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Appendix A

GPC Parameters of Chromatopac

Q-Factor (QF) is the monomer molecular weight of a polymer divided by the length of the extended monomer chain. Molecular chain length multiplied by this QF gives average molecular weights as shown in eqs Ap1.1-Ap1.6.

$$M_n = \frac{\Sigma H_i}{\Sigma(H_i/M_i)} \times QF \qquad \text{(Ap1.1)}$$

$$M_w = \frac{\Sigma(M_i \times H_i)}{\Sigma H_i} \times QF \qquad \text{(Ap1.2)}$$

$$M_z = \frac{\Sigma(M_i^2 \times H_i)}{\Sigma(M_i \times H_i)} \times QF \qquad \text{(Ap1.3)}$$

$$M_v = \frac{\Sigma H_i M_i^{\alpha}}{\Sigma H_i} \times QF \qquad \text{(Ap1.4)}$$



$$\text{I.VISC} = K(M_v)^{\alpha} \qquad \text{(Ap1.5)}$$

$H_i$ = Peak height

M = Molecular weight or molecular chain length

$\alpha$, K = Viscosity equation $[\eta]$ = Constant of $K(\bar{M}_V)^{\alpha}$

$[\eta]$ = Intrinsic viscosity

The average molecular weight is calculated by multiplying the slice peak height by QF. When a molecular weight is selected in the calibration curve file, one should be sure to set a value of "1" to QF. QF is applied in an easy method to obtain the average molecular weight of polymer B (the polymer to be analyzed) using the calibration curve of polymer A (the reference polymer). In this case, the QF value is determined as follows:

1. When setting the calibration curve file using molecular chain length one should set the QF to that of polymer B regardless of the QF of the reference polymer A, or

2. When setting the calibration curve file using molecular weight, one should set the QF to polymer B divided by the QF of the reference polymer A. The calibration curve is drawn by using polyethylene (PE) as the reference to measure the average molecular weights of polyvinyl chloride (PVC).

$$QF = \frac{\text{M.W. per unit chain length}}{\text{The length of C-C bond}} \qquad \text{(Ap1.6)}$$

$$QF_{pullulan} = 41.3$$

$$QF_{acrylic\ acid} = 24.8$$

$$RQF_{(ratio\ Q\ factor)} = \frac{24.8}{41.3} = 0.600$$

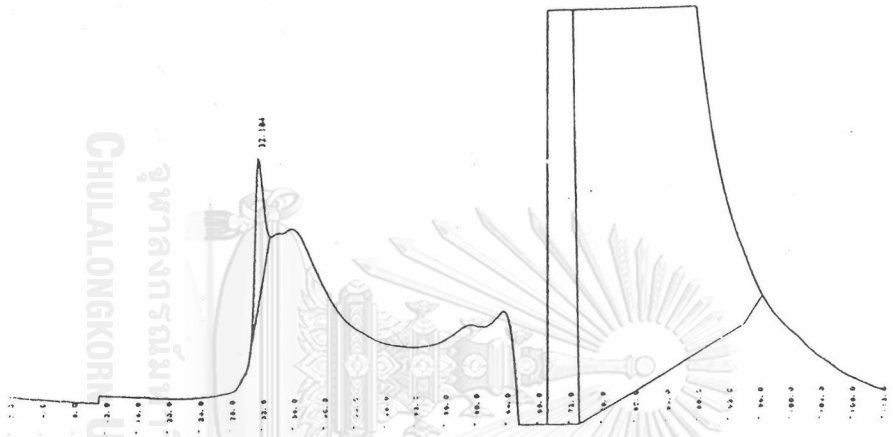
$$M_{acrylic\ acid} = M_{GPC} \times 0.600$$

Alpha is a constant used in the calculation of viscosity-average molecular weight and inherent viscosity. It corresponds to $\alpha$ in equation Ap1.5.

Kappa is a constant used for the calculation of inherent viscosity and corresponds to K in equation Ap1.5.

# Appendix B.1

The GFC Chromatographs of the Hydrolyzed Products of Saponified Cassava Starch-*g*-polyacrylate at various AA Concentrations as indicated in each Figure



[AA] = 1.70M

Peak No.1

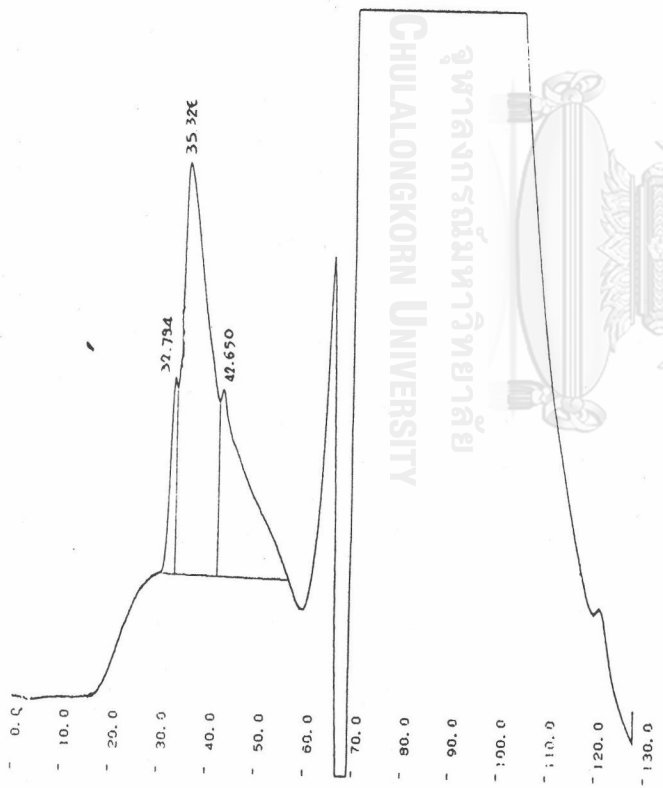
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ = 1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ =1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |




[AA] = 2.06M

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.250 | 803813 | 1 |
| top | 32.794 | 513491 | 289 |
| end | 33.300 | 469670 | 551 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 538114 | Weight-A.W.M. | $M_w$ | = 543338 |
| Z-A.W.M | $M_z$ | = 548968 | Visc-A.W.M. | $M_v$ | = 542358 |
| Dispersity | $M_w/M_n$ | = 1.00971 | Dispersity | $M_z/M_w$ | = 1.01036 |
| Dispersity | $M_v/M_n$ | = 1.00789 | I.Viscorsiry | I.VISC | = 2993.10766 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 33.300 | 469670 | 551 |
| top | 35.326 | 328665 | 590 |
| end | 42.000 | 101423 | 517 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 213967 | Weight-A.W.M. | $M_w$ | = 251550 |
| Z-A.W.M | $M_z$ | = 287986 | Visc-A.W.M. | $M_v$ | = 244840 |
| Dispersity | $M_w/M_n$ | = 1.17565 | Dispersity | $M_z/M_w$ | = 1.14484 |
| Dispersity | $M_v/M_n$ | = 1.14429 | I.Viscorsiry | I.VISC | = 1799.1372 |

Peak No.3

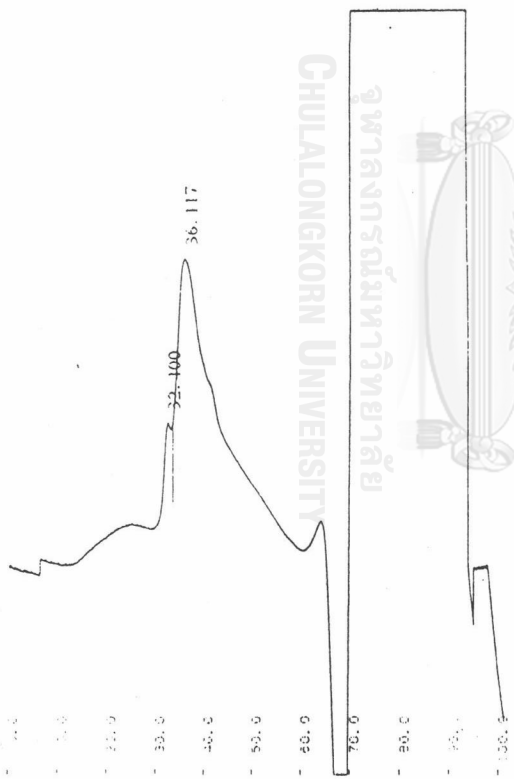
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 42.000 | 101423 | 517 |
| top | 42.650 | 90449 | 277 |
| end | 54.3 | 7477 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 35355 | Weight-A.W.M. | $M_w$ | = 51420 |
| Z-A.W.M | $M_z$ | = 64884 | Visc-A.W.M. | $M_v$ | = 48752 |
| Dispersity | $M_w/M_n$ | = 1.45439 | Dispersity | $M_z/M_w$ | = 1.26184 |
| Dispersity | $M_v/M_n$ | = 1.37894 | I.Viscorsiry | I.VISC | = 640.46563 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.250 | 803813 | 1 |
| top | 35.326 | 328665 | 590 |
| end | 56.800 | 7477 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 84621 | Weight-A.W.M. | $M_w$ | = 209951 |
| Z-A.W.M | $M_z$ | = 813770 | Visc-A.W.M. | $M_v$ | = 188767 |
| Dispersity | $M_w/M_n$ | = 2.48107 | Dispersity | $M_z/M_w$ | = 1.51830 |
| Dispersity | $M_v/M_n$ | = 2.23073 | I.Viscorsiry | I.VISC | = 1523.25549 |




[AA] = 2.40M

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 31.300 | 668063 | 2 |
| top | 32.400 | 550369 | 233 |
| end | 33.600 | 445491 | 242 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 520927 | Weight-A.W.M. | $M_w$ | = | 525767 |
| Z-A.W.M | $M_z$ | = 530709 | Visc-A.W.M. | $M_v$ | = | 524884 |
| Dispersity | $M_w/M_n$ | = 1.00929 | Dispersity | $M_z/M_w$ | = | 1.0094 |
| Dispersity | $M_v/M_n$ | = 1.0076 | I.Viscorsiry | I.VISC | = | 2931.03222 |

Peak No.2

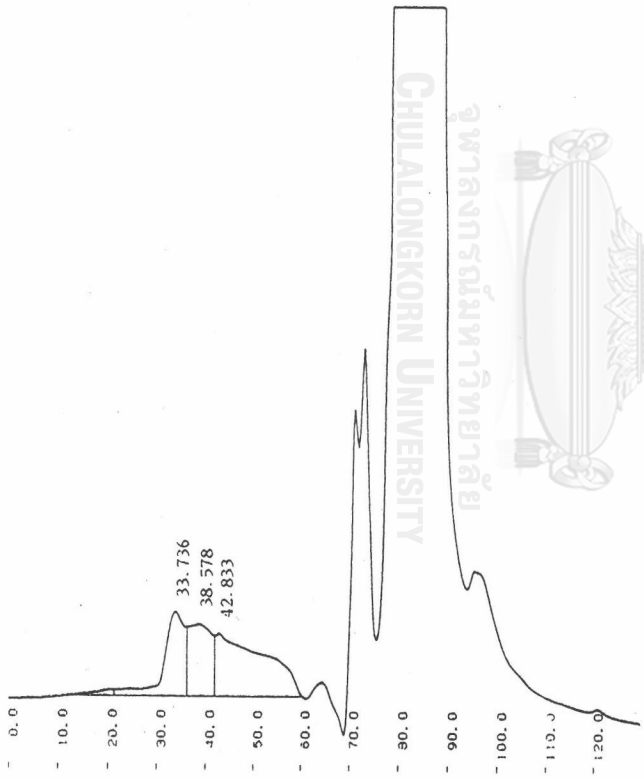
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 33.600 | 445491 | 250 |
| top | 36.117 | 285945 | 700 |
| end | 52.650 | 15534 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 119474 | Weight-A.W.M. | $M_w$ | = | 197292 |
| Z-A.W.M | $M_z$ | = 256853 | Visc-A.W.M. | $M_v$ | = | 185197 |
| Dispersity | $M_w/M_n$ | = 1.65134 | Dispersity | $M_z/M_w$ | = | 1.30189 |
| Dispersity | $M_v/M_n$ | = 1.5501 | I.Viscorsiry | I.VISC | = | 1504.75579 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 31.300 | 668063 | 2 |
| top | 36.117 | 285945 | 700 |
| end | 52.650 | 15534 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 126242 | Weight-A.W.M. | $M_w$ | = | 220143 |
| Z-A.W.M | $M_z$ | = 302354 | Visc-A.W.M. | $M_v$ | = | 204629 |
| Dispersity | $M_w/M_n$ | = 1.74381 | Dispersity | $M_z/M_w$ | = | 1.37344 |
| Dispersity | $M_v/M_n$ | = 1.62092 | I.Viscorsiry | I.VISC | = | 1603.97656 |




[AA] = 2.73M

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 21.300 | 3889921 | 260 |
| top | 33.736 | 434944 | 1915 |
| end | 36.200 | 281778 | 6233 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 464607 | Weight-A.W.M. | $M_w$ = | 651967 |
| Z-A.W.M | $M_z$ = | 1222646 | Visc-A.W.M. | $M_v$ = | 594068 |
| Dispersity | $M_w/M_n$ = | 1.40327 | Dispersity | $M_z/M_w$ = | 1.87532 |
| Dispersity | $M_v/M_n$ = | 1.27865 | I.Viscorsiry | I.VISC = | 3172.74267 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 36.200 | 281778 | 6233 |
| top | 38.578 | 185336 | 1622 |
| end | 42.000 | 101423 | 5442 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 161988 | Weight-A.W.M. | $M_w$ = | 176114 |
| Z-A.W.M | $M_z$ = | 190528 | Visc-A.W.M. | $M_v$ = | 173526 |
| Dispersity | $M_w/M_n$ = | 1.0872 | Dispersity | $M_z/M_w$ = | 1.08184 |
| Dispersity | $M_v/M_n$ = | 1.07122 | I.Viscorsiry | I.VISC = | 1443.35363 |

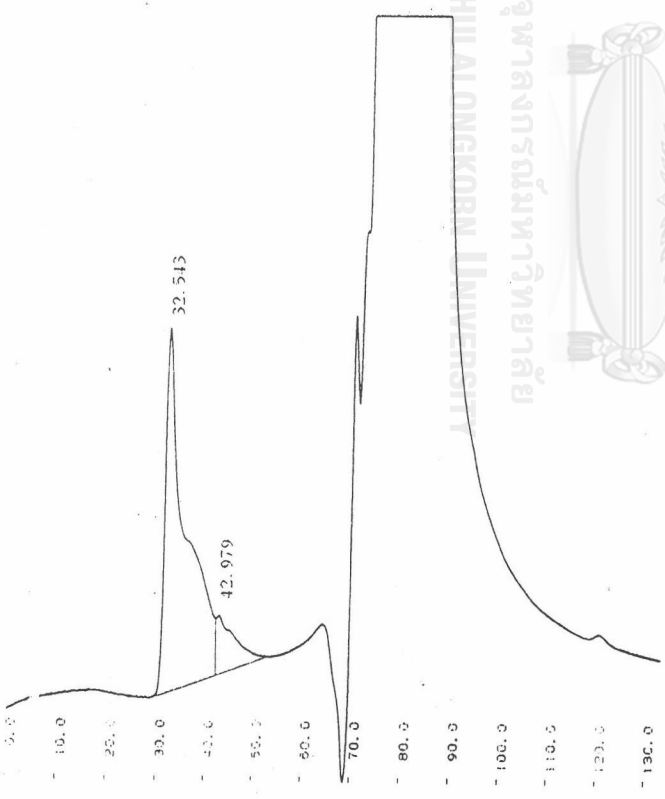
Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 21.300 | 3889921 | 260 |
| top | 33.736 | 434944 | 1915 |
| end | 42.000 | 101423 | 54420 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 294961 | Weight-A.W.M. | $M_w$ = | 357495 |
| Z-A.W.M | $M_z$ = | 414416 | Visc-A.W.M. | $M_v$ = | 346735 |
| Dispersity | $M_w/M_n$ = | 1.21201 | Dispersity | $M_z/M_w$ = | 1.15922 |
| Dispersity | $M_v/M_n$ = | 1.17552 | I.Viscorsiry | I.VISC = | 2247.89331 |

## Appendix B.2

The GFC Chromatographs of the Hydrolyzed Products of Saponified Cassava Starch-*g*-polyacrylate at various $H_2O_2$ Concentrations as indicated in each Figure




$[H_2O_2] = 9.70 \times 10^{-2}$M

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 29.000 | 1001833 | 4 |
| top | 32.543 | 536676 | 4244 |
| end | 42.300 | 92601 | 2594 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 283330 | Weight-A.W.M. | $M_w$ | = | 372641 |
| Z-A.W.M | $M_z$ | = | 448297 | Visc-A.W.M. | $M_v$ | = | 357720 |
| Dispersity | $M_w/M_n$ | = | 1.31522 | Dispersity | $M_z/M_w$ | = | 1.20303 |
| Dispersity | $M_v/M_n$ | = | 1.26255 | I.Viscorsiry | I.VISC | = | 2293.2268 |

Peak No.2

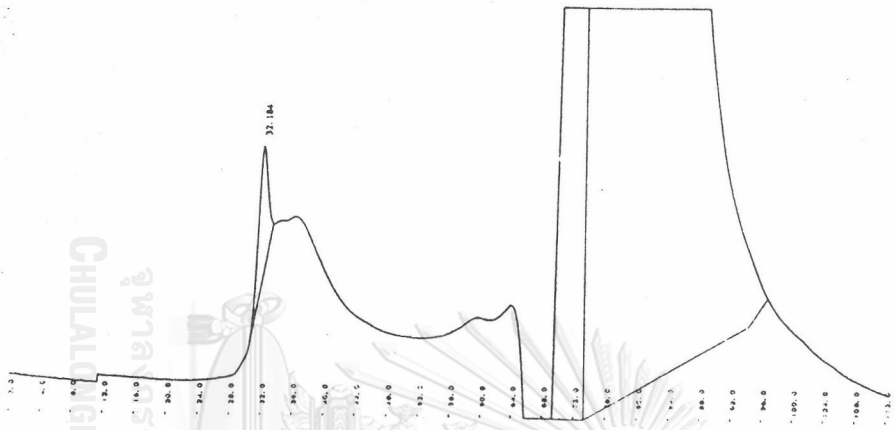
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 42.300 | 96201 | 2592 |
| top | 42.979 | 85355 | 671 |
| end | 53.100 | 14350 | 8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 50772 | Weight-A.W.M. | $M_w$ | = | 59710 |
| Z-A.W.M | $M_z$ | = | 66946 | Visc-A.W.M. | $M_v$ | = | 58279 |
| Dispersity | $M_w/M_n$ | = | 1.17604 | Dispersity | $M_z/M_w$ | = | 1.2117 |
| Dispersity | $M_v/M_n$ | = | 1.14785 | I.Viscorsiry | I.VISC | = | 717.97161 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 29.000 | 1001833 | 4 |
| top | 32.543 | 536676 | 4244 |
| end | 53.100 | 14350 | 8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 52464 | Weight-A.W.M. | $M_w$ | = | 60949 |
| Z-A.W.M | $M_z$ | = | 67912 | Visc-A.W.M. | $M_v$ | = | 59579 |
| Dispersity | $M_w/M_n$ | = | 1.16173 | Dispersity | $M_z/M_w$ | = | 1.11424 |
| Dispersity | $M_v/M_n$ | = | 1.13561 | I.Viscorsiry | I.VISC | = | 728.17956 |



$[H_2O_2] = 1.94 \times 10^{-1}$M

Peak No.1

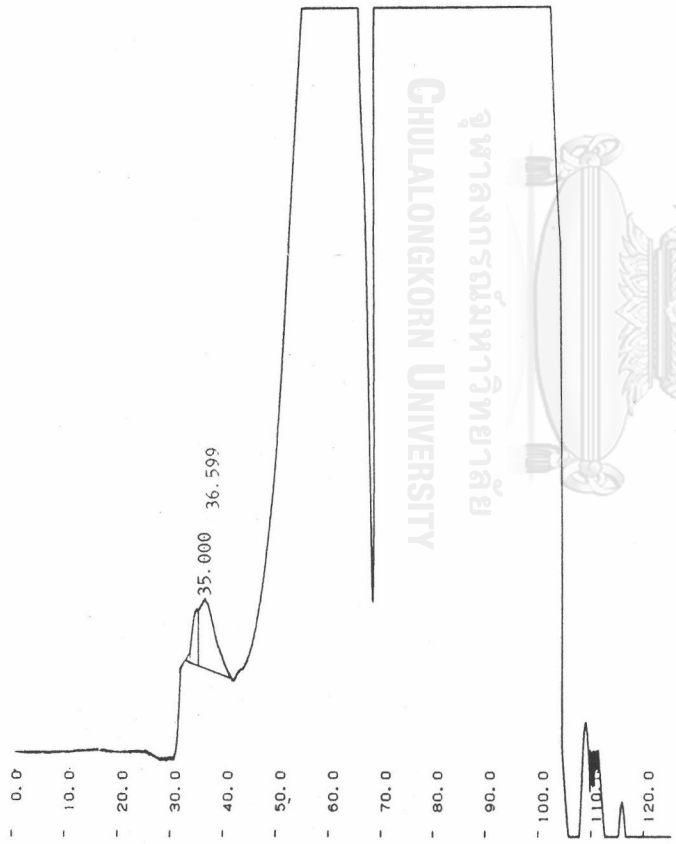
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 578412 | Weight-A.W.M. | $M_w$ | = 583262 |
| Z-A.W.M | $M_z$ | = 588174 | Visc-A.W.M. | $M_v$ | = 582383 |
| Dispersity | $M_w/M_n$ | = 1.00838 | Dispersity | $M_z/M_w$ | = 1.00842 |
| Dispersity | $M_v/M_n$ | = 1.00868 | I.Viscorsiry | I.VISC | = 3132.66113 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 578412 | Weight-A.W.M. | $M_w$ | = 583262 |
| Z-A.W.M | $M_z$ | = 588174 | Visc-A.W.M. | $M_v$ | = 582383 |
| Dispersity | $M_w/M_n$ | = 1.00838 | Dispersity | $M_z/M_w$ | = 1.00842 |
| Dispersity | $M_v/M_n$ | =1.00868 | I.Viscorsiry | I.VISC | =3132.66113 |




$[H_2O_2] = 2.90 \times 10^{-1}$M

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 33.400 | 461468 | 1 |
| top | 35.000 | 348114 | 74 |
| end | 35.350 | 327297 | 145 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 367580 | Weight-A.W.M. | $M_w$ | = | 369813 |
| Z-A.W.M | $M_z$ | = 372121 | Visc-A.W.M. | $M_v$ | = | 369403 |
| Dispersity | $M_w/M_n$ | = 1.00607 | Dispersity | $M_z/M_w$ | = | 1.00624 |
| Dispersity | $M_v/M_n$ | = 1.00496 | I.Viscorsiry | I.VISC | = | 2340.87988 |

Peak No.2

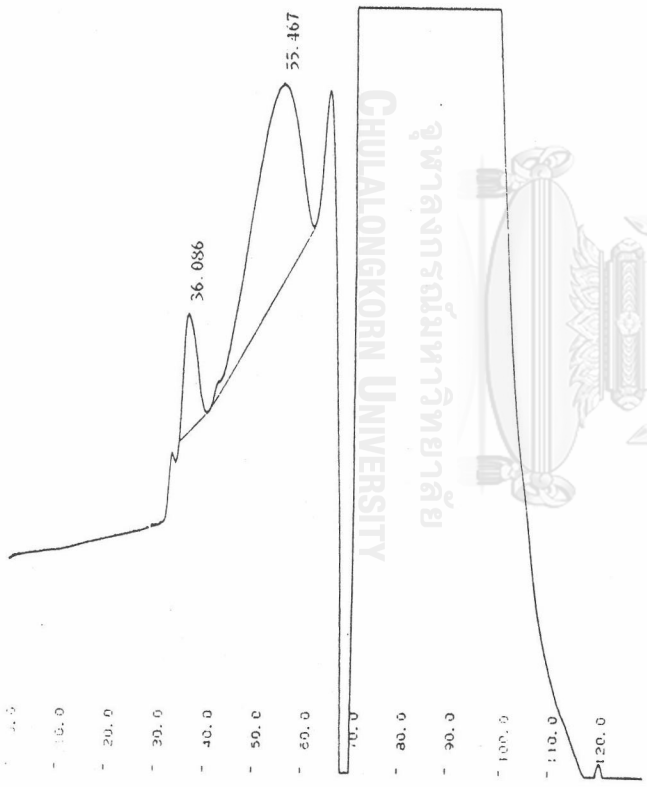
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 35.350 | 327297 | 145 |
| top | 36.599 | 262666 | 91 |
| end | 42.250 | 97053 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 219269 | Weight-A.W.M. | $M_w$ | = | 232524 |
| Z-A.W.M | $M_z$ | = 244376 | Visc-A.W.M. | $M_v$ | = | 230281 |
| Dispersity | $M_w/M_n$ | = 1.06046 | Dispersity | $M_z/M_w$ | = | 1.05097 |
| Dispersity | $M_v/M_n$ | = 1.05023 | I.Viscorsiry | I.VISC | = | 1729.91723 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 33.400 | 461468 | 1 |
| top | 36.599 | 262666 | 91 |
| end | 42.250 | 97053 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 241231 | Weight-A.W.M. | $M_w$ | = | 263505 |
| Z-A.W.M | $M_z$ | = 284833 | Visc-A.W.M. | $M_v$ | = | 259593 |
| Dispersity | $M_w/M_n$ | = 1.09233 | Dispersity | $M_z/M_w$ | = | 1.08094 |
| Dispersity | $M_v/M_n$ | =1.07612 | I.Viscorsiry | I.VISC | = | 1867.78588 |




$[H_2O_2] = 3.86x10^{-1}M$

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 34.300 | 393804 | 4 |
| top | 36.086 | 287511 | 169 |
| end | 40.050 | 142999 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 259044 | Weight-A.W.M. | $M_w$ | = | 269099 |
| Z-A.W.M | $M_z$ | = 278723 | Visc-A.W.M. | $M_v$ | = | 267333 |
| Dispersity | $M_w/M_n$ | = 1.03881 | Dispersity | $M_z/M_w$ | = | 1.03576 |
| Dispersity | $M_v/M_n$ | = 1.03199 | I.Viscorsiry | I.VISC | = | 1903.23718 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 40.050 | 142999 | 1 |
| top | 55.467 | 9457 | 281 |
| end | 61.85 | 3072 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 11372 | Weight-A.W.M. | $M_w$ | = | 18700 |
| Z-A.W.M | $M_z$ | = 32623 | Visc-A.W.M. | $M_v$ | = | 16906 |
| Dispersity | $M_w/M_n$ | = 1.6444 | Dispersity | $M_z/M_w$ | = | 1.7459 |
| Dispersity | $M_v/M_n$ | = 1.48669 | I.Viscorsiry | I.VISC | = | 325.18563 |

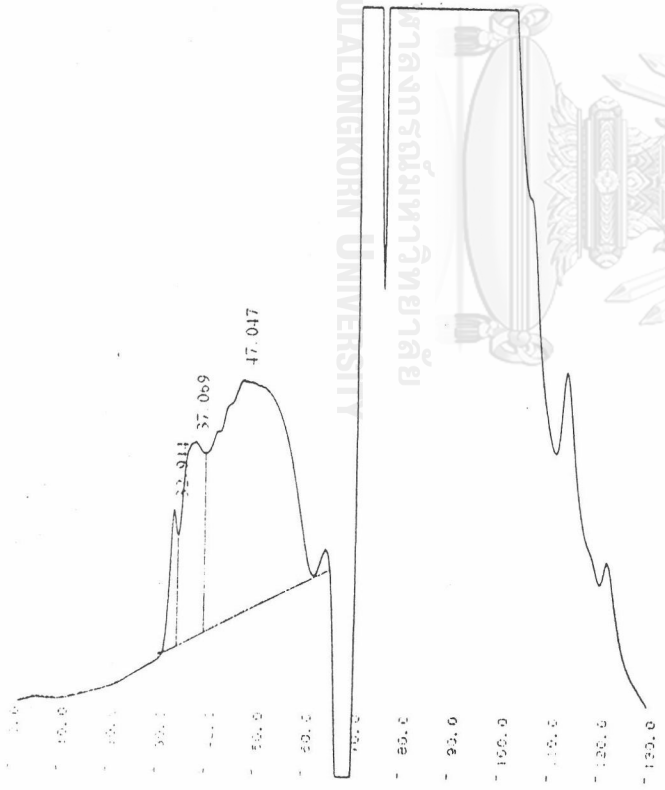
Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 34.300 | 393804 | 4 |
| top | 55.467 | 9457 | 281 |
| end | 61.850 | 3072 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 13141 | Weight-A.W.M. | $M_w$ | = | 53958 |
| Z-A.W.M | $M_z$ | = 205443 | Visc-A.W.M. | $M_v$ | = | 38144 |
| Dispersity | $M_w/M_n$ | = 4.10609 | Dispersity | $M_z/M_w$ | = | 3.80748 |
| Dispersity | $M_v/M_n$ | = 2.90271 | I.Viscorsiry | I.VISC | = | 547.38598 |

## Appendix B.3

The GFC Chromatographs of the Hydrolyzed Products of Saponified Cassava Starch-*g*-Polyacrylate at various Amount of Starch as indicated in each Figure




Starch = 50 g

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.650 | 749117 | 2 |
| top | 32.944 | 500070 | 395 |
| end | 33.850 | 426296 | 636 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 503589 | Weight-A.W.M. | $M_w$ = | 509498 |
| Z-A.W.M | $M_z$ = | 515741 | Visc-A.W.M. | $M_v$ = | 508401 |
| Dispersity | $M_w/M_n$ = | 1.01173 | Dispersity | $M_z/M_w$ = | 1.01225 |
| Dispersity | $M_v/M_n$ = | 1.00956 | I.Viscorsiry | I.VISC = | 2871.78344 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 33.850 | 426296 | 636 |
| top | 37.069 | 241779 | 570 |
| end | 39.350 | 161768 | 2082 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 245096 | Weight-A.W.M. | $M_w$ = | 263328 |
| Z-A.W.M | $M_z$ = | 282440 | Visc-A.W.M. | $M_v$ = | 259944 |
| Dispersity | $M_w/M_n$ = | 1.07439 | Dispersity | $M_z/M_w$ = | 1.07258 |
| Dispersity | $M_v/M_n$ = | 1.06058 | I.Viscorsiry | I.VISC = | 1869.40283 |

Peak No.3

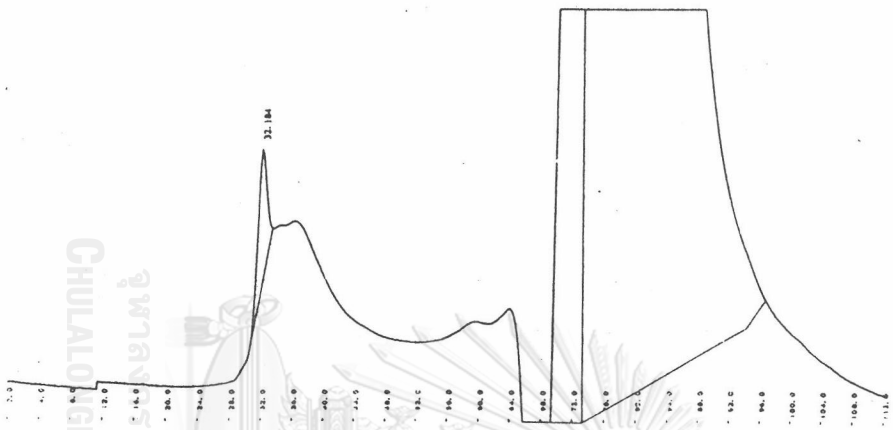
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 39.350 | 161768 | 2078 |
| top | 47.047 | 41685 | 683 |
| end | 61.833 | 3054 | 39 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 19484 | Weight-A.W.M. | $M_w$ = | 45420 |
| Z-A.W.M | $M_z$ = | 79754 | Visc-A.W.M. | $M_v$ = | 39731 |
| Dispersity | $M_w/M_n$ = | 2.33111 | Dispersity | $M_z/M_w$ = | 1.75592 |
| Dispersity | $M_v/M_n$ = | 2.0391 | I.Viscorsiry | I.VISC = | 561.84924 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.650 | 7491174 | 2 |
| top | 47.047 | 41685 | 683 |
| end | 61.883 | 3054 | 39 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 25144 | Weight-A.W.M. | $M_w$ = | 108541 |
| Z-A.W.M | $M_z$ = | 268159 | Visc-A.W.M. | $M_v$ = | 85709 |
| Dispersity | $M_w/M_n$ = | 4.31676 | Dispersity | $M_z/M_w$ = | 2.47059 |
| Dispersity | $M_v/M_n$ = | 3.40872 | I.Viscorsiry | I.VISC = | 918.99993 |




Starch = 60 g
Peak No.1

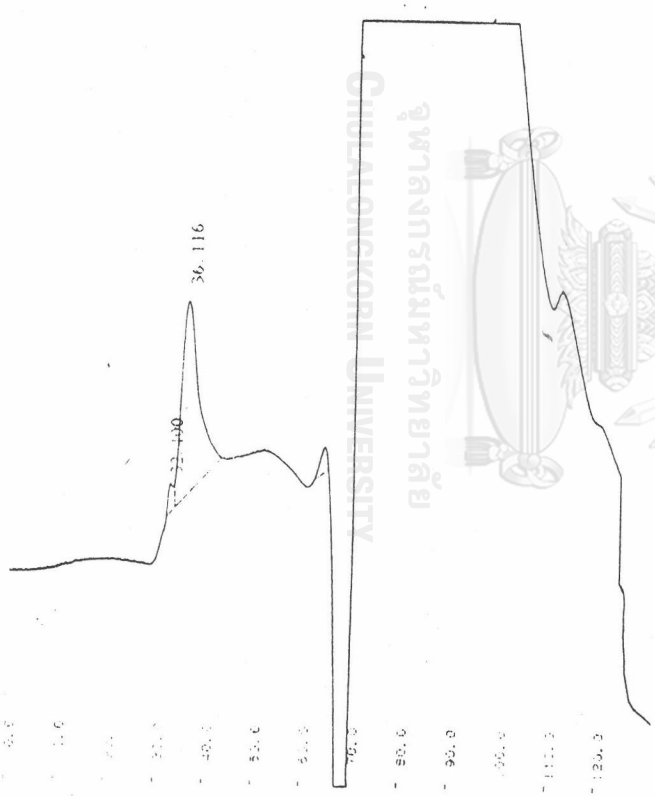
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = | 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = | 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ = | 1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W M. | $M_n$ = | 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = | 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = | 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ = | 1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |




Starch = 70 g

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 31.700 | 622604 | 2 |
| top | 32.400 | 550369 | 81 |
| end | 33.500 | 453409 | 73 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 520103 | Weight-A.W.M. | $M_w$ = | 523306 |
| Z-A.W.M | $M_z$ = 526516 | Visc-A.W.M. | $M_v$ = | 522727 |
| Dispersity | $M_w/M_n$ = 1.00616 | Dispersity | $M_z/M_w$ = | 1.00613 |
| Dispersity | $M_v/M_n$ = 1.00505 | I.Viscorsiry | I.VISC = | 2923.3142 |

Peak No.2

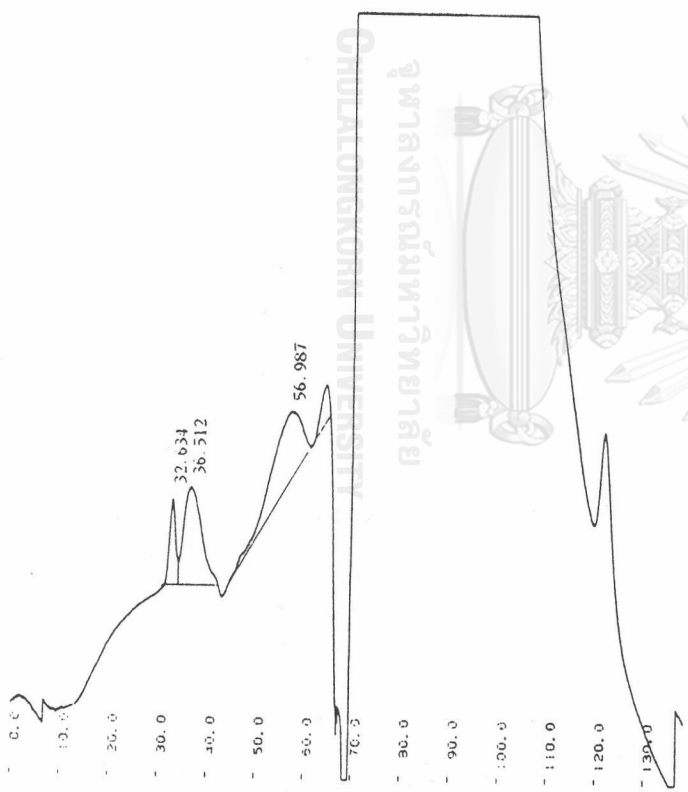
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 33.500 | 453409 | 73 |
| top | 36.116 | 285995 | 556 |
| end | 42.950 | 85792 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 238153 | Weight-A.W.M. | $M_w$ = | 263934 |
| Z-A.W.M | $M_z$ = 286374 | Visc-A.W.M. | $M_v$ = | 259661 |
| Dispersity | $M_w/M_n$ = 1.10825 | Dispersity | $M_z/M_w$ = | 1.08502 |
| Dispersity | $M_v/M_n$ = 1.09031 | I.Viscorsiry | I.VISC = | 1868.09973 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 31.700 | 622604 | 2 |
| top | 36.116 | 285995 | 556 |
| end | 42.950 | 85792 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 138424 | Weight-A.W.M. | $M_w$ = | 242365 |
| Z-A.W.M | $M_z$ = 324576 | Visc-A.W.M. | $M_v$ = | 226851 |
| Dispersity | $M_w/M_n$ = 1.8872 | Dispersity | $M_z/M_w$ = | 1.33920 |
| Dispersity | $M_v/M_n$ = 1.63881 | I.Viscorsiry | I.VISC = | 1713.38129 |




Starch = 80 g

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 31.150 | 685952 | 0 |
| top | 32.634 | 528141 | 123 |
| end | 34.050 | 411537 | 68 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 511978 | Weight-A.W.M. | $M_w$ = | 517270 |
| Z-A.W.M | $M_z$ = | 522532 | Visc-A.W.M. | $M_v$ = | 516320 |
| Dispersity | $M_w/M_n$ = | 1.01034 | Dispersity | $M_z/M_w$ = | 1.01017 |
| Dispersity | $M_v/M_n$ = | 1.00848 | I.Viscorsiry | I.VISC = | 2900.32763 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 34.050 | 411537 | 68 |
| top | 36.512 | 266707 | 141 |
| end | 42.350 | 95358 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 229473 | Weight-A.W.M. | $M_w$ = | 249907 |
| Z-A.W.M | $M_z$ = | 268540 | Visc-A.W.M. | $M_v$ = | 246423 |
| Dispersity | $M_w/M_n$ = | 1.08904 | Dispersity | $M_z/M_w$ = | 1.07456 |
| Dispersity | $M_v/M_n$ = | 1.07386 | I.Viscorsiry | I.VISC = | 1806.57385 |

Peak No.3

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 44.350 | 68231 | 3 |
| top | 56.987 | 7236 | 103 |
| end | 61.050 | 3537 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 8804 | Weight-A.W.M. | $M_w$ = | 11798 |
| Z-A.W.M | $M_z$ = | 18024 | Visc-A.W.M. | $M_v$ = | 11044 |
| Dispersity | $M_w/M_n$ = | 1.34014 | Dispersity | $M_z/M_w$ = | 1.52766 |
| Dispersity | $M_v/M_n$ = | 1.25449 | I.Viscorsiry | I.VISC = | 247.62225 |

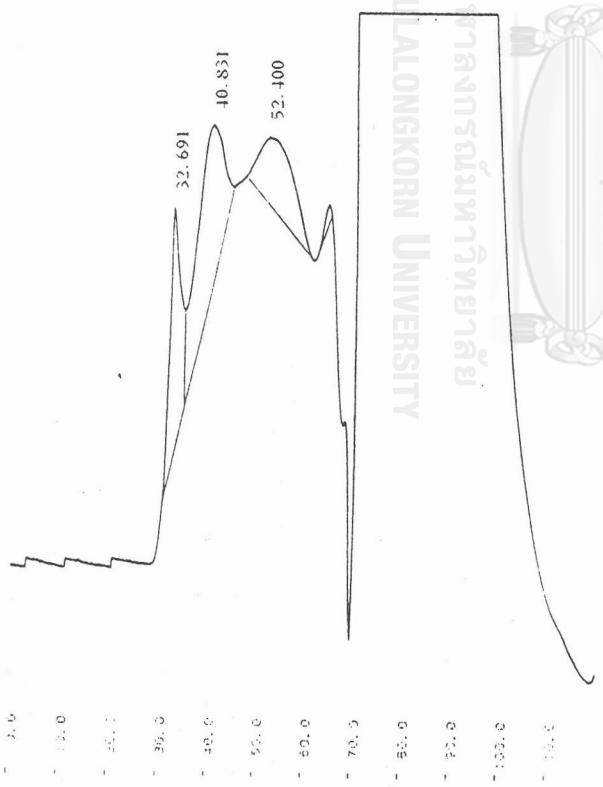
Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 31.150 | 685952 | 0 |
| top | 56.987 | 7236 | 103 |
| end | 61.050 | 3537 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 18339 | Weight-A.W.M. | $M_w$ = | 164878 |
| Z-A.W.M | $M_z$ = | 348394 | Visc-A.W.M. | $M_v$ = | 126833 |
| Dispersity | $M_w/M_n$ = | 8.99052 | Dispersity | $M_z/M_w$ = | 2.11303 |
| Dispersity | $M_v/M_n$ = | 6.51596 | I.Viscorsiry | I.VISC = | 1180.99487 |

## Appendix B.4

The GFC Chromatographs of the Hydrolyzed Products of Saponified Cassava Starch-*g*-Polyacrylate at various Percent Ascorbic Acid as indicated in each Figure




Ascorbic acid = 0.16%

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.600 | 755746 | 4 |
| top | 32.691 | 522864 | 722 |
| end | 35.050 | 345061 | 575 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 481221 | Weight-A.W.M. | $M_w$ = | 495714 |
| Z-A.W.M | $M_z$ = 510201 | Visc-A.W.M. | $M_v$ = | 493105 |
| Dispersity | $M_w/M_n$ = 1.03012 | Dispersity | $M_z/M_w$ = | 1.02922 |
| Dispersity | $M_v/M_n$ = 1.02469 | I.Viscorsiry | I.VISC = | 2816.17993 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 35.050 | 345061 | 575 |
| top | 40.831 | 124617 | 434 |
| end | 44.550 | 60315 | 26 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 147322 | Weight-A.W.M. | $M_w$ = | 173286 |
| Z-A.W.M | $M_z$ = 201488 | Visc-A.W.M. | $M_v$ = | 168370 |
| Dispersity | $M_w/M_n$ = 1.17624 | Dispersity | $M_z/M_w$ = | 1.16275 |
| Dispersity | $M_v/M_n$ = 1.14287 | I.Viscorsiry | I.VISC = | 1415.75891 |

Peak No.3

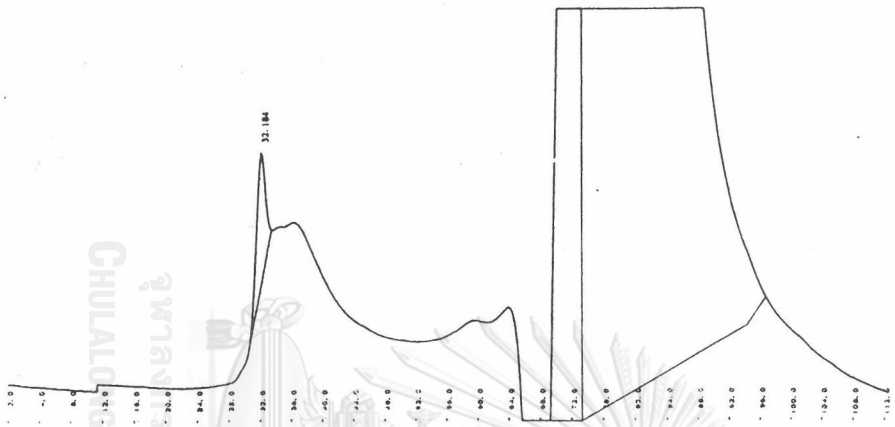
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 44.950 | 38150 | 16 |
| top | 52.400 | 16233 | 189 |
| end | 61.550 | 3238 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 10540 | Weight-A.W.M. | $M_w$ = | 13313 |
| Z-A.W.M | $M_z$ = 16521 | Visc-A.W.M. | $M_v$ = | 12771 |
| Dispersity | $M_w/M_n$ = 1.26299 | Dispersity | $M_z/M_w$ = | 1.24101 |
| Dispersity | $M_v/M_n$ = 1.21166 | I.Viscorsiry | I.VISC = | 271.7525 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.600 | 755746 | 4 |
| top | 32.691 | 522864 | 722 |
| end | 61.550 | 3238 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 174537 | Weight-A.W.M. | $M_w$ = | 142135 |
| Z-A.W.M | $M_z$ = 323398 | Visc-A.W.M. | $M_v$ = | 113911 |
| Dispersity | $M_w/M_n$ = 4.72882 | Dispersity | $M_z/M_w$ = | 2..27528 |
| Dispersity | $M_v/M_n$ = 3.7898 | I.Viscorsiry | I.VISC = | 1102.50805 |



Ascorbic acid = 0.33%
Peak No.1

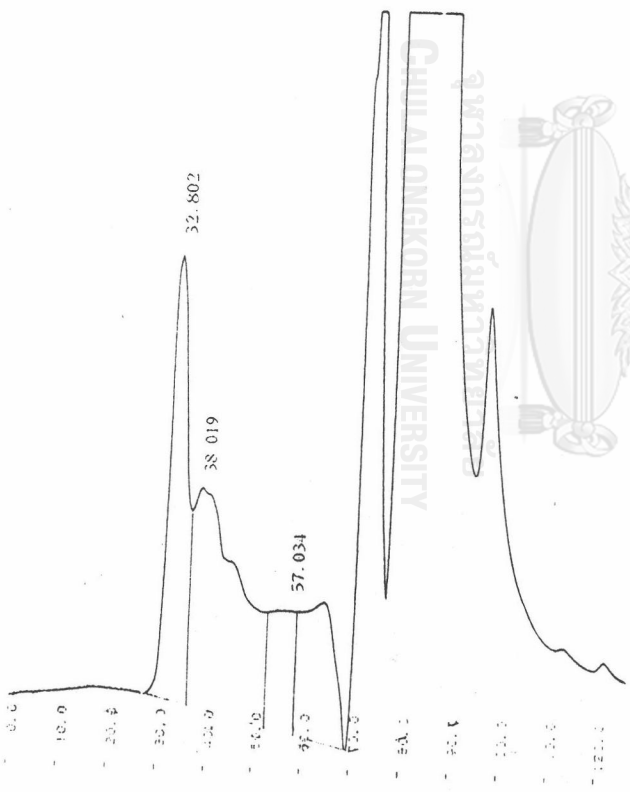
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ = 1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ =1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |




Ascorbic acid = 0.50%

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 27.150 | 1387854 | 1143 |
| top | 82.802 | 512738 | 5429 |
| end | 36.150 | 284271 | 9903 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 471584 | Weight-A.W.M. | $M_w$ = | 516135 |
| Z-A.W.M | $M_z$ = 572586 | Visc-A.W.M. | $M_v$ = | 507186 |
| Dispersity | $M_w/M_n$ = 1.09447 | Dispersity | $M_z/M_w$ = | 1.10937 |
| Dispersity | $M_v/M_n$ = 1.07549 | I.Viscorsiry | I.VISC = | 2867.38647 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 36.150 | 284271 | 9903 |
| top | 38.019 | 204518 | 2761 |
| end | 52.550 | 15810 | 5799 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 56903 | Weight-A.W.M. | $M_w$ = | 107009 |
| Z-A.W.M | $M_z$ = 158623 | Visc-A.W.M. | $M_v$ = | 97403 |
| Dispersity | $M_w/M_n$ = 1.88056 | Dispersity | $M_z/M_w$ = | 1.48233 |
| Dispersity | $M_v/M_n$ = 1.71175 | I.Viscorsiry | I.VISC = | 997.39227 |

Peak No.3

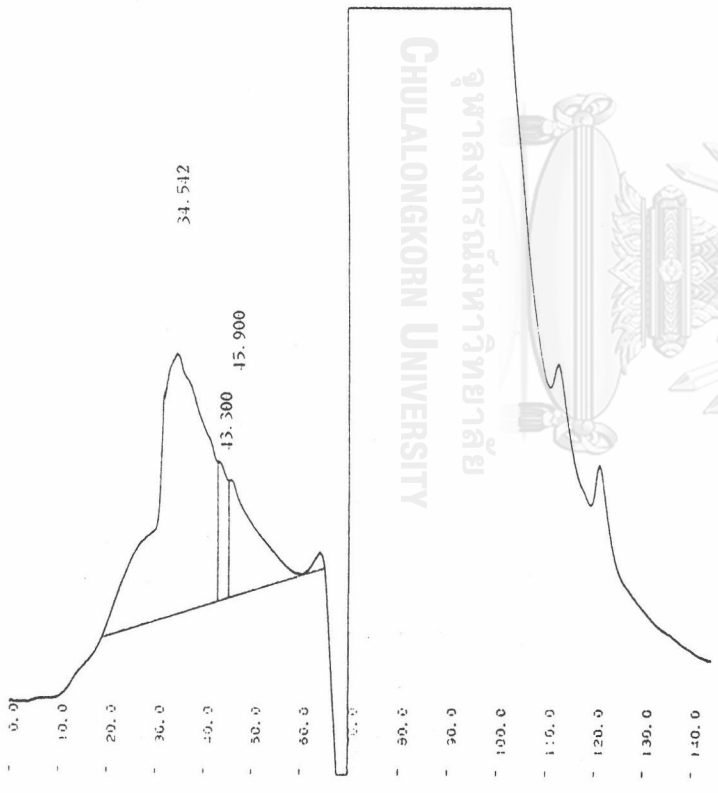
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 52.550 | 15810 | 5799 |
| top | 57.034 | 7175 | 1508 |
| end | 58.550 | 5494 | 6056 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 8756 | Weight-A.W.M. | $M_w$ = | 9599 |
| Z-A.W.M | $M_z$ = 10477 | Visc-A.W.M. | $M_v$ = | 9443 |
| Dispersity | $M_w/M_n$ = 1.09631 | Dispersity | $M_z/M_w$ = | 1.09145 |
| Dispersity | $M_v/M_n$ = 1.07845 | I.Viscorsiry | I.VISC = | 223.99444 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 27.150 | 13877854 | 1143 |
| top | 32.802 | 512738 | 5429 |
| end | 58.550 | 5494 | 6056 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 174537 | Weight-A.W.M. | $M_w$ = | 338433 |
| Z-A.W.M | $M_z$ = 464146 | Visc-A.W.M. | $M_v$ = | 312356 |
| Dispersity | $M_w/M_n$ = 1..93903 | Dispersity | $M_z/M_w$ = | 1..37146 |
| Dispersity | $M_v/M_n$ = 1.78962 | I.Viscorsiry | I.VISC = | 2102.59399 |




Ascorbic acid = 0.67%

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 33.700 | 437711 | 1499 |
| top | 33.452 | 377346 | 764 |
| end | 43.000 | 85040 | 828 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 187715 | Weight-A.W.M. | $M_w$ | = | 231539 |
| Z-A.W.M | $M_z$ | = | 274914 | Visc-A.W.M. | $M_v$ | = | 223566 |
| Dispersity | $M_w/M_n$ | = | 1.23346 | Dispersity | $M_z/M_w$ | = | 1.18733 |
| Dispersity | $M_v/M_n$ | = | 1.19099 | I.Viscorsiry | I.VISC | = | 1697.46081 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 43.000 | 85040 | 830 |
| top | 43.300 | 80662 | 414 |
| end | 45.300 | 56708 | 694 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 69174 | Weight-A.W.M. | $M_w$ | = | 70116 |
| Z-A.W.M | $M_z$ | = | 71053 | Visc-A.W.M. | $M_v$ | = | 69946 |
| Dispersity | $M_w/M_n$ | = | 1.01361 | Dispersity | $M_z/M_w$ | = | 1.01337 |
| Dispersity | $M_v/M_n$ | = | 1.01116 | I.Viscorsiry | I.VISC | = | 806.91619 |

Peak No.3

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 45.300 | 56708 | 694 |
| top | 45.900 | 51020 | 348 |
| end | 60.000 | 4255 | 6 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 21458 | Weight-A.W.M. | $M_w$ | = | 30043 |
| Z-A.W.M | $M_z$ | = | 36982 | Visc-A.W.M. | $M_v$ | = | 28657 |
| Dispersity | $M_w/M_n$ | = | 1.40007 | Dispersity | $M_z/M_w$ | = | 1.23095 |
| Dispersity | $M_v/M_n$ | = | 1.33545 | I.Viscorsiry | I.VISC | = | 455.83056 |

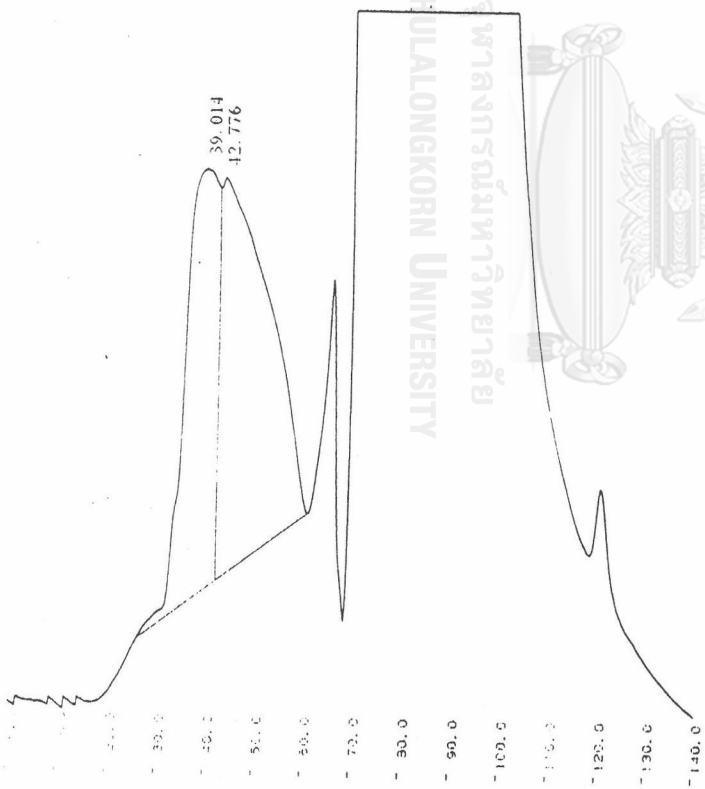
Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 33.700 | 437711 | 1499 |
| top | 34.542 | 377346 | 764 |
| end | 60.000 | 4522 | 6 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 85274 | Weight-A.W.M. | $M_w$ | = | 214332 |
| Z-A.W.M | $M_z$ | = | 359734 | Visc-A.W.M. | $M_v$ | = | 1880427 |
| Dispersity | $M_w/M_n$ | = | 2.51346 | Dispersity | $M_z/M_w$ | = | 1.67839 |
| Dispersity | $M_v/M_n$ | = | 1.78962 | I.Viscorsiry | I.VISC | = | 1521.49867 |

## Appendix B.5

The GFC Chromatographs of the Hydrolyzed Products of Saponified Cassava Starch-*g*-Polyacrylate at various Reaction Temperatures as indicated in each Figure




Temperature = 25°C

Peak No.1

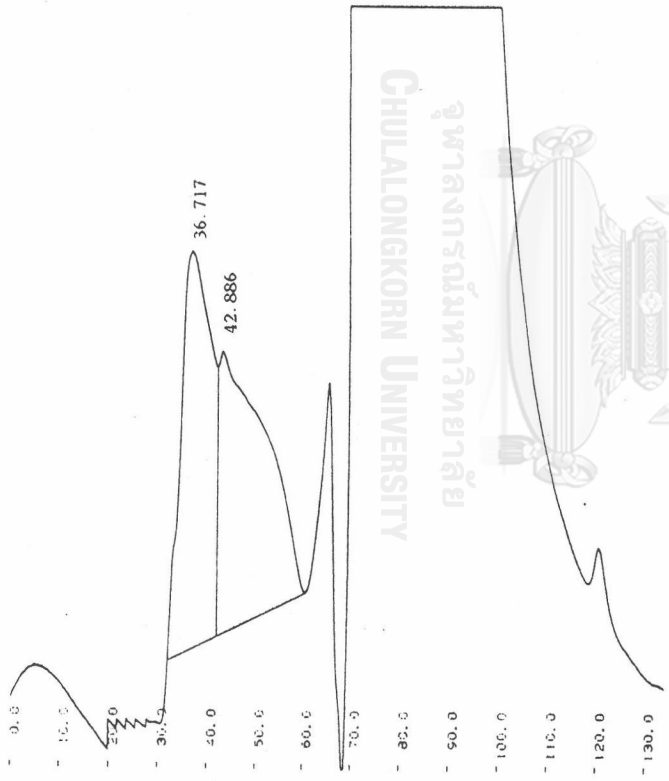
| Peak information | Time(min) | Mol.Size | Height | |
|---|---|---|---|---|
| start | 25.900 | 1729751 | 1 | |
| top | 39.014 | 171643 | 1220 | |
| end | 41.750 | 105989 | 2277 | |
| Number-A.W.M. | $M_n$ = 194695 | Weight-A.W.M. | $M_w$ = | 239731 |
| Z-A.W.M | $M_z$ = 322104 | Visc-A.W.M. | $M_v$ = | 229283 |
| Dispersity | $M_w/M_n$ = 1.23131 | Dispersity | $M_z/M_w$ = | 1.34361 |
| Dispersity | $M_v/M_n$ = 1.1765 | I.Viscorsiry | I.VISC = | 1725.11413 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height | |
|---|---|---|---|---|
| start | 41.750 | 105989 | 2276 | |
| top | 42.767 | 88458 | 1157 | |
| end | 60.450 | 3931 | 1 | |
| Number-A.W.M. | $M_n$ = 23454 | Weight-A.W.M. | $M_w$ = | 42338 |
| Z-A.W.M | $M_z$ = 60869 | Visc-A.W.M. | $M_v$ = | 1157 |
| Dispersity | $M_w/M_n$ = 1.80515 | Dispersity | $M_z/M_w$ = | 1.4377 |
| Dispersity | $M_v/M_n$ = 1.65689 | I.Viscorsiry | I.VISC = | 553.9447 |

Total data

| Peak information | Time(min) | Mol.Size | Height | |
|---|---|---|---|---|
| start | 25.900 | 1729751 | 1 | |
| top | 39.014 | 171643 | 1220 | |
| end | 60.450 | 3931 | 1 | |
| Number-A.W.M. | $M_n$ = 36667 | Weight-A.W.M. | $M_w$ = | 123212 |
| Z-A.W.M | $M_z$ = 269116 | Visc-A.W.M. | $M_v$ = | 103013 |
| Dispersity | $M_w/M_n$ = 3.36028 | Dispersity | $M_z/M_w$ = | 2.18418 |
| Dispersity | $M_v/M_n$ = 2.8904 | I.Viscorsiry | I.VISC = | 1033.78247 |




Temperature = 30°C

Peak No.1

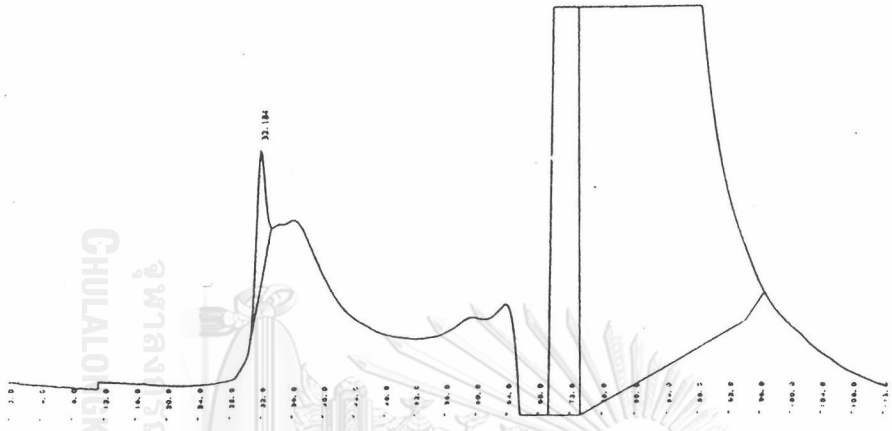
| Peak information | Time(min) | Mol.Size | Height | | |
|---|---|---|---|---|---|
| start | 31.900 | 601049 | 2 | | |
| top | 36.717 | 25747 | 1151 | | |
| end | 41.950 | 102320 | 1584 | | |
| Number-A.W.M. | $M_n$ = 200450 | Weight-A.W.M. | $M_w$ | = | 238838 |
| Z-A.W.M | $M_z$ = 282590 | Visc-A.W.M. | $M_v$ | = | 231390 |
| Dispersity | $M_w/M_n$ = 1.19178 | Dispersity | $M_z/M_w$ | = | 1.18319 |
| Dispersity | $M_v/M_n$ = 1.15461 | I.Viscorsiry | I.VISC | = | 1735.24157 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height | | |
|---|---|---|---|---|---|
| start | 41.950 | 102320 | 1586 | | |
| top | 42.886 | 86765 | 829 | | |
| end | 60.350 | 4001 | 1 | | |
| Number-A.W.M. | $M_n$ = 22785 | Weight-A.W.M. | $M_w$ | = | 40667 |
| Z-A.W.M | $M_z$ = 58685 | Visc-A.W.M. | $M_v$ | = | 37320 |
| Dispersity | $M_w/M_n$ = 1.78482 | Dispersity | $M_z/M_w$ | = | 1.44305 |
| Dispersity | $M_v/M_n$ = 1.63789 | I.Viscorsiry | I.VISC | = | 539.78381 |

Total data

| Peak information | Time(min) | Mol.Size | Height | | |
|---|---|---|---|---|---|
| start | 31.900 | 601049 | 2 | | |
| top | 36.717 | 257247 | 1151 | | |
| end | 60.350 | 4001 | 1 | | |
| Number-A.W.M. | $M_n$ = 39103 | Weight-A.W.M. | $M_w$ | = | 133972 |
| Z-A.W.M | $M_z$ = 246624 | Visc-A.W.M. | $M_v$ | = | 113932 |
| Dispersity | $M_w/M_n$ = 3.42615 | Dispersity | $M_z/M_w$ | = | 1.84086 |
| Dispersity | $M_v/M_n$ = 2.91367 | I.Viscorsiry | I.VISC | = | 1102.64074 |



Temperature = 35°C
Peak No.1

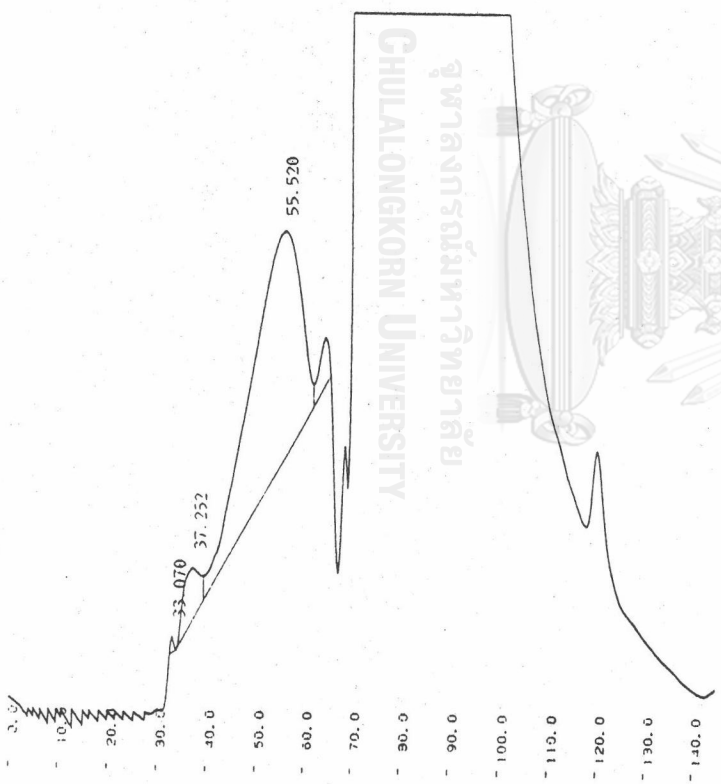
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = | 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = | 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ = | 1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = | 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = | 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ = | 1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |




Temperature = 40°C

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 32.650 | 526655 | 6 |
| top | 33.070 | 489063 | 45 |
| end | 34.000 | 41577 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 479342 | Weight-A.W.M. | $M_w$ = | 480377 |
| Z-A.W.M | $M_z$ = 481401 | Visc-A.W.M. | $M_v$ = | 480190 |
| Dispersity | $M_w/M_n$ = 1.00216 | Dispersity | $M_z/M_w$ = | 1.00213 |
| Dispersity | $M_v/M_n$ = 1.00177 | I.Viscorsiry | I.VISC = | 2768.7517 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 34.050 | 411537 | 1 |
| top | 37.252 | 234108 | 152 |
| end | 39.500 | 157549 | 140 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 241038 | Weight-A.W.M. | $M_w$ = | 253461 |
| Z-A.W.M | $M_z$ = 265882 | Visc-A.W.M. | $M_v$ = | 251220 |
| Dispersity | $M_w/M_n$ = 1.05154 | Dispersity | $M_z/M_w$ = | 1.04901 |
| Dispersity | $M_v/M_n$ = 1.04224 | I.Viscorsiry | I.VISC = | 1829.00183 |

Peak No.3

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 39.500 | 157549 | 139 |
| top | 55.520 | 9368 | 655 |
| end | 61.600 | 3210 | 274 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 11738 | Weight-A.W.M. | $M_w$ = | 22560 |
| Z-A.W.M | $M_z$ = 46094 | Visc-A.W.M. | $M_v$ = | 19714 |
| Dispersity | $M_w/M_n$ = 1.92192 | Dispersity | $M_z/M_w$ = | 2.04317 |
| Dispersity | $M_v/M_n$ = 1.67946 | I.Viscorsiry | I.VISC = | 358.78814 |

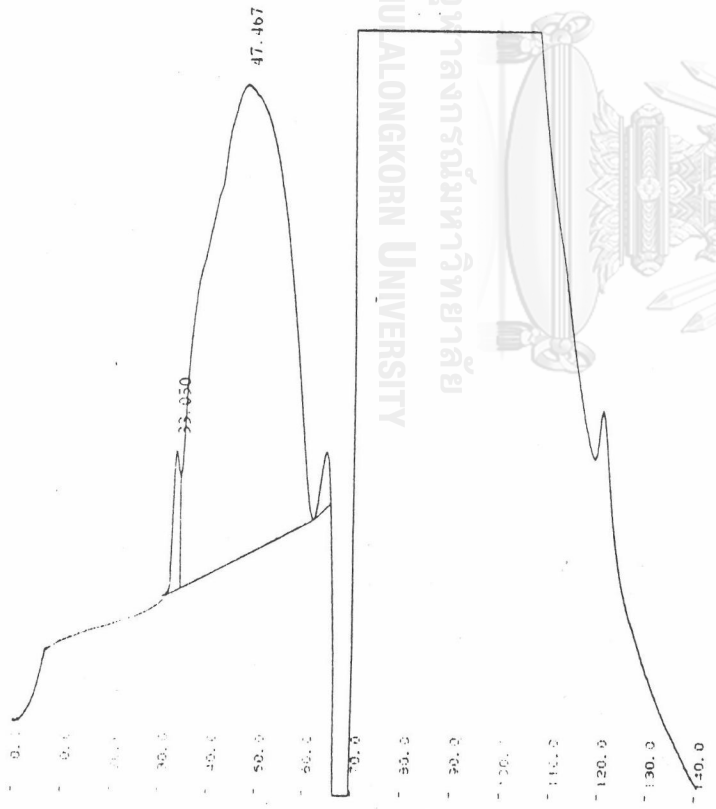
Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 32.650 | 526655 | 6 |
| top | 55.520 | 9368 | 655 |
| end | 61.600 | 3210 | 274 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 13032 | Weight-A.W.M. | $M_w$ = | 39371 |
| Z-A.W.M | $M_z$ = 150575 | Visc-A.W.M. | $M_v$ = | 29692 |
| Dispersity | $M_w/M_n$ = 3.02113 | Dispersity | $M_z/M_w$ = | 3.82451 |
| Dispersity | $M_v/M_n$ = 2.27840 | I.Viscorsiry | I.VISC = | 466.30337 |

## Appendix B.6

The GFC Chromatographs of the Hydrolyzed Products of Saponified Cassava Starch-*g*-Polyacrylate at various Reaction Times as indicated in each Figure




Time = 2 h

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 31.200 | 679938 | 1 |
| top | 33.050 | 490819 | 203 |
| end | 33.900 | 422557 | 323 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 492353 | Weight-A.W.M. | $M_w$ = | 497003 |
| Z-A.W.M | $M_z$ = 501843 | Visc-A.W.M. | $M_v$ = | 496147 |
| Dispersity | $M_w/M_n$ = 1.00944 | Dispersity | $M_z/M_w$ = | 1.00974 |
| Dispersity | $M_v/M_n$ = 1.00771 | I.Viscorsiry | I.VISC = | 2827.28515 |

Peak No.2

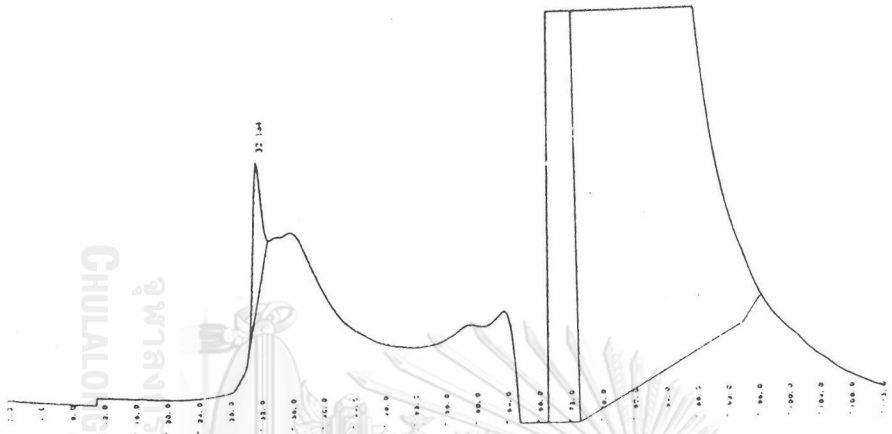
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 33.900 | 422557 | 324 |
| top | 47.467 | 38712 | 676 |
| end | 61.600 | 3210 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 23644 | Weight-A.W.M. | $M_w$ = | 77459 |
| Z-A.W.M | $M_z$ = 174188 | Visc-A.W.M. | $M_v$ = | 63557 |
| Dispersity | $M_w/M_n$ = 3.27606 | Dispersity | $M_z/M_w$ = | 2.24878 |
| Dispersity | $M_v/M_n$ = 2.68808 | I.Viscorsiry | I.VISC = | 758.93078 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 31.200 | 679938 | 1 |
| top | 47.467 | 38712 | 676 |
| end | 61.600 | 3210 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 24197 | Weight-A.W.M. | $M_w$ = | 87653 |
| Z-A.W.M | $M_z$ = 219507 | Visc-A.W.M. | $M_v$ = | 70248 |
| Dispersity | $M_w/M_n$ = 3.62253 | Dispersity | $M_z/M_w$ = | 2.50426 |
| Dispersity | $M_v/M_n$ = 2.90318 | I.Viscorsiry | I.VISC = | 809.1405 |



Time = 3 h
Peak No.1

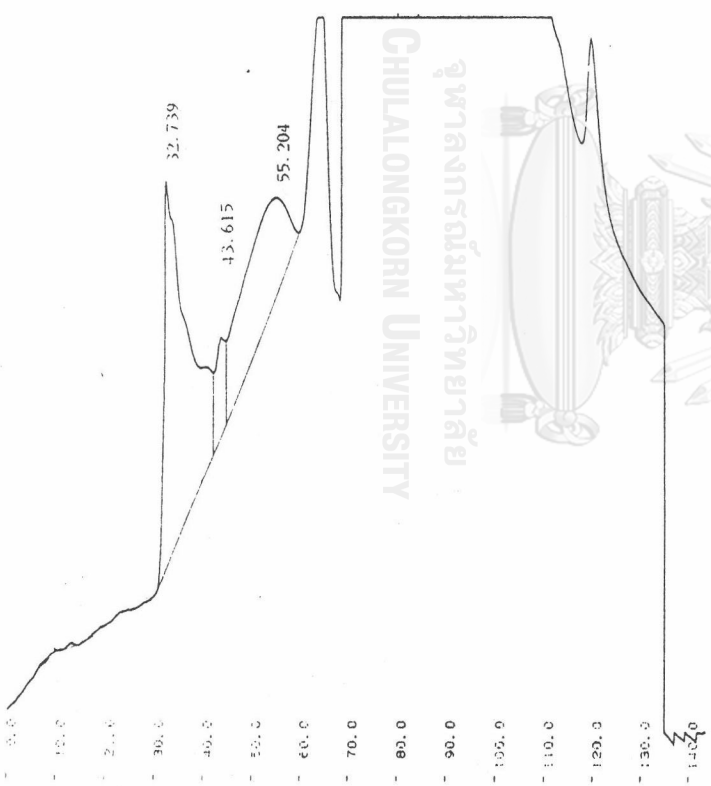
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ = 1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ =1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |




Time = 4 h

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.450 | 775983 | 23 |
| top | 32.739 | 518431 | 1108 |
| end | 39.650 | 153440 | 1391 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 325698 | Weight-A.W.M. | $M_w$ | = | 376937 |
| Z-A.W.M | $M_z$ | = 423797 | Visc-A.W.M | $M_v$ | = | 368090 |
| Dispersity | $M_w/M_n$ | = 1.15732 | Dispersity | $M_z/M_w$ | = | 1.12432 |
| Dispersity | $M_v/M_n$ | = 1.13066 | I.Viscorsiry | I.VISC | = | 2335.55175 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 39.650 | 153440 | 1365 |
| top | 43.615 | 128655 | 309 |
| end | 44.650 | 100533 | 990 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 123143 | Weight-A.W.M. | $M_w$ | = | 124944 |
| Z-A.W.M | $M_z$ | = 126730 | Visc-A.W.M. | $M_v$ | = | 121620 |
| Dispersity | $M_w/M_n$ | = 1.01462 | Dispersity | $M_z/M_w$ | = | 1.01429 |
| Dispersity | $M_v/M_n$ | = 1.0120 | I.Viscorsiry | I.VISC | = | 1167.76745 |

Peak No.3

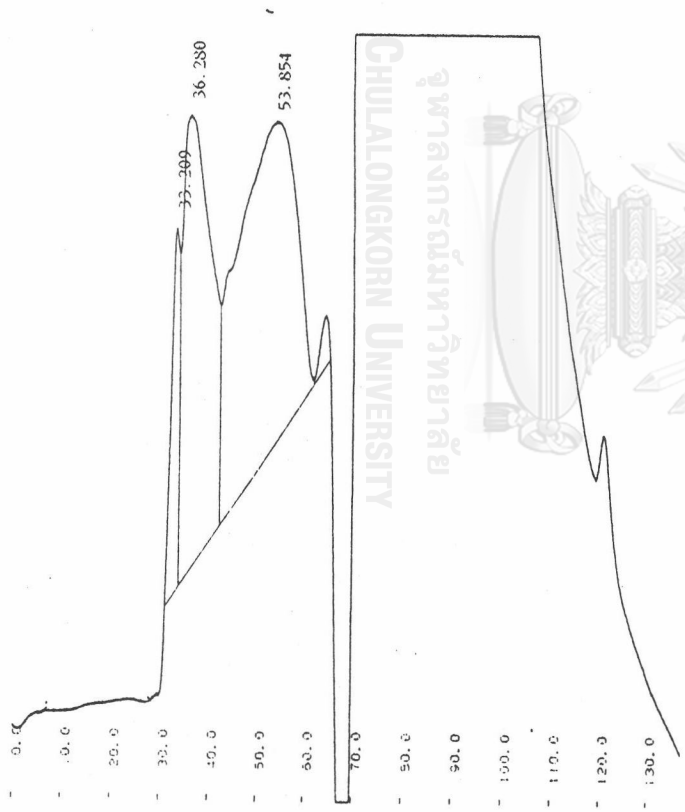
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 44.650 | 63588 | 960 |
| top | 55.204 | 9905 | 261 |
| end | 59.850 | 4369 | 40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 15807 | Weight-A.W.M. | $M_w$ | = | 24049 |
| Z-A.W.M | $M_z$ | = 33609 | Visc-A.W.M. | $M_v$ | = | 22401 |
| Dispersity | $M_w/M_n$ | = 1.52148 | Dispersity | $M_z/M_w$ | = | 1.3975 |
| Dispersity | $M_v/M_n$ | = 1.4172 | I.Viscorsiry | I.VISC | = | 389.35974 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.450 | 775983 | 23 |
| top | 32.739 | 518431 | 1108 |
| end | 59.850 | 4369 | 40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 41090 | Weight-A.W.M. | $M_w$ | = | 221611 |
| Z-A.W.M | $M_z$ | = 393237 | Visc-A.W.M. | $M_v$ | = | 184917 |
| Dispersity | $M_w/M_n$ | = 5.39337 | Dispersity | $M_z/M_w$ | = | 1.77445 |
| Dispersity | $M_v/M_n$ | = 4.50033 | I.Viscorsiry | I.VISC | = | 1503.29614 |




Time = 5 h

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 31.150 | 685952 | 8 |
| top | 33.209 | 477288 | 524 |
| end | 33.900 | 422557 | 965 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 502224 | Weight-A.W.M. | $M_w$ = | 508912 |
| Z-A.W.M | $M_z$ = 515925 | Visc-A.W.M. | $M_v$ = | 507674 |
| Dispersity | $M_w/M_n$ = 1.01332 | Dispersity | $M_z/M_w$ = | 1.01378 |
| Dispersity | $M_v/M_n$ = 1.01085 | I.Viscorsiry | I.VISC = | 2869.15576 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 33.900 | 422557 | 964 |
| top | 36.280 | 277834 | 652 |
| end | 42.200 | 97911 | 644 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 200500 | Weight-A.W.M. | $M_w$ = | 234051 |
| Z-A.W.M | $M_z$ = 266943 | Visc-A.W.M. | $M_v$ = | 228020 |
| Dispersity | $M_w/M_n$ = 1.16734 | Dispersity | $M_z/M_w$ = | 1.14053 |
| Dispersity | $M_v/M_n$ = 1.13726 | I.Viscorsiry | I.VISC = | 1719.02502 |

Peak No.3

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 42.200 | 97911 | 643 |
| top | 53.854 | 12566 | 454 |
| end | 61.700 | 3154 | 31 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 15009 | Weight-A.W.M. | $M_w$ = | 29296 |
| Z-A.W.M | $M_z$ = 48646 | Visc-A.W.M. | $M_v$ = | 26146 |
| Dispersity | $M_w/M_n$ = 1.9519 | Dispersity | $M_z/M_w$ = | 1.6605 |
| Dispersity | $M_v/M_n$ = 1.74202 | I.Viscorsiry | I.VISC = | 429.84887 |

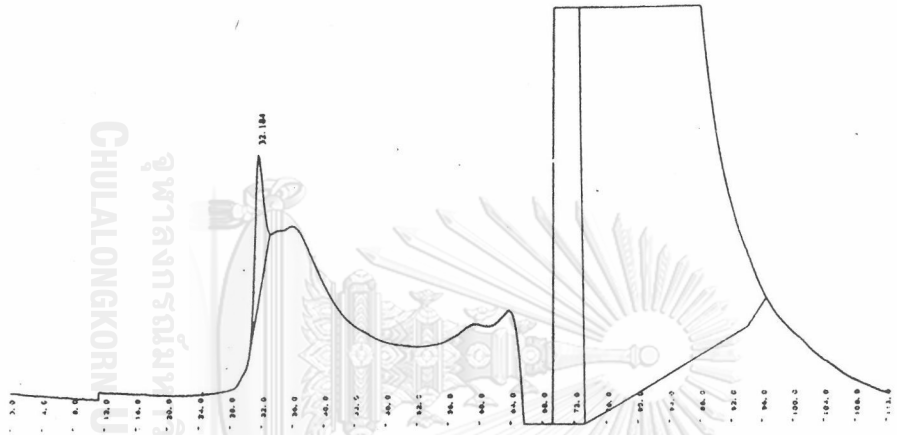
Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 31.150 | 685952 | 8 |
| top | 36.280 | 277834 | 652 |
| end | 61.700 | 3154 | 31 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = 25649 | Weight-A.W.M. | $M_w$ = | 141783 |
| Z-A.W.M | $M_z$ = 314307 | Visc-A.W.M. | $M_v$ = | 112054 |
| Dispersity | $M_w/M_n$ = 5.52786 | Dispersity | $M_z/M_w$ = | 2.21682 |
| Dispersity | $M_v/M_n$ = 4.36879 | I.Viscorsiry | I.VISC = | 1090.97058 |

## Appendix B.7

The GFC Chromatographs of the Hydrolyzed Products of Saponified Cassava Starch-*g*-Polyacrylate at various Addition Rates as indicated in each Figure



Addition rate = 0.0167 $cm^3/s$

Peak No.1

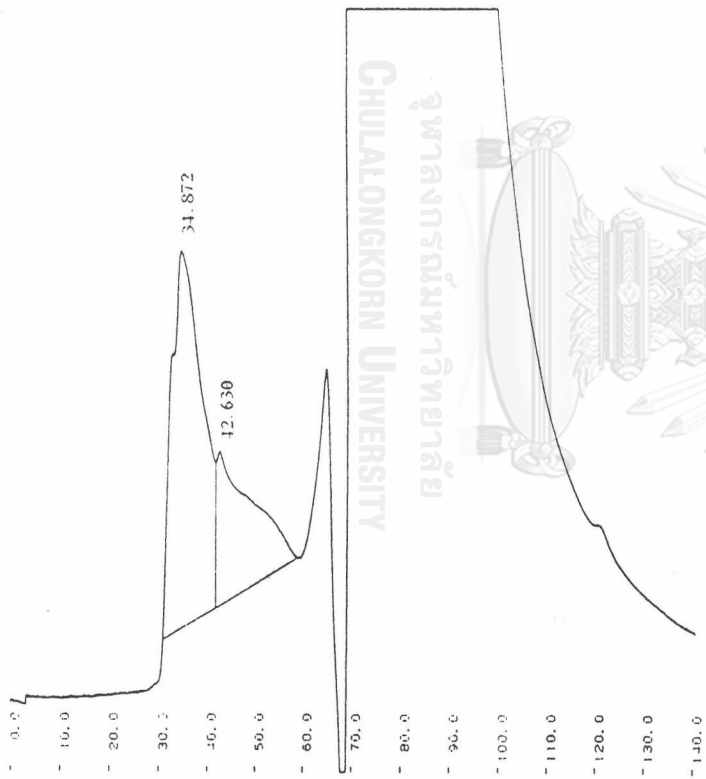
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = | 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = | 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ = | 1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 30.500 | 768179 | 6 |
| top | 32.184 | 571716 | 708 |
| end | 33.500 | 453409 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ = | 578412 | Weight-A.W.M. | $M_w$ = | 583262 |
| Z-A.W.M | $M_z$ = | 588174 | Visc-A.W.M. | $M_v$ = | 582383 |
| Dispersity | $M_w/M_n$ = | 1.00838 | Dispersity | $M_z/M_w$ = | 1.00842 |
| Dispersity | $M_v/M_n$ = | 1.00868 | I.Viscorsiry | I.VISC = | 3132.66113 |




Addition rate = 0.0250 $cm^3/s$

Peak No.1

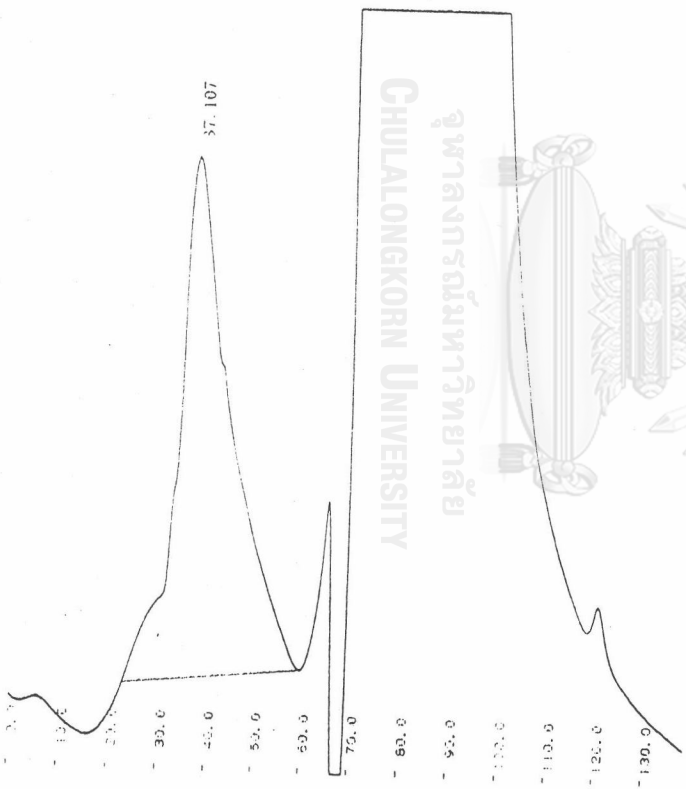
| Peak information | Time(min) | Mol.Size | Height | | |
|---|---|---|---|---|---|
| start | 30.900 | 716839 | 6 | | |
| top | 34.872 | 356054 | 1089 | | |
| end | 41.85 | 104139 | 861 | | |
| Number-A.W.M. | $M_n$ = 249337 | Weight-A.W.M. | $M_w$ | = | 311536 |
| Z-A.W.M | $M_z$ = 374766 | Visc-A.W.M. | $M_v$ | = | 300146 |
| Dispersity | $M_w/M_n$ = 1.24946 | Dispersity | $M_z/M_w$ | = | 1.20296 |
| Dispersity | $M_v/M_n$ = 1.20378 | I.Viscorsiry | I.VISC | = | 2049.61328 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height | | |
|---|---|---|---|---|---|
| start | 41.850 | 104139 | 864 | | |
| top | 42.630 | 90763 | 458 | | |
| end | 58.950 | 5120 | 1 | | |
| Number-A.W.M. | $M_n$ = 28041 | Weight-A.W.M. | $M_w$ | = | 46594 |
| Z-A.W.M | $M_z$ = 63415 | Visc-A.W.M. | $M_v$ | = | 43336 |
| Dispersity | $M_w/M_n$ = 1.66167 | Dispersity | $M_z/M_w$ | = | 1.36100 |
| Dispersity | $M_v/M_n$ = 1.54546 | I.Viscorsiry | I.VISC | = | 593.96594 |

Total data

| Peak information | Time(min) | Mol.Size | Height | | |
|---|---|---|---|---|---|
| start | 30.900 | 716839 | 6 | | |
| top | 34.872 | 356054 | 1089 | | |
| end | 58.950 | 5120 | 1 | | |
| Number-A.W.M. | $M_n$ = 70141 | Weight-A.W.M. | $M_w$ | = | 225769 |
| Z-A.W.M | $M_z$ = 353965 | Visc-A.W.M. | $M_v$ | = | 199551 |
| Dispersity | $M_w/M_n$ = 3.21878 | Dispersity | $M_z/M_w$ | = | 1.56782 |
| Dispersity | $M_v/M_n$ = 2.845 | I.Viscorsiry | I.VISC | = | 1578.39111 |




Addition rate = 0.0333 $cm^3/s$

Peak No.1

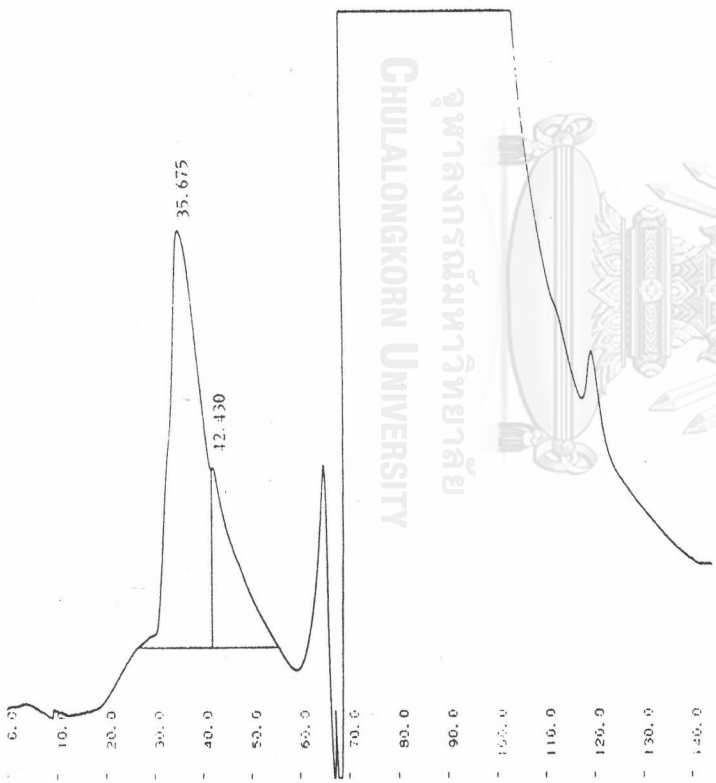
| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 22.650 | 3066546 | 1 |
| top | 37.107 | 240179 | 1490 |
| end | 59.800 | 4408 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 73755 | Weight-A.W.M. | $M_w$ | = | 255895 |
| Z-A.W.M | $M_z$ | = | 668798 | Visc-A.W.M. | $M_v$ | = | 211102 |
| Dispersity | $M_w/M_n$ | = | 3.46952 | Dispersity | $M_z/M_w$ | = | 2.61356 |
| Dispersity | $M_v/M_n$ | = | 2.86219 | I.Viscorsiry | I.VISC | = | 1636.26818 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 22.650 | 3066546 | 1 |
| top | 37.107 | 240179 | 1490 |
| end | 59.800 | 4408 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 73755 | Weight-A.W.M. | $M_w$ | = | 255895 |
| Z-A.W.M | $M_z$ | = | 668798 | Visc-A.W.M. | $M_v$ | = | 211102 |
| Dispersity | $M_w/M_n$ | = | 3.46952 | Dispersity | $M_z/M_w$ | = | 2.61356 |
| Dispersity | $M_v/M_n$ | = | 2.86219 | I.Viscorsiry | I.VISC | = | 1636.26818 |




Addition rate = 0.0417 $cm^3/s$

Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 27.350 | 1339801 | 8 |
| top | 35.675 | 309065 | 1200 |
| end | 42.100 | 99651 | 1036 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 225957 | Weight-A.W.M. | $M_w$ | = 282938 |
| Z-A.W.M | $M_z$ | = 354688 | Visc-A.W.M. | $M_v$ | = 271539 |
| Dispersity | $M_w/M_n$ | = 1.25218 | Dispersity | $M_z/M_w$ | = 1.25359 |
| Dispersity | $M_v/M_n$ | = 1.20173 | I.Viscorsiry | I.VISC | = 1922.34765 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 42.100 | 99651 | 1043 |
| top | 42.430 | 94029 | 526 |
| end | 56.000 | 8609 | 0 |

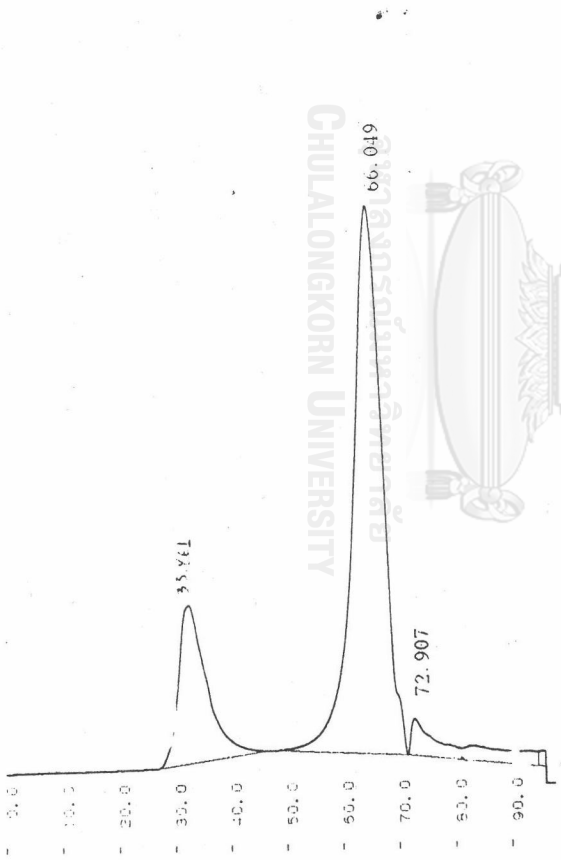
| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 41063 | Weight-A.W.M. | $M_w$ | = 55230 |
| Z-A.W.M | $M_z$ | = 66508 | Visc-A.W.M. | $M_v$ | = 52965 |
| Dispersity | $M_w/M_n$ | = 1.3450 | Dispersity | $M_z/M_w$ | = 1.2042 |
| Dispersity | $M_v/M_n$ | = 1.28938 | I.Viscorsiry | I.VISC | = 675.35314 |

Total data

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 27.350 | 1339801 | 7 |
| top | 35.675 | 309065 | 1200 |
| end | 56.000 | 8609 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = 104540 | Weight-A.W.M. | $M_w$ | = 224018 |
| Z-A.W.M | $M_z$ | = 330297 | Visc-A.W.M. | $M_v$ | = 204347 |
| Dispersity | $M_w/M_n$ | = 2.14288 | Dispersity | $M_z/M_w$ | = 1.47443 |
| Dispersity | $M_v/M_n$ | = 1.95472 | I.Viscorsiry | I.VISC | = 1602.56494 |

# Appendix B.8
## The GFC Chromatographs of the Sodium Alginate 700




Peak No.1

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 27.150 | 1400133 | 2 |
| top | 32.861 | 507406 | 1573 |
| end | 45.950 | 50572 | 1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 362060 | Weight-A.W.M. | $M_w$ | = | 466313 |
| Z-A.W.M | $M_z$ | = | 552912 | Visc-A.W.M. | $M_v$ | = | 449957 |
| Dispersity | $M_w/M_n$ | = | 1.28794 | Dispersity | $M_z/M_w$ | = | 1.18571 |
| Dispersity | $M_v/M_n$ | = | 1.24277 | I.Viscorsiry | I.VISC | = | 2655.88256 |

Peak No.2

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 48.550 | 31987 | 4 |
| top | 66.049 | 1466 | 5458 |
| end | 71.750 | 537 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 1579 | Weight-A.W.M. | $M_w$ | = | 2087 |
| Z-A.W.M | $M_z$ | = | 3496 | Visc-A.W.M. | $M_v$ | = | 1950 |
| Dispersity | $M_w/M_n$ | = | 1.32227 | Dispersity | $M_z/M_w$ | = | 1.67504 |
| Dispersity | $M_v/M_n$ | = | 1.23541 | I.Viscorsiry | I.VISC | = | 81.62599 |

Peak No.3

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 71.750 | 537 | 204 |
| top | 72.907 | 438 | 358 |
| end | 80.950 | 106 | 425 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 247 | Weight-A.W.M. | $M_w$ | = | 299 |
| Z-A.W.M | $M_z$ | = | 344 | Visc-A.W.M. | $M_v$ | = | 290 |
| Dispersity | $M_w/M_n$ | = | 1.21191 | Dispersity | $M_z/M_w$ | = | 1.15176 |
| Dispersity | $M_v/M_n$ | = | 1.17616 | I.Viscorsiry | I.VISC | = | 20.10517 |

Total data (Sodium alginate 700)

| Peak information | Time(min) | Mol.Size | Height |
|---|---|---|---|
| start | 27.150 | 1387854 | 0 |
| top | 66.051 | 1465 | 5452 |
| end | 81.000 | 105 | 2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number-A.W.M. | $M_n$ | = | 1750 | Weight-A.W.M. | $M_w$ | = | 100981 |
| Z-A.W.M | $M_z$ | = | 543622 | Visc-A.W.M. | $M_v$ | = | 47395 |
| Dispersity | $M_w/M_n$ | = | 57.69259 | Dispersity | $M_z/M_w$ | = | 5.3834 |
| Dispersity | $M_v/M_n$ | = | 27.07777 | I.Viscorsiry | I.VISC | = | 628.99755 |

# Appendix C

## The Differential Scanning Calorimetry Curve of Hydrolyzed Starch-*g*-Poly(acrylic acid) and Sodium Alginate-700

A NETZSCH heat flux DSC 200 was used for the calorimetric studues on hydrolyzed starch-*g*-poly(acrylic acid) and sodium alginate-700. Pan aluminium, pierced lid, nitrogen atmosphere and heating rate 10°C were used.

The DSC curves of the hydrolyzed starch-*g*-poly(acrylic acid) and sodium alginate were shown in Figure C.1 and C.2, respectively.

In Figure C.1 the decomposition of hydrolyzed starch-*g*-poly(acrylic acid) is at 230.5°C (decomposition temperature, $T_d$). For sodium alginate-700, the decomposition temperature is at 197.3°C (Figure C.2).

The prime function of thickener in textile printing is to enable the dyestuff or pigment to be transfered to the fabric at the printing stage and contain the dye within the printed area during drying. Furthermore, the thickening agent must not breakdown during steaming or any drying fixation by heat. From the DSC curve, it shows that the decomposition temperature of hydrolyzed starch-*g*-poly(acrylic acid) is higher than $T_d$ of sodium alginate, then hydrolyzed starch-*g*-poly(acrylic acid) is better in heat resistance.

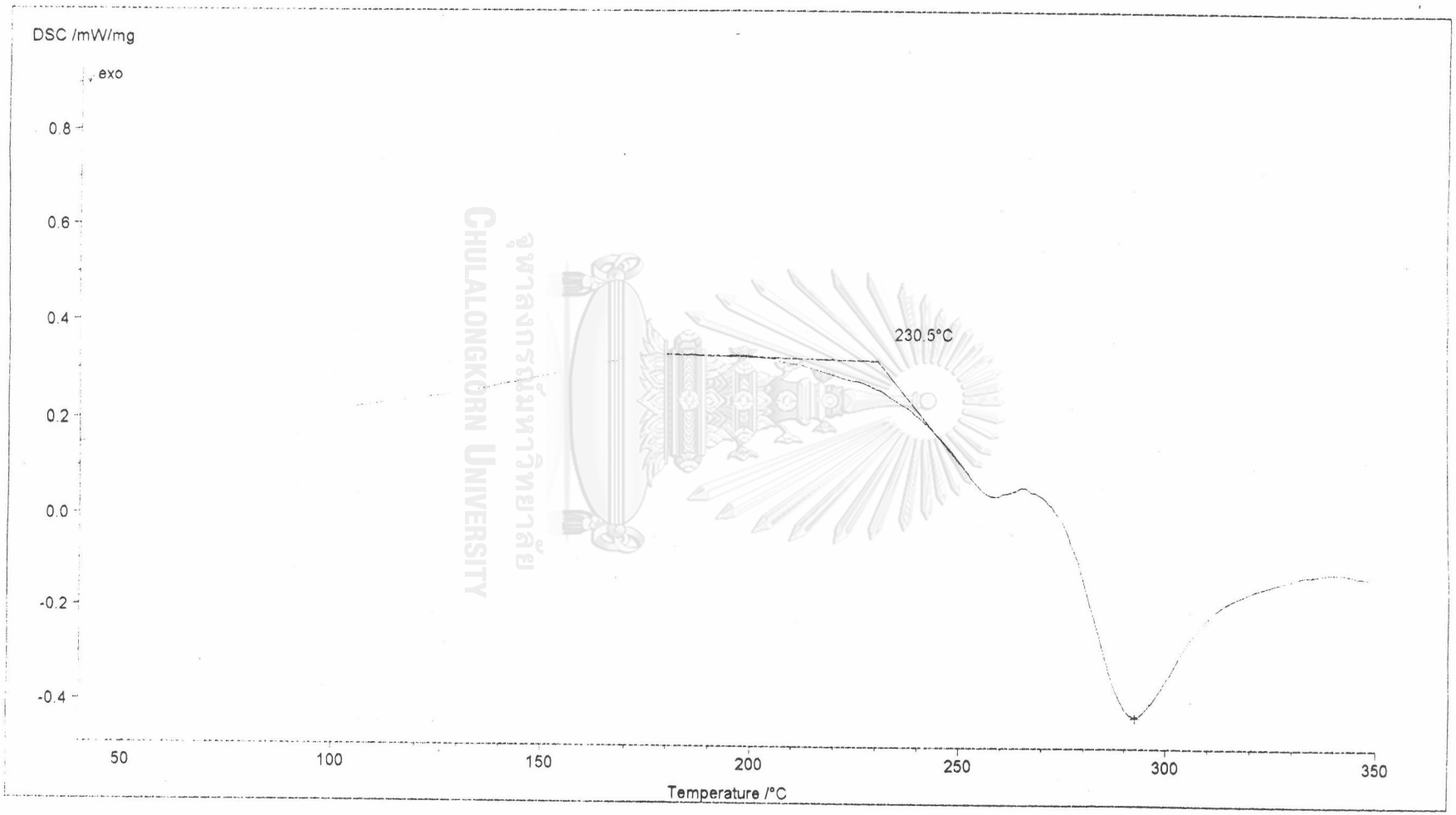



Figure C.1 The Differential Scanning Calorimetry Curve of Hydrolyzed Starch-*g*-Poly(acrylic acid)

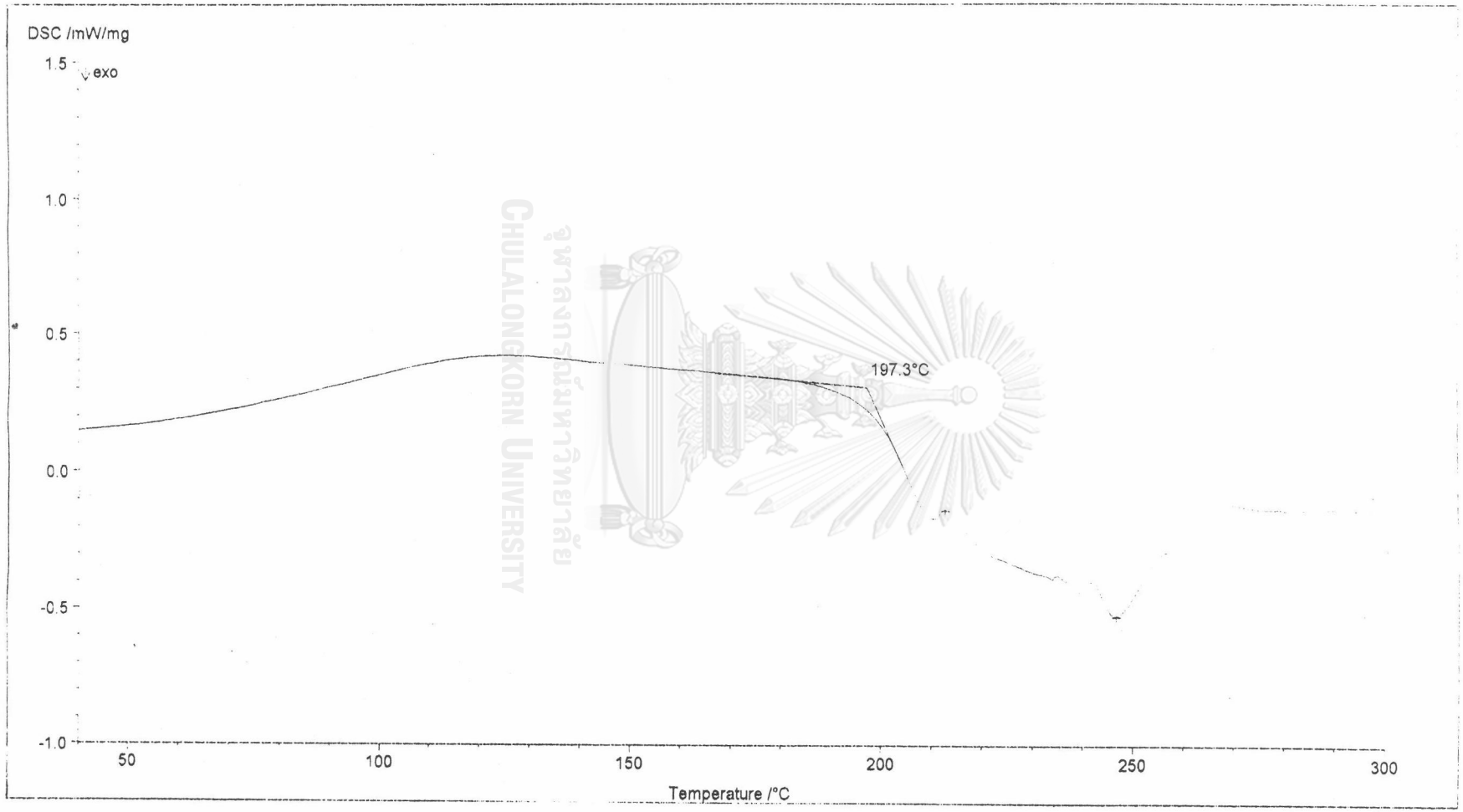



Figure C.2 The Differential Scanning Calorimetry Curve of Sodium Alginate-700

# VITA

Miss Suruck Arayamaythalert was born on January 10, 1972, in Bangkok. She received her B.Sc. in Chemistry from Faculty of Science, Srinakharinwirot University in 1993. She began her masters degree study in Polymer Science, Multi-disciplinary Program of Petrochemistry and Polymer, Chulalongkorn University in 1993.