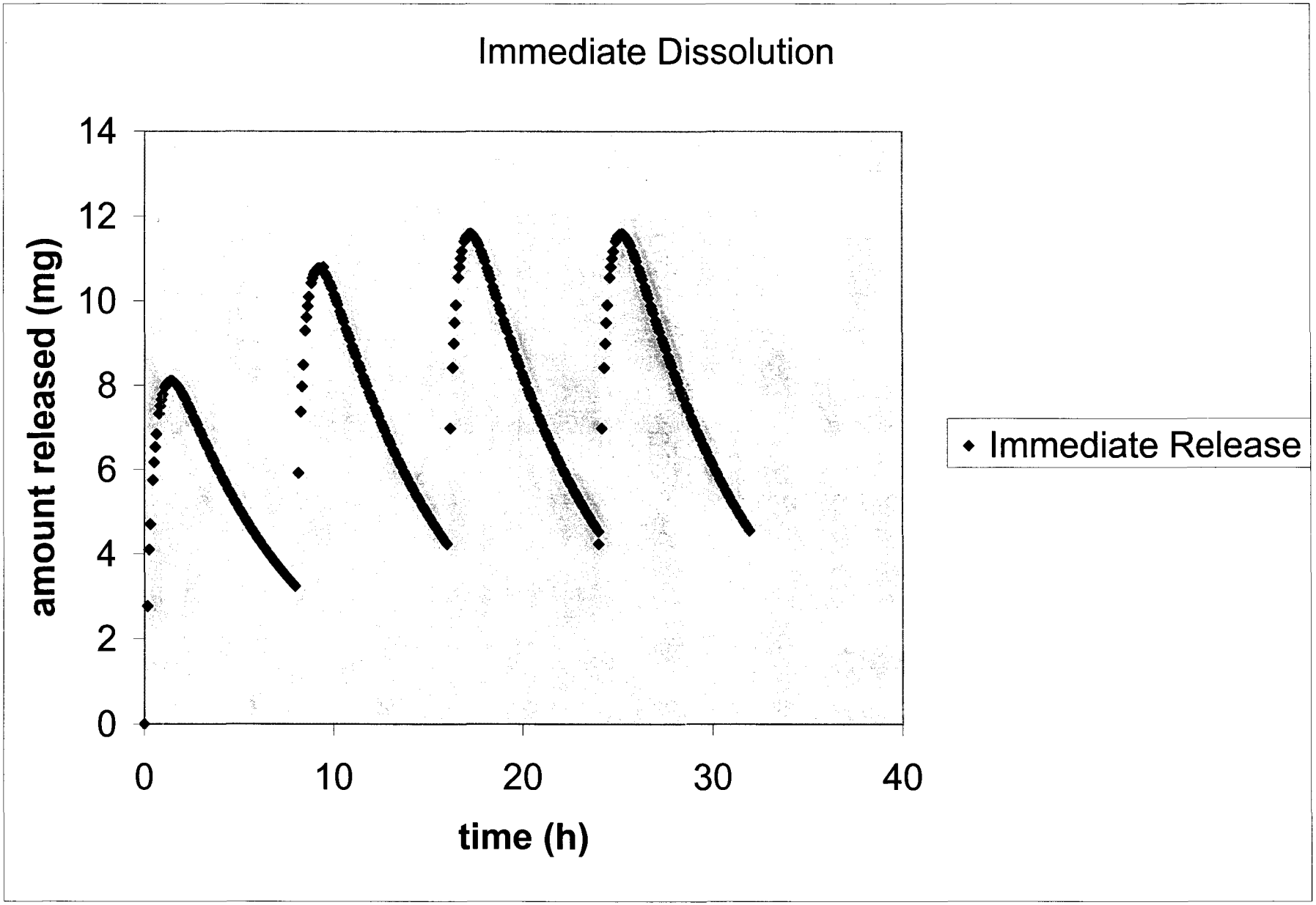
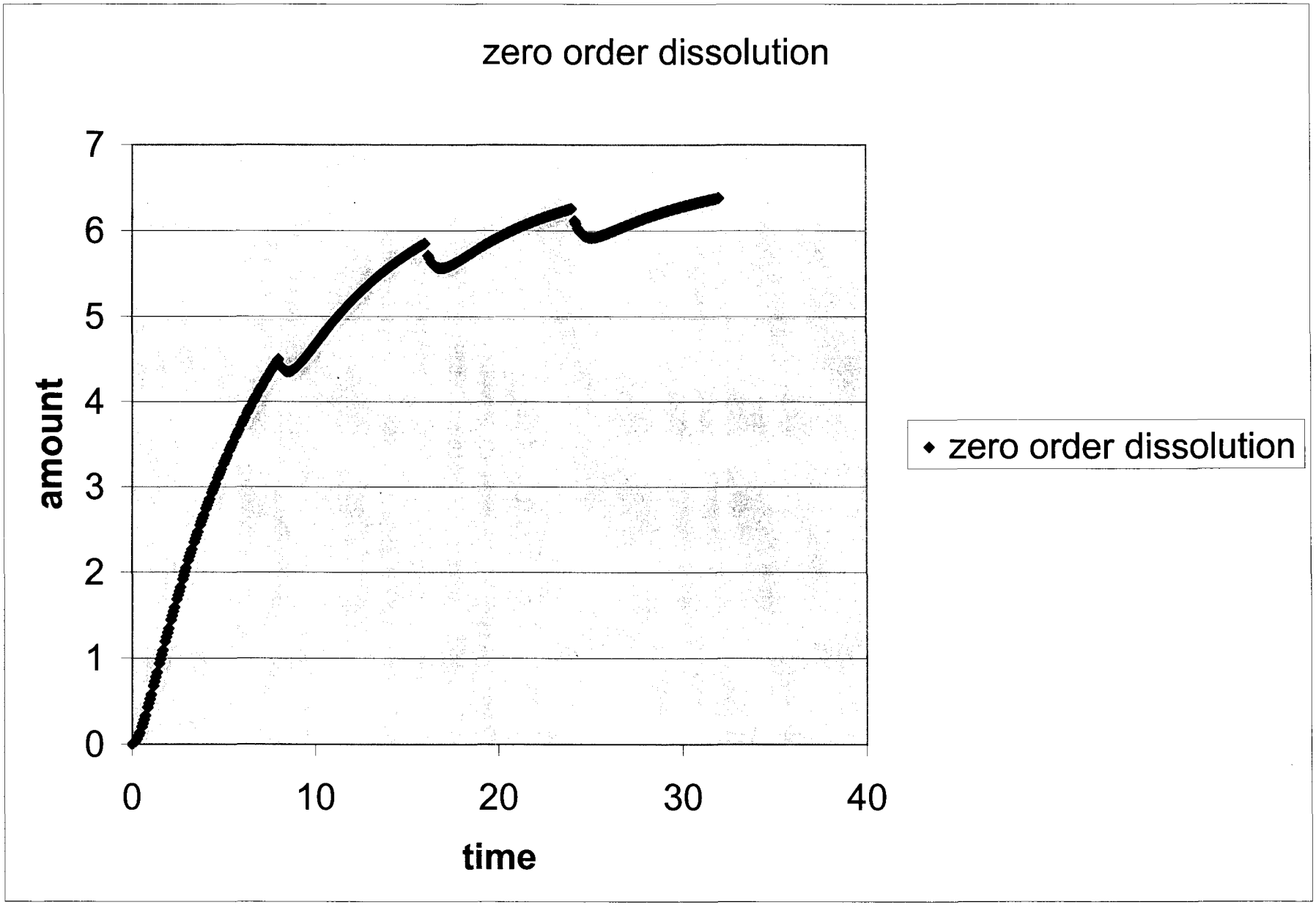
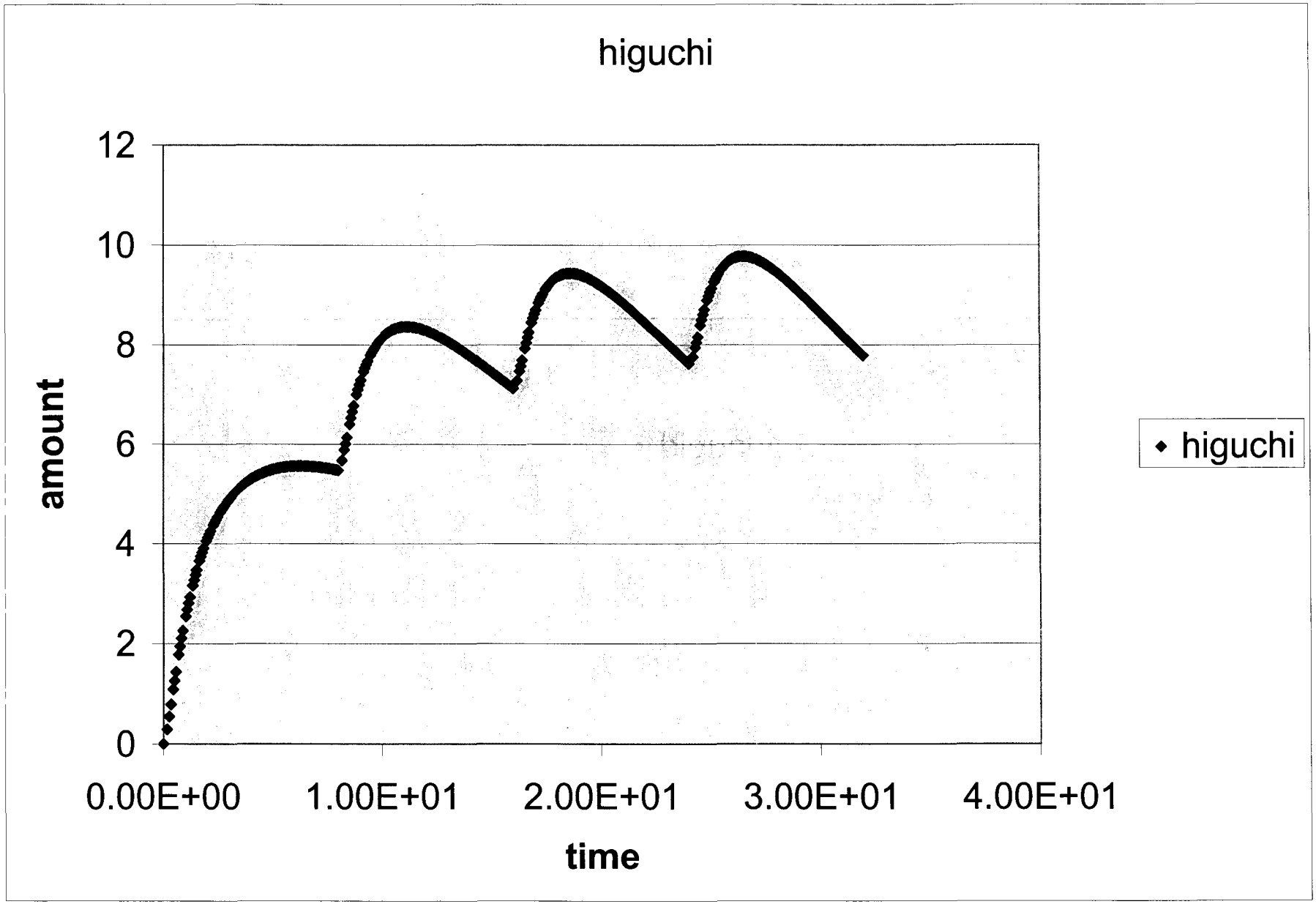
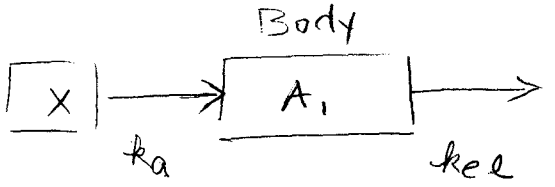

Immediate Dissolution
amount released (mg)
14
12
10
8
6
4
2
0
0
10
20
30
40
time (h)
Immediate Release


zero order dissolution
amount
7
6
5
4
3
2
1
0
0
10
20
30
40
time
zero order dissolution


higuchi
12
10
8
6
4
2
0
amount
0.00E+00
1.00E+01
2.00E+01
3.00E+01
4.00E+01
time
higuchi

# Oral Dosage Forms

1st order absorption + elimination




$k_a = 2\ h^{-1}$

$k_{el} = 0.15\ h^{-1}$

$$\frac{dA_1}{dt} = k_a X - k_{el} A_1$$

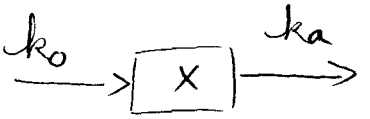
Case 1 - immediate dissolution of tablet

so that at $t = 0$ $\quad X = D =$ D = 10 mg

$$\frac{dX}{dt} = -k_a X$$

excreted after 8 h

Case 2 - zero order dissolution




$$\frac{dX}{dt} = k_0 - k_a X$$

$k_0$ ↑ $\frac{mg}{h}$

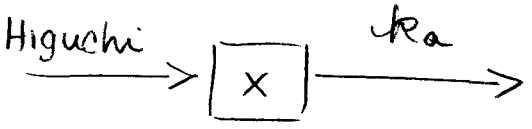
with $X(0) = 0$

$k_0 = 1\ \frac{mg}{h}$

assume excreted after 8 h

Case 3

Higuchi dissolution




$$\frac{dX}{dt} = \frac{\sqrt{D C_S C_T}}{2\sqrt{t}} - k_a X \quad \text{with} \quad X(0) = 0$$

$$\frac{dX}{dt} = \frac{2}{\sqrt{t}} \, mg \cdot h^{1/2} - k_a X$$

Case 1 - repeat dose after 8 h

assume X gets excreted

at 8 h al = 3.256 mg — max = 8.086 mg at t = 1.53 h

at 16 h al = 4.24 mg — max = 10.8 mg at t = 9.49 h

at 24 h al = 4.53 mg — max = 11.55 mg at t = 17.37 h

at 32 h al = 4.55 mg — max = 11.555 at t = 25.37

Toxic after 1st dose.

Case 2

at 8 h al = 4.49

16 h al = 5.84

24 h al = 6.255

32 h al = 6.379

Case 3 Higuchi

$$\frac{dx}{dt} = \frac{0.949}{\sqrt{t}}$$

$t = 8$ $a1 = 5.357$

$t = 16$ $a1 =$