banana wax	Carnauba wax	Ricebran wax	Sugarcane wax	Theobroma oil
2	2.16	3.74	3.05	1.25	1.26	2.83
4	4.15	2.66	4.61	3.14	3.17	5.93
6	1.98	1.66	2.09	4.14	4.95	2.05
8	1.21	1.22	0.98	2.55	3.70	1.43
12	0.27	0.28	0.49	0.92	0.41	0.45
24	0.15	0.20	0.17	0.31	0.21	0.12
Total	9.92	9.76	11.39	12.31	13.70	12.81

Note : Subjects' ages, weights and sexes.

Subject	Age years	Weight kgs.	Sex
1	22	50	♂
2	21	60	♂
3	21	57	♂
4	23	55	♂
5	25	53	♂
6	23	58	♂
7	34	45	♀



Table 5. Conclusion of the releasing property of the natural waxes ointment bases containing different concentrations Me. Sal. (from high to low)

	In vitro			In vivo
	25% Me. Sal.	50% Me. Sal.	75% Me. Sal.	75% Me. Sal.
Sugarcane wax	Ricebran wax	Theobroma oil	Sugarcane wax	
Banana wax	Theobroma oil	Banana wax	Theobroma oil	
Theobroma oil	Sugarcane wax	Sugarcane wax	Ricebran wax	
Carnauba wax	Beeswax	Beeswax	Carnauba wax	
Ricebran wax	Banana wax	Ricebran wax	Beeswax	
Beeswax	Carnauba wax	Carnauba wax	Banana wax	

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