BIO-BASED STARCH FILMS FROM RIPE PLANTAIN PEELS: KINETIC MODELLING AND PHYSICOMECHANICAL ASSESSMENT (Data availability statement)

Cosmos Kojo Boateng [a, b*], Persis Tweneboah [c], Arafat Mohammed [c]

[a,] Department of Applied Chemistry, School of Chemical and Biochemical Sciences, C. K. Tedam University of Technology and Applied Sciences, Navrongo, Ghana.

[b] Regional water & Environmental Sanitation Centre Kumasi (RWESCK) Laboratories, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

[c] Department of Biochemistry and Forensic Sciences, School of Chemical and Biochemical Sciences, C. K. Tedam University of Technology and Applied Sciences, Navrongo, Ghana.

*Corresponding author E-mail address: cosmosboateng060@gmail.com

1. Biodegradability studies

Week	Weight (g) at a particular time	Difference between initial and final weight (g)
0	7.000	7.000
1	2.532	4.468
2	2.130	4.870
3	1.424	5.576
4	0.706	6.234

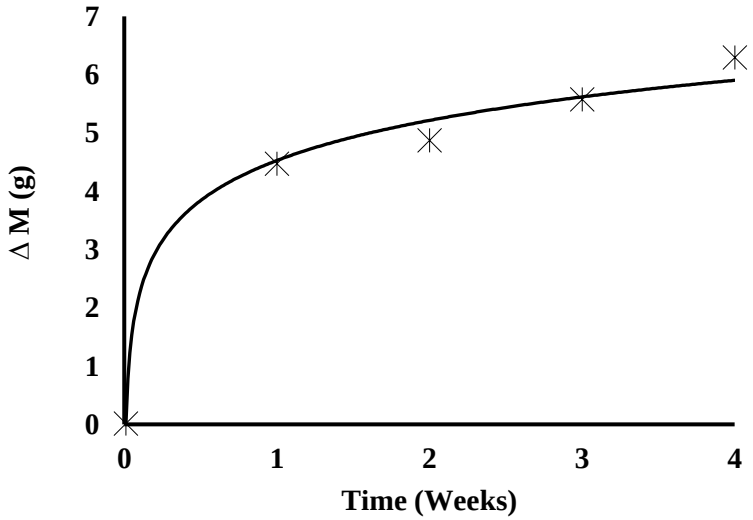

***Figure 1**: Biodegradation curve of RPP bioplastic film showing rapid early mass loss and gradual stabilization over 28 days*

2. Kinetic Studies
    1. First Order Kinetic Model [Time Vs Ln(W_t/W_o)]

Time (week)	Weight (g) at a particular time (W_t)	Initial weight (g) (W_0)	W_t/W_0	Ln(W_t/W_0)
0	7.000	7.000	1.000	0
1	2.532	7.000	0.362	-1.017
2	2.130	7.000	0.304	-1.188
3	1.424	7.000	0.203	-1.592
4	0.706	7.000	0.101	-2.294

    2. Zero Order Kinetic Model (Time Vs W_t)

Time (week)	Weight (g) at a particular time (W_t)
1	2.532
2	2.130
3	1.424
4	0.706

    3. Second Order Kinetic Model (Time Vs $1/W_t$)

Time (week)	Weight (g) at a particular time (W_t)	$1/W_t$
1	2.532	0.395
2	2.130	0.469
3	1.424	0.702
4	0.706	1.416

    4. Korsmeyer–Peppas model [Ln(Time) Vs Ln($\Delta W/W_o$)]

Time	Ln(Time)	$\Delta W=(W_o-W_t)$	$\Delta W/W_o$	Ln($\Delta W/W_o$)
1	0.000	4.468	0.638	-0.449
2	0.693	4.870	0.696	-0.362
3	1.097	5.903	0.843	-0.171
4	1.386	5.614	0.802	-0.221

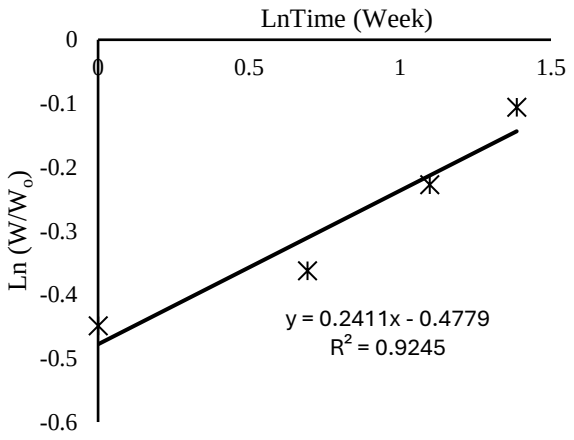

Figure 1: *Korsmeyer–Peppas model*

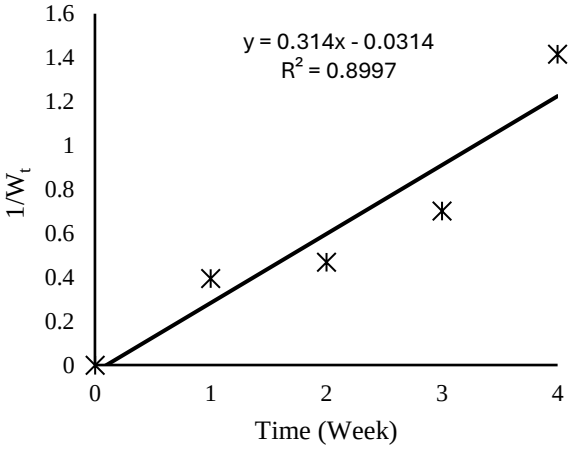

Figure 3: *Second Order Kinetics Model*

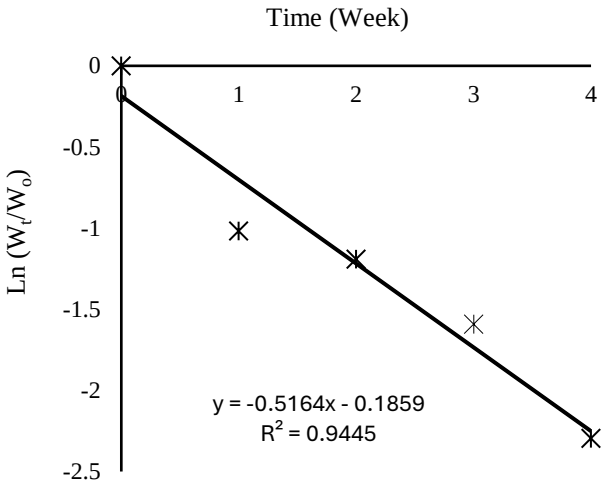

Figure 4*: First Order Kinetics Model*

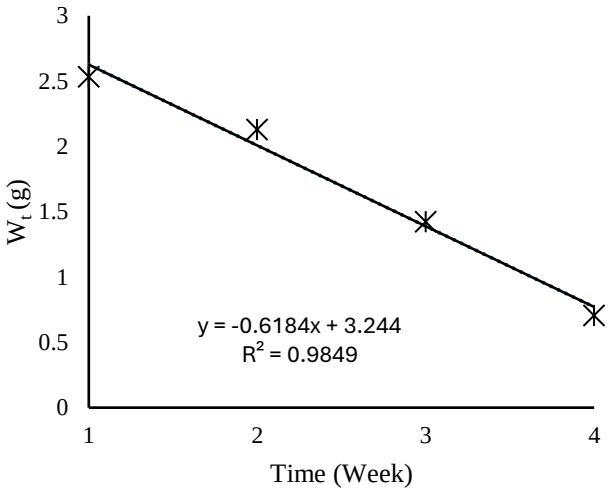

Figure 5*: Zero Order Kinetics Model*