



Experiment Title:

pH Stability on the enzymatic activity

Prefix. Experiment Code:

pHStb.TII

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: lunes, 11 de mayo de 2020

Finish Date: viernes, 15 de mayo de 2020

Goal and Observations:

Determine the enzymatic activity of the free Laccase enzyme and the bionanocompounds by spectrophotometric measurement with ABTS as oxidation substrate.

(ABTS Solution: 550 mg -> 50 mL H₂O milli Q 1:10)

Follow up of the experimentation:

Experiment Code	Description	Starting Date	Finish Date	Location	Result
pHStb.TII-JN-Exp-1	Spectrophotometric measurement for Free Laccase Enzyme -> D.2JN	11/05/2020	11/05/2020	H-Lab	Repeat
pHStb.TII-JN-Exp-2	Spectrophotometric measurement for Free Laccase Enzyme -> D.3JN	11/05/2020	11/05/2020	H-Lab	Good
pHStb.TII-JN-Exp-3	Spectrophotometric measurement for supernatant -> SA_2020	12/05/2020	12/05/2020	H-Lab	Good
pHStb.TII-JN-Exp-4	Spectrophotometric measurement for bionanocompound -> A_2020	12/05/2020	14/05/2020	H-Lab	Repeat
pHStb.TII-JN-Exp-5	Spectrophotometric measurement for bionanocompound -> A_2020	15/05/2020	15/05/2020	H-Lab	Good

Sample numbering/codification:

Prefix. Code	Description	Qty.	Location
D.2JN	D1 Laccase enzyme solution from Mexico diluted on 2mL	1	H-Lab
D.3JN	D.2JN Laccase enzyme solution from Mexico diluted on 3mL	1	H-Lab
D.2JN-Bk	Data of the spectrophotometric measurement for the Blank for D.2JN	1	Onedrive
D.2JN-ABTS.Ctl	Data of the spectrophotometric measurement for the ABTS-Control for D.2JN	1	Onedrive
D.2JN-pH	Data of the spectrophotometric measurement for the D.2JN Enzyme at pH XX	5	Onedrive
D.3JN-Bk	Data of the spectrophotometric measurement for the Blank for D.3JN	1	Onedrive
D.3JN-ABTS.Ctl	Data of the spectrophotometric measurement for the ABTS-Control for D.3JN	1	Onedrive
D.3JN-pH	Data of the spectrophotometric measurement for the D.3JN Enzyme at pH XX	5	Onedrive
SA_2020-Bk	Data of the spectrophotometric measurement for the Blank for SA_2020	1	Onedrive
SA_2020-ABTS.Ctl	Data of the spectrophotometric measurement for the ABTS-Control for SA_2020	1	Onedrive
SA_2020-pH	Data of the spectrophotometric measurement for the SA_2020 Enzyme at pH XX	5	Onedrive
A_2020-Bk	Data of the spectrophotometric measurement for the Blank for A_2020	1	Onedrive
A_2020-ABTS.Ctl	Data of the spectrophotometric measurement for the ABTS-Control for A_2020	1	Onedrive
A_2020-pH	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH XX	5	Onedrive



List of Reagents and/or materials:

CAS N°	Name of Reagent or material	Provider	Lot number	Qty.	Units	Location
30931-67-0	2,2-azino-bis(3-ethylbenzothiazoline-6) sulphonic acid (ABTS)	Sigma-Aldrich (USA)	-	552,00	mg	Sala Limpia



Experiment Title:

pH Stability on the enzymatic activity

Experiment Code:

pHStb.TII-JN-Exp-1

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: lunes, 11 de mayo de 2020

Finish Date: lunes, 11 de mayo de 2020

Laboratory Data:

H-Lab

Description of the experiment:

Spectrophotometric measurement for Free Laccase Enzyme -> D.2JN.

Follow up of the experimentation:

Step	Description	Starting Date	Finish Date	Sample Prefix
1	Take 200 uL of D1 Laccase Mex and gauge with H2O milli Q to 2 mL of solution	11/05/2020	11/05/2020	
2	Manually mix vigorously and store refrigerated	11/05/2020	11/05/2020	D.2JN
3	Prepare 7 clean absorbance cells (Blank, ABTS-Control, Buffers pH: 2-3-4-5-6)	11/05/2020	11/05/2020	
4	Place 950 uL of the corresponding Buffer (pH: 2-3-4-5-6, Blank and Control: H2O milliQ)	11/05/2020	11/05/2020	
5	Place 200 uL of the corresponding sample -> D.2JN (Blank and Control: H2O milliQ)	11/05/2020	11/05/2020	
6	Add 350 uL of H2O milli Q to the Blank cell and place it on the spectrophotometer to measure the baseline	11/05/2020	11/05/2020	D.2JN-Bk
7	Add 350 uL of ABTS solution to the ABTS-Control cell and place it on the spectrophotometer to measure the baseline again	11/05/2020	11/05/2020	D.2JN-ABTS.Ctl
8	Place each cell on the corresponding space and previous to each measurement add 350 uL of ABTS solution	11/05/2020	11/05/2020	
9	Measure the absorbance change during 1 min for each sample	11/05/2020	11/05/2020	D.2JN-pH
10	Collect all the cells, eliminate the residues present and clean delicately	11/05/2020	11/05/2020	

Samples generated:

Sample Code	Description	Replicas	Units	Location
D.2JN	D1 Laccase enzyme solution from Mexico diluted on 2mL	1,00		H-Lab
D.2JN-Bk	Data of the spectrophotometric measurement for the Blank	1,00		Onedrive
D.2JN-ABTS.Ctl	Data of the spectrophotometric measurement for the ABTS-Control	1,00		Onedrive
D.2JN-pH2	Data of the spectrophotometric measurement for the D.2JN Enzyme at pH 2	1,00		Onedrive
D.2JN-pH3	Data of the spectrophotometric measurement for the D.2JN Enzyme at pH 3	1,00		Onedrive
D.2JN-pH4	Data of the spectrophotometric measurement for the D.2JN Enzyme at pH 4	1,00		Onedrive
D.2JN-pH5	Data of the spectrophotometric measurement for the D.2JN Enzyme at pH 5	1,00		Onedrive
D.2JN-pH6	Data of the spectrophotometric measurement for the D.2JN Enzyme at pH 6	1,00		Onedrive



Measurement:

Date	Type	Sample	Replica 1	Replica 2	Replica 3	Replica 4	Replica 5	Average	Units
11/05/2020	Spectrophotometric measurement	Blank Cell	0,000					0	min [^] (-1)
11/05/2020	Spectrophotometric measurement	ABTS-Control Cell	0,061					0,061	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°1 - D.2JN - pH2	3,107					3,107	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°2 - D.2JN - pH3	2,860					2,86	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°3 - D.2JN - pH4	2,460					2,46	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°4 - D.2JN - pH5	1,384					1,384	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°5 - D.2JN - pH6	0,094					0,094	min [^] (-1)

Summary of results:

REPEAT -> The maximum value for all the samples must be ≤ 1 to have a lineal behave, as the maximum obtained is higher, the sample must be diluted and measure again.



Experiment Title:

pH Stability on the enzymatic activity

Experiment Code:

pHStb.TII-JN-Exp-1

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: lunes, 11 de mayo de 2020

Finish Date: lunes, 11 de mayo de 2020

Description of data analysis:

Determine the enzymatic activity by the Lambert-Beer equation using the value of absorbance change in time obtained.

$$\text{Actividad Enzimática} \left[\frac{U}{L} \right] = \frac{\Delta \frac{ABS}{t}}{\varepsilon \cdot d} \cdot \text{Factor de dilución}$$

$$\text{Actividad Enzimática} \left[\frac{U}{L} \right] = \frac{\frac{1}{\text{min}}}{M^{-1} \text{cm}^{-1} \cdot \text{cm}} \cdot \frac{\mu\text{t}}{\mu\text{t}} = \frac{\text{mol}}{\text{min} \cdot L} = 1 \cdot 10^6 \frac{\mu\text{mol}}{\text{min} \cdot L} = 1 \cdot 10^6 \frac{L}{L}$$

$$\Delta \frac{ABS}{t} \left[\frac{1}{\text{min}} \right] = \text{Valor dado por el espectrofotómetro}$$

ε	Coeficiente de extinción	[M ⁻¹ cm ⁻¹]	29300	Factor de dilución	V.Tol/V.m	7,5
d	Distancia haz de luz a la muestra	cm	1	Volumen de muestra usado	[uL]	200
				Volumen Total en la celda	[uL]	1500

N°1 Calculation and/or formula: Enzymatic activity

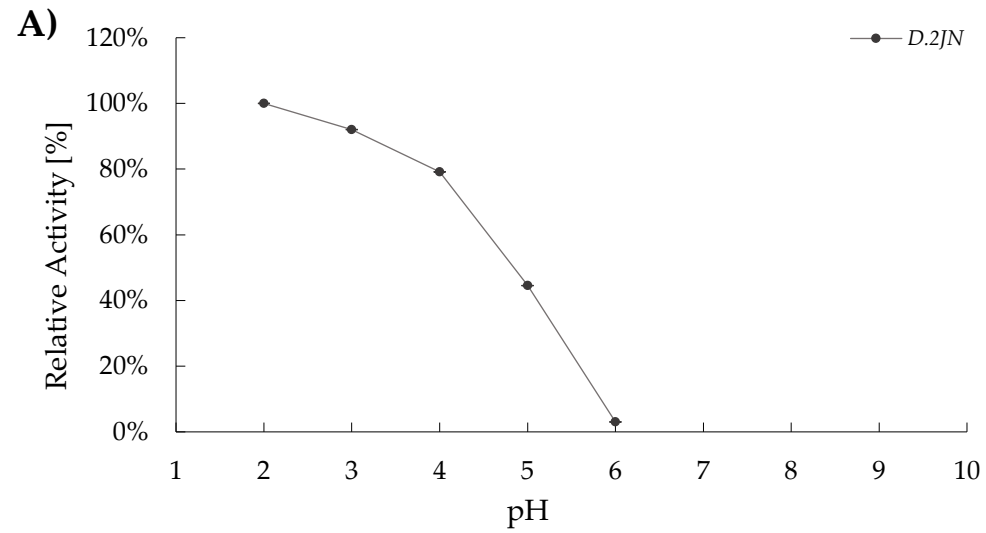
Date	Sample	pH	Replica 1	Replica 2	Replica 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00			0,00	0,00	0,00	U/L
11/05/2020	ABTS-Control Cell	-	0,00			0,00	0,00	0,00	U/L
11/05/2020	Cell N°1 - D.2JN - pH2	2	795,31			795,31	0,00	0,00	U/L
11/05/2020	Cell N°2 - D.2JN - pH3	3	732,08			732,08	0,00	0,00	U/L
11/05/2020	Cell N°3 - D.2JN - pH4	4	629,69			629,69	0,00	0,00	U/L
11/05/2020	Cell N°4 - D.2JN - pH5	5	354,27			354,27	0,00	0,00	U/L
11/05/2020	Cell N°5 - D.2JN - pH6	6	24,06			24,06	0,00	0,00	U/L

N°2 Calculation and/or formula: Relative activity

Date	Sample	pH	Relative Act. % 1	Relative Act. % 2	Relative Act. % 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00%			0,00%	0,00%	0,00%	%
11/05/2020	ABTS-Control Cell	-	0,00%			0,00%	0,00%	0,00%	%
11/05/2020	Cell N°1 - D.2JN - pH2	2	100,00%			100,00%	0,00%	0,00%	%
11/05/2020	Cell N°2 - D.2JN - pH3	3	92,05%			92,05%	0,00%	0,00%	%
11/05/2020	Cell N°3 - D.2JN - pH4	4	79,18%			79,18%	0,00%	0,00%	%
11/05/2020	Cell N°4 - D.2JN - pH5	5	44,54%			44,54%	0,00%	0,00%	%
11/05/2020	Cell N°5 - D.2JN - pH6	6	3,03%			3,03%	0,00%	0,00%	%



Final table and/or graphic:




Experiment Title:

pH Stability on the enzymatic activity

Experiment Code:

pHStb.TII-JN-Exp-2

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: lunes, 11 de mayo de 2020

Finish Date: lunes, 11 de mayo de 2020

Laboratory Data:

H-Lab

Description of the experiment:

Spectrophotometric measurement for Free Laccase Enzyme -> D.3JN.

Follow up of the experimentation:

Step	Description	Starting Date	Finish Date	Sample Prefix
1	Take 300 uL of D.2JN and gauge with H2O milli Q to 3 mL of solution	11/05/2020	11/05/2020	
2	Manually mix vigorously and store refrigerated	11/05/2020	11/05/2020	D.3JN
3	Prepare 10 clean absorbance cells (Blank, ABTS-Control, Buffers pH: 2-3-4-4.5-5-6-7-10)	11/05/2020	11/05/2020	
4	Place 950 uL of the corresponding Buffer (pH: 2-3-4-4.5-5-6-7-10, Blank and Control: H2O milliQ)	11/05/2020	11/05/2020	
5	Place 200 uL of the corresponding sample -> D.2JN (Blank and Control: H2O milliQ)	11/05/2020	11/05/2020	
6	Add 350 uL of H2O milli Q to the Blank cell and place it on the spectrophotometer to measure the baseline	11/05/2020	11/05/2020	D.3JN-Bk
7	Add 350 uL of ABTS solution to the ABTS-Control cell and place it on the spectrophotometer to measure the baseline again	11/05/2020	11/05/2020	D.3JN-ABTS.Ctl
8	Place each cell on the corresponding space and previous to each measurement add 350 uL of ABTS solution	11/05/2020	11/05/2020	
9	Measure the absorbance change during 1 min for each sample	11/05/2020	11/05/2020	D.3JN-pH
10	Collect all the cells, eliminate the residues present and clean delicately	11/05/2020	11/05/2020	

Samples generated:

Sample Code	Description	Replicas	Units	Location
D.3JN	D.2JN Laccase enzyme solution from Mexico diluted on 3mL	1,00		H-Lab
D.3JN-Bk	Data of the spectrophotometric measurement for the Blank	1,00		Onedrive
D.3JN-ABTS.Ctl	Data of the spectrophotometric measurement for the ABTS-Control	1,00		Onedrive
D.3JN-pH2	Data of the spectrophotometric measurement for the D.3JN Enzyme at pH 2	1,00		Onedrive
D.3JN-pH3	Data of the spectrophotometric measurement for the D.3JN Enzyme at pH 3	1,00		Onedrive
D.3JN-pH4	Data of the spectrophotometric measurement for the D.3JN Enzyme at pH 4	1,00		Onedrive
D.3JN-pH4.5	Data of the spectrophotometric measurement for the D.3JN Enzyme at pH 4.5	1,00		Onedrive
D.3JN-pH5	Data of the spectrophotometric measurement for the D.3JN Enzyme at pH 5	1,00		Onedrive



D.3JN-pH6	Data of the spectrophotometric measurement for the D.3JN Enzyme at pH 6	1,00		Onedrive
D.3JN-pH7	Data of the spectrophotometric measurement for the D.3JN Enzyme at pH 7	1,00		Onedrive
D.3JN-pH10	Data of the spectrophotometric measurement for the D.3JN Enzyme at pH 10	1,00		Onedrive

Measurement:

Date	Type	Sample	Replica 1	Replica 2	Replica 3	Replica 4	Replica 5	Average	Units
11/05/2020	Spectrophotometric measurement	Blank Cell	0,000	0,000	0,000			0,000	min [^] (-1)
11/05/2020	Spectrophotometric measurement	ABTS-Control Cell	0,000	0,000	0,000			0,000	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°1 - D.3JN - pH2	0,177	0,175	0,176			0,176	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°2 - D.3JN - pH3	0,168	0,160	0,184			0,171	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°3 - D.3JN - pH4	0,135	0,123	0,131			0,130	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°3 - D.3JN - pH4.5	0,125	0,117	0,121			0,121	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°4 - D.3JN - pH5	0,074	0,066	0,067			0,069	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°5 - D.3JN - pH6	0,004	0,004	0,003			0,004	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°5 - D.3JN - pH7	0,000	0,001	-0,002			0,000	min [^] (-1)
11/05/2020	Spectrophotometric measurement	Cell N°5 - D.3JN - pH10	-0,014	-0,011	-0,002			-0,009	min [^] (-1)

Summary of results:

GOOD -> The maximum value for all the samples is lower than 1 so it has a lineal behave.



Experiment Title:

pH Stability on the enzymatic activity

Experiment Code:

pHStb.TII-JN-Exp-2

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: lunes, 11 de mayo de 2020

Finish Date: lunes, 11 de mayo de 2020

Description of data analysis:

Determine the enzymatic activity by the Lambert-Beer equation using the value of absorbance change in time obtained.

$$\text{Actividad Enzimática} \left[\frac{U}{L} \right] = \frac{\Delta \frac{ABS}{t}}{\varepsilon \cdot d} \cdot \text{Factor de dilución}$$

$$\text{Actividad Enzimática} \left[\frac{U}{L} \right] = \frac{\frac{1}{\text{min}}}{M^{-1} \text{cm}^{-1} \cdot \text{cm}} \cdot \frac{\mu\text{t}}{\mu\text{t}} = \frac{\text{mol}}{\text{min} \cdot L} = 1 \cdot 10^6 \frac{\mu\text{mol}}{\text{min} \cdot L} = 1 \cdot 10^6 \frac{L}{L}$$

$$\Delta \frac{ABS}{t} \left[\frac{1}{\text{min}} \right] = \text{Valor dado por el espectrofotómetro}$$

ε	Coeficiente de extinción	[M ⁻¹ cm ⁻¹ (-1)]	29300	Factor de dilución	V.Tol/V.m	7,5
d	Distancia haz de luz a la muestra	cm	1	Volumen de muestra usado	[uL]	200
				Volumen Total en la celda	[uL]	1500

N°1 Calculation and/or formula: Enzymatic activity D.3JN

Date	Sample	pH	Replica 1	Replica 2	Replica 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00	0,00	0,00	0,00	0,00	0,00	U/L
11/05/2020	ABTS-Control Cell	-	0,00	0,00	0,00	0,00	0,00	0,00	U/L
11/05/2020	Cell N°1 - D.3JN - pH2	2,0	45,31	44,80	45,05	45,05	0,26	0,26	U/L
11/05/2020	Cell N°2 - D.3JN - pH3	3,0	43,00	40,96	47,10	43,69	2,73	3,41	U/L
11/05/2020	Cell N°3 - D.3JN - pH4	4,0	34,56	31,48	33,53	33,19	1,71	1,37	U/L
11/05/2020	Cell N°3 - D.3JN - pH4.5	4,5	32,00	29,95	30,97	30,97	1,02	1,02	U/L
11/05/2020	Cell N°4 - D.3JN - pH5	5,0	18,94	16,89	17,15	17,66	0,77	1,28	U/L
11/05/2020	Cell N°5 - D.3JN - pH6	6,0	1,02	1,02	0,77	0,94	0,17	0,09	U/L
11/05/2020	Cell N°5 - D.3JN - pH7	7,0	0,00	0,26	0,00	0,09	0,09	0,17	U/L
11/05/2020	Cell N°5 - D.3JN - pH10	10,0	0,00	0,00	0,00	0,00	0,00	0,00	U/L

N°2 Calculation and/or formula: Relative activity D.3JN

Date	Sample	pH	Relative Act. % 1	Relative Act. % 2	Relative Act. % 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	ABTS-Control Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	Cell N°1 - D.3JN - pH2	2,0	100,57%	99,43%	100,00%	100,00%	0,57%	0,57%	%
11/05/2020	Cell N°2 - D.3JN - pH3	3,0	95,45%	90,91%	104,55%	96,97%	6,06%	7,58%	%



11/05/2020	Cell N°3 - D.3JN - pH4	4,0	76,70%	69,89%	74,43%	73,67%	3,79%	3,03%	%
11/05/2020	Cell N°3 - D.3JN - pH4.5	4,5	71,02%	66,48%	68,75%	68,75%	2,27%	2,27%	%
11/05/2020	Cell N°4 - D.3JN - pH5	5,0	42,05%	37,50%	38,07%	39,20%	1,70%	2,84%	%
11/05/2020	Cell N°5 - D.3JN - pH6	6,0	2,27%	2,27%	1,70%	2,08%	0,38%	0,19%	%
11/05/2020	Cell N°5 - D.3JN - pH7	7,0	0,00%	0,57%	0,00%	0,19%	0,19%	0,38%	%
11/05/2020	Cell N°5 - D.3JN - pH10	10,0	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%

Sample	Dilution Factor
D.2JN Laccase Mex	10
D1 Laccase Mex	10

N°3 Calculation and/or formula: Enzymatic activity D.1

Date	Sample	pH	Replica 1	Replica 2	Replica 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00	0,00	0,00	0,00	0,00	0,00	U/L
11/05/2020	ABTS-Control Cell	-	0,00	0,00	0,00	0,00	0,00	0,00	U/L
11/05/2020	D.1 - pH2	2,0	4530,72	4479,52	4505,12	4505,12	25,60	25,60	U/L
11/05/2020	D.1 - pH3	3,0	4300,34	4095,56	4709,90	4368,60	273,04	341,30	U/L
11/05/2020	D.1 - pH4	4,0	3455,63	3148,46	3353,24	3319,11	170,65	136,52	U/L
11/05/2020	D.1 - pH4.5	4,5	3199,66	2994,88	3097,27	3097,27	102,39	102,39	U/L
11/05/2020	D.1 - pH5	5,0	1894,20	1689,42	1715,02	1766,21	76,79	127,99	U/L
11/05/2020	D.1 - pH6	6,0	102,39	102,39	76,79	93,86	17,06	8,53	U/L
11/05/2020	D.1 - pH7	7,0	0,00	25,60	0,00	8,53	8,53	17,06	U/L
11/05/2020	D.1 - pH10	10,0	0,00	0,00	0,00	0,00	0,00	0,00	U/L

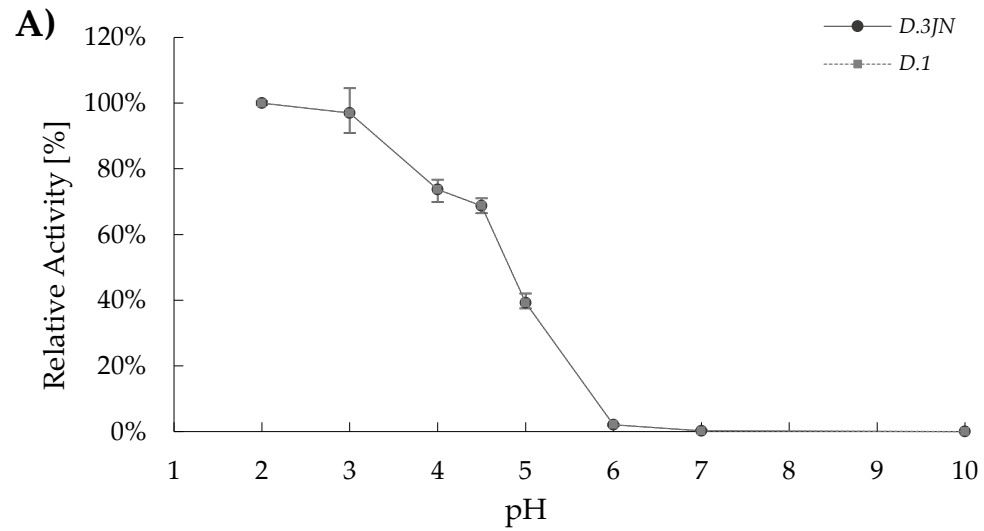
N°4 Calculation and/or formula: Relative activity D.1

Date	Sample	pH	Relative Act. % 1	Relative Act. % 2	Relative Act. % 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	ABTS-Control Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	D.1 - pH2	2,0	100,57%	99,43%	100,00%	100,00%	0,57%	0,57%	%
11/05/2020	D.1 - pH3	3,0	95,45%	90,91%	104,55%	96,97%	6,06%	7,58%	%
11/05/2020	D.1 - pH4	4,0	76,70%	69,89%	74,43%	73,67%	3,79%	3,03%	%
11/05/2020	D.1 - pH4.5	4,5	71,02%	66,48%	68,75%	68,75%	2,27%	2,27%	%
11/05/2020	D.1 - pH5	5,0	42,05%	37,50%	38,07%	39,20%	1,70%	2,84%	%
11/05/2020	D.1 - pH6	6,0	2,27%	2,27%	1,70%	2,08%	0,38%	0,19%	%



11/05/2020	D.1 - pH7	7,0	0,00%	0,57%	0,00%	0,19%	0,19%	0,38%	%
11/05/2020	D.1 - pH10	10,0	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%

Final table and/or graphic:





Experiment Title:

pH Stability on the enzymatic activity

Experiment Code:

pHStb.TII-JN-Exp-3

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: martes, 12 de mayo de 2020

Finish Date: martes, 12 de mayo de 2020

Laboratory Data:

H-Lab

Description of the experiment:

Spectrophotometric measurement for supernatant -> SA_2020.

Follow up of the experimentation:

Step	Description	Starting Date	Finish Date	Sample Prefix
1	Prepare 10 clean absorbance cells (Blank, ABTS-Control, Buffers pH: 2-3-4-4.5-5-6-7-10)	12/05/2020	12/05/2020	
2	Place 950 uL of the corresponding Buffer (pH: 2-3-4-4.5-5-6-7-10, Blank and Control: H2O milliQ)	12/05/2020	12/05/2020	
3	Place 200 uL of the corresponding sample -> SA_2020 (Blank and Control: H2O milliQ)	12/05/2020	12/05/2020	SA_2020
4	Add 350 uL of H2O milli Q to the Blank cell and place it on the spectrophotometer to measure the baseline	12/05/2020	12/05/2020	SA_2020-Bk
5	Add 350 uL of ABTS solution to the ABTS-Control cell and place it on the spectrophotometer to measure the baseline again	12/05/2020	12/05/2020	SA_2020-ABTS.Ctl
6	Place each cell on the corresponding space and previous to each measurement add 350 uL of ABTS solution	12/05/2020	12/05/2020	
7	Measure the absorbance change during 1 min for each sample	12/05/2020	12/05/2020	SA_2020-pH
8	Collect all the cells, eliminate the residues present and clean delicately	12/05/2020	12/05/2020	

Samples generated:

Sample Code	Description	Replicas	Units	Location
SA_2020	Supernatant solution obtained at the functionalization process	1,00		H-Lab
SA_2020-Bk	Data of the spectrophotometric measurement for the Blank	1,00		Onedrive
SA_2020-ABTS.Ctl	Data of the spectrophotometric measurement for the ABTS-Control	1,00		Onedrive
SA_2020-pH2	Data of the spectrophotometric measurement for the SA_2020 Enzyme at pH 2	1,00		Onedrive
SA_2020-pH3	Data of the spectrophotometric measurement for the SA_2020 Enzyme at pH 3	1,00		Onedrive
SA_2020-pH4	Data of the spectrophotometric measurement for the SA_2020 Enzyme at pH 4	1,00		Onedrive
SA_2020-pH4.5	Data of the spectrophotometric measurement for the SA_2020 Enzyme at pH 4.5	1,00		Onedrive
SA_2020-pH5	Data of the spectrophotometric measurement for the SA_2020 Enzyme at pH 5	1,00		Onedrive
SA_2020-pH6	Data of the spectrophotometric measurement for the SA_2020 Enzyme at pH 6	1,00		Onedrive
SA_2020-pH7	Data of the spectrophotometric measurement for the SA_2020 Enzyme at pH 7	1,00		Onedrive



SA_2020-pH10	Data of the spectrophotometric measurement for the SA_2020 Enzyme at pH 10	1,00		Onedrive
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Measurement:

Date	Type	Sample	Replica 1	Replica 2	Replica 3	Replica 4	Replica 5	Average	Units
12/05/2020	Spectrophotometric measurement	Blank Cell	0,000	0,000	0,000			0,000	min [^] (-1)
12/05/2020	Spectrophotometric measurement	ABTS-Control Cell	0,000	0,000	0,000			0,000	min [^] (-1)
12/05/2020	Spectrophotometric measurement	Cell N°1 - SA_2020 - pH2	0,321	0,337	0,359			0,339	min [^] (-1)
12/05/2020	Spectrophotometric measurement	Cell N°2 - SA_2020 - pH3	0,284	0,298	0,327			0,303	min [^] (-1)
12/05/2020	Spectrophotometric measurement	Cell N°3 - SA_2020 - pH4	0,219	0,219	0,225			0,221	min [^] (-1)
12/05/2020	Spectrophotometric measurement	Cell N°3 - SA_2020 - pH4.5	0,201	0,200	0,203			0,201	min [^] (-1)
12/05/2020	Spectrophotometric measurement	Cell N°4 - SA_2020 - pH5	0,086	0,084	0,085			0,085	min [^] (-1)
12/05/2020	Spectrophotometric measurement	Cell N°5 - SA_2020 - pH6	0,002	0,004	0,004			0,003	min [^] (-1)
12/05/2020	Spectrophotometric measurement	Cell N°5 - SA_2020 - pH7	-0,002	-0,005	-0,001			-0,003	min [^] (-1)
12/05/2020	Spectrophotometric measurement	Cell N°5 - SA_2020 - pH10	-0,009	-0,010	-0,001			-0,007	min [^] (-1)

Summary of results:

GOOD -> The maximum value for all the samples is lower than 1 and it has a lineal behave.



Experiment Title:

pH Stability on the enzymatic activity

Experiment Code:

pHStb.TII-JN-Exp-3

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: martes, 12 de mayo de 2020

Finish Date: martes, 12 de mayo de 2020

Description of data analysis:

Determine the enzymatic activity by the Lambert-Beer equation using the value of absorbance change in time obtained.

$$\text{Actividad Enzimática} \left[\frac{U}{L} \right] = \frac{\Delta \frac{ABS}{t}}{\varepsilon \cdot d} \cdot \text{Factor de dilución}$$

$$\text{Actividad Enzimática} \left[\frac{U}{L} \right] = \frac{\frac{1}{\text{min}}}{M^{-1} \text{cm}^{-1} \cdot \text{cm}} \cdot \frac{\mu\text{t}}{\mu\text{t}} = \frac{\text{mol}}{\text{min} \cdot L} = 1 \cdot 10^6 \frac{\mu\text{mol}}{\text{min} \cdot L} = 1 \cdot 10^6 \frac{L}{L}$$

$$\Delta \frac{ABS}{t} \left[\frac{1}{\text{min}} \right] = \text{Valor dado por el espectrofotómetro}$$

ε	Coeficiente de extinción	[M ⁻¹ cm ^{^-1}]	29300	Factor de dilución	V.Tol/V.m	7,5
d	Distancia haz de luz a la muestra	cm	1	Volumen de muestra usado	[uL]	200
				Volumen Total en la celda	[uL]	1500

N°1 Calculation and/or formula: Enzymatic activity SA_2020

Date	Sample	pH	Replica 1	Replica 2	Replica 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00	0,00	0,00	0,00	0,00	0,00	U/L
11/05/2020	ABTS-Control Cell	-	0,00	0,00	0,00	0,00	0,00	0,00	U/L
11/05/2020	Cell N°1 - SA_2020 - pH2	2,0	82,17	86,26	91,89	86,77	4,61	5,12	U/L
11/05/2020	Cell N°2 - SA_2020 - pH3	3,0	72,70	76,28	83,70	77,56	4,86	6,14	U/L
11/05/2020	Cell N°3 - SA_2020 - pH4	4,0	56,06	56,06	57,59	56,57	0,51	1,02	U/L
11/05/2020	Cell N°3 - SA_2020 - pH4.5	4,5	51,45	51,19	51,96	51,54	0,34	0,43	U/L
11/05/2020	Cell N°4 - SA_2020 - pH5	5,0	22,01	21,50	21,76	21,76	0,26	0,26	U/L
11/05/2020	Cell N°5 - SA_2020 - pH6	6,0	0,51	1,02	1,02	0,85	0,34	0,17	U/L
11/05/2020	Cell N°6 - SA_2020 - pH7	7,0	0,00	0,00	0,00	0,00	0,00	0,00	U/L
11/05/2020	Cell N°7 - SA_2020 - pH10	10,0	0,00	0,00	0,00	0,00	0,00	0,00	U/L

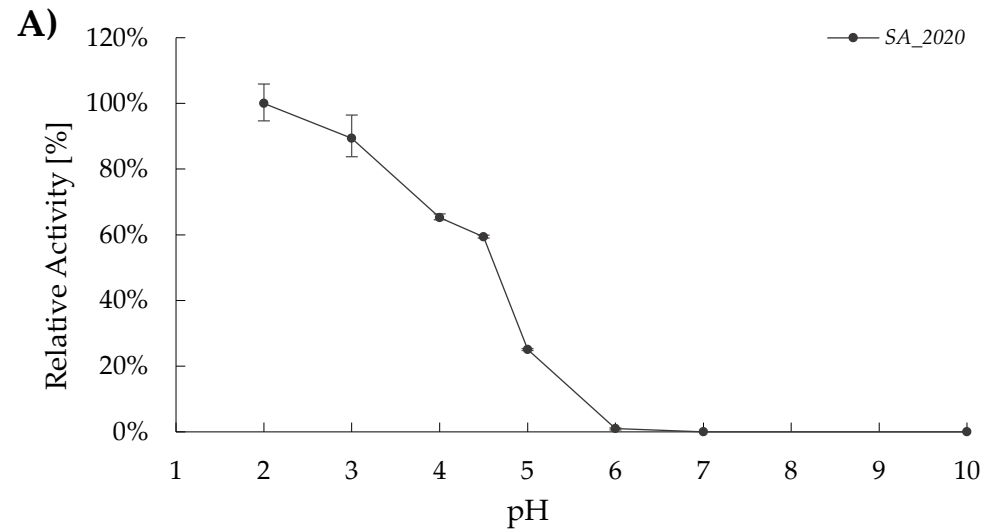
N°2 Calculation and/or formula: Relative activity SA_2020

Date	Sample	pH	Relative Act. % 1	Relative Act. % 2	Relative Act. % 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	ABTS-Control Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	Cell N°1 - SA_2020 - pH2	2,0	94,69%	99,41%	105,90%	100,00%	5,31%	5,90%	%
11/05/2020	Cell N°2 - SA_2020 - pH3	3,0	83,78%	87,91%	96,46%	89,38%	5,60%	7,08%	%



11/05/2020	Cell N°3 - SA_2020 - pH4	4,0	64,60%	64,60%	66,37%	65,19%	0,59%	1,18%	%
11/05/2020	Cell N°3 - SA_2020 - pH4.5	4,5	59,29%	59,00%	59,88%	59,39%	0,39%	0,49%	%
11/05/2020	Cell N°4 - SA_2020 - pH5	5,0	25,37%	24,78%	25,07%	25,07%	0,29%	0,29%	%
11/05/2020	Cell N°5 - SA_2020 - pH6	6,0	0,59%	1,18%	1,18%	0,98%	0,39%	0,20%	%
11/05/2020	Cell N°6 - SA_2020 - pH7	7,0	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	Cell N°7 - SA_2020 - pH10	10,0	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%

Final table and/or graphic:





Experiment Title:

pH Stability on the enzymatic activity

Experiment Code:

pHStb.TII-JN-Exp-4

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: martes, 12 de mayo de 2020

Finish Date: jueves, 14 de mayo de 2020

Laboratory Data:

H-Lab

Description of the experiment:

Spectrophotometric measurement for bionanocompound -> A_2020.

Follow up of the experimentation:

Step	Description	Starting Date	Finish Date	Sample Prefix
1	Prepare 10 clean absorbance cells (Blank, ABTS-Control, Buffers pH: 2-3-4-4.5-5-6-7-10)	12/05/2020	12/05/2020	
2	Place 1120 uL of the corresponding Buffer (pH: 2-3-4-4.5-5-6-7-10, Blank and Control: H2O milliQ)	12/05/2020	12/05/2020	
3	Place 30 uL of the corresponding sample -> A_2020 (Blank and Control: H2O milliQ)	12/05/2020	12/05/2020	A_2020
4	Add 350 uL of H2O milli Q to the Blank cell and place it on the spectrophotometer to measure the baseline	12/05/2020	12/05/2020	A_2020-Bk
5	Add 350 uL of ABTS solution to the ABTS-Control cell and place it on the spectrophotometer to measure the baseline again	12/05/2020	12/05/2020	A_2020-ABTS.Ctl
6	Place each cell on the corresponding space and previous to each measurement add 350 uL of ABTS solution	12/05/2020	12/05/2020	
7	Measure the absorbance change during 1 min for each sample	12/05/2020	12/05/2020	A_2020-pH
8	Collect all the cells, eliminate the residues present and clean delicately	12/05/2020	12/05/2020	

Samples generated:

Sample Code	Description	Replicas	Units	Location
A_2020	Bionanocompound solution obtained	1,00		H-Lab
A_2020-Bk	Data of the spectrophotometric measurement for the Blank	1,00		Onedrive
A_2020-ABTS.Ctl	Data of the spectrophotometric measurement for the ABTS-Control	1,00		Onedrive
A_2020-pH2	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 2	1,00		Onedrive
A_2020-pH3	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 3	1,00		Onedrive
A_2020-pH4	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 4	1,00		Onedrive
A_2020-pH4.5	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 4.5	1,00		Onedrive
A_2020-pH5	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 5	1,00		Onedrive
A_2020-pH6	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 6	1,00		Onedrive
A_2020-pH7	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 7	1,00		Onedrive



A_2020-pH10	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 10	1,00		Onedrive
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Measurement:

Date	Type	Sample	Replica 1	Replica 2	Replica 3	Replica 4	Replica 5	Average	Units
12/05/2020	Spectrophotometric measurement	Blank Cell	0,000					0,000	min ⁽⁻¹⁾
12/05/2020	Spectrophotometric measurement	ABTS-Control Cell	0,000					0,000	min ⁽⁻¹⁾
12/05/2020	Spectrophotometric measurement	Cell N°1 - A_2020 - pH2	-0,039					-0,039	min ⁽⁻¹⁾
12/05/2020	Spectrophotometric measurement	Cell N°2 - A_2020 - pH3	-0,170					-0,170	min ⁽⁻¹⁾
12/05/2020	Spectrophotometric measurement	Cell N°3 - A_2020 - pH4	-0,025					-0,025	min ⁽⁻¹⁾
12/05/2020	Spectrophotometric measurement	Cell N°3 - A_2020 - pH4.5	0,009					0,009	min ⁽⁻¹⁾
12/05/2020	Spectrophotometric measurement	Cell N°4 - A_2020 - pH5	0,002					0,002	min ⁽⁻¹⁾
12/05/2020	Spectrophotometric measurement	Cell N°5 - A_2020 - pH6	0,003					0,003	min ⁽⁻¹⁾
12/05/2020	Spectrophotometric measurement	Cell N°5 - A_2020 - pH7	0,000					0,000	min ⁽⁻¹⁾
12/05/2020	Spectrophotometric measurement	Cell N°5 - A_2020 - pH10	0,019					0,019	min ⁽⁻¹⁾

Summary of results:

REPEAT -> The solutions were too cloudy and can't be analyzed by absorbance, most of the values obtained were negative and it doesn't show a lineal behave. The experiment was repeated several times determine the time of sedimentation. It was concluded that after 6 measurements the cloudiness decreases and the values weren't negative, the final experiment will be measured 6 times and only the final time will be use expecting less cloudiness due to the sedimentation of the bionanocompound.



Experiment Title:

pH Stability on the enzymatic activity

Experiment Code:

pHStb.TII-JN-Exp-4

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: martes, 12 de mayo de 2020

Finish Date: jueves, 14 de mayo de 2020

Description of data analysis:

Determine the enzymatic activity by the Lambert-Beer equation using the value of absorbance change in time obtained.

$$\text{Actividad Enzimática} \left[\frac{U}{L} \right] = \frac{\Delta \frac{ABS}{t}}{\varepsilon \cdot d} \cdot \text{Factor de dilución}$$

$$\text{Actividad Enzimática} \left[\frac{U}{L} \right] = \frac{\frac{1}{\frac{min}{min}}}{M^{-1}cm^{-1} \cdot cm} \cdot \frac{\mu L}{\mu L} = \frac{mol}{min \cdot L} = 1 \cdot 10^6 \frac{\mu mol}{min \cdot L} = 1 \cdot 10^6 \frac{L}{L}$$

$$\Delta \frac{ABS}{t} \left[\frac{1}{min} \right] = \text{Valor dado por el espectrofotómetro}$$

ε	Coeficiente de extinción	[M ⁻¹ cm ⁻¹]	29300	Factor de dilución	V.Tol/V.m	50
d	Distancia haz de luz a la muestra	cm	1	Volumen de muestra usado	[uL]	30
				Volumen Total en la celda	[uL]	1500

N°1 Calculation and/or formula: Enzymatic activity A_2020

Date	Sample	pH	Replica 1	Replica 2	Replica 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00			0,00	0,00	0,00	U/L
11/05/2020	ABTS-Control Cell	-	0,00			0,00	0,00	0,00	U/L
11/05/2020	Cell N°1 - A_2020 - pH2	2,0	0,00			0,00	0,00	0,00	U/L
11/05/2020	Cell N°2 - A_2020 - pH3	3,0	0,00			0,00	0,00	0,00	U/L
11/05/2020	Cell N°3 - A_2020 - pH4	4,0	0,00			0,00	0,00	0,00	U/L
11/05/2020	Cell N°3 - A_2020 - pH4.5	4,5	15,36			15,36	0,00	0,00	U/L
11/05/2020	Cell N°4 - A_2020 - pH5	5,0	3,41			3,41	0,00	0,00	U/L
11/05/2020	Cell N°5 - A_2020 - pH6	6,0	5,12			5,12	0,00	0,00	U/L
11/05/2020	Cell N°6 - A_2020 - pH7	7,0	0,00			0,00	0,00	0,00	U/L
11/05/2020	Cell N°7 - A_2020 - pH10	10,0	32,42			32,42	0,00	0,00	U/L

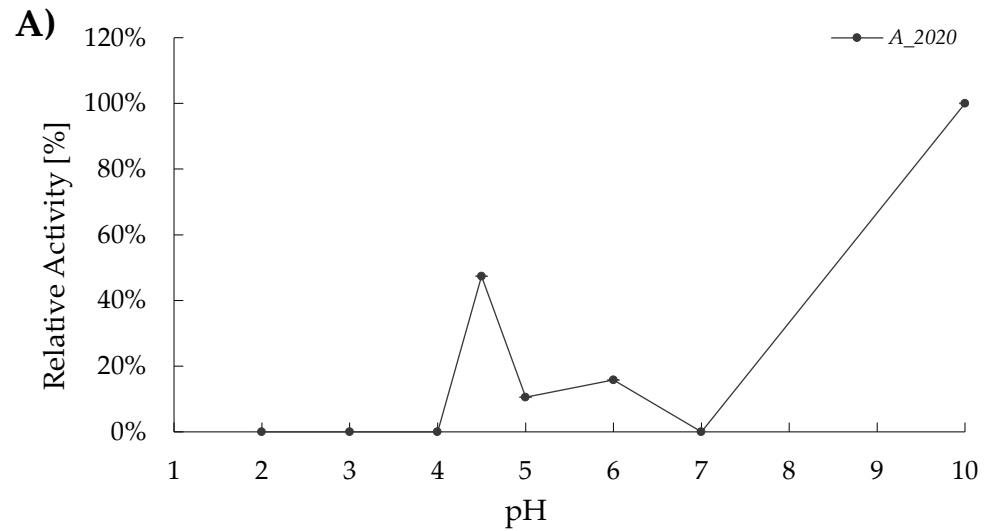
N°2 Calculation and/or formula: Relative activity A_2020

Date	Sample	pH	Relative Act. % 1	Relative Act. % 2	Relative Act. % 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00%			0,00%	0,00%	0,00%	%
11/05/2020	ABTS-Control Cell	-	0,00%			0,00%	0,00%	0,00%	%
11/05/2020	Cell N°1 - A_2020 - pH2	2,0	0,00%			0,00%	0,00%	0,00%	%
11/05/2020	Cell N°2 - A_2020 - pH3	3,0	0,00%			0,00%	0,00%	0,00%	%



11/05/2020	Cell N°3 - A_2020 - pH4	4,0	0,00%			0,00%	0,00%	0,00%	%
11/05/2020	Cell N°3 - A_2020 - pH4.5	4,5	47,37%			47,37%	0,00%	0,00%	%
11/05/2020	Cell N°4 - A_2020 - pH5	5,0	10,53%			10,53%	0,00%	0,00%	%
11/05/2020	Cell N°5 - A_2020 - pH6	6,0	15,79%			15,79%	0,00%	0,00%	%
11/05/2020	Cell N°6 - A_2020 - pH7	7,0	0,00%			0,00%	0,00%	0,00%	%
11/05/2020	Cell N°7 - A_2020 - pH10	10,0	100,00%			100,00%	0,00%	0,00%	%

Final table and/or graphic:





Experiment Title:

pH Stability on the enzymatic activity

Experiment Code:

pHStb.TII-JN-Exp-5

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: viernes, 15 de mayo de 2020

Finish Date: viernes, 15 de mayo de 2020

Laboratory Data:

H-Lab

Description of the experiment:

Spectrophotometric measurement for bionanocompound -> A_2020.

Follow up of the experimentation:

Step	Description	Starting Date	Finish Date	Sample Prefix
1	Take 200 uL of A_2020 and gauge with H2O milli Q to 5 mL of solution	14/05/2020	14/05/2020	
2	Manually mix vigorously and store refrigerated	14/05/2020	14/05/2020	A_2020
3	Prepare 10 clean absorbance cells (Blank, ABTS-Control, Buffers pH: 2-3-4-4.5-5-6-7-10)	15/05/2020	15/05/2020	
4	Place 1120 uL of the corresponding Buffer (pH: 2-3-4-4.5-5-6-7-10, Blank and Control: H2O milliQ)	15/05/2020	15/05/2020	
5	Place 30 uL of the corresponding sample -> A_2020 (Blank and Control: H2O milliQ)	15/05/2020	15/05/2020	
6	Add 350 uL of H2O milli Q to the Blank cell and place it on the spectrophotometer to measure the baseline	15/05/2020	15/05/2020	A_2020-Bk
7	Add 350 uL of ABTS solution to the ABTS-Control cell and place it on the spectrophotometer to measure the baseline again	15/05/2020	15/05/2020	A_2020-ABTS.Ctl
8	Place each cell on the corresponding space and previous to each measurement add 350 uL of ABTS solution	15/05/2020	15/05/2020	
9	Measure the absorbance change during 1 min for each sample	15/05/2020	15/05/2020	A_2020-pH
10	Collect all the cells, eliminate the residues present and clean delicately	15/05/2020	15/05/2020	

Samples generated:

Sample Code	Description	Replicas	Units	Location
A_2020	Bionanocompound solution obtained	1,00		H-Lab
A_2020-Bk	Data of the spectrophotometric measurement for the Blank	1,00		Onedrive
A_2020-ABTS.Ctl	Data of the spectrophotometric measurement for the ABTS-Control	1,00		Onedrive
A_2020-pH2	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 2	1,00		Onedrive
A_2020-pH3	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 3	1,00		Onedrive
A_2020-pH4	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 4	1,00		Onedrive
A_2020-pH4.5	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 4.5	1,00		Onedrive
A_2020-pH5	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 5	1,00		Onedrive



A_2020-pH6	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 6	1,00		Onedrive
A_2020-pH7	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 7	1,00		Onedrive
A_2020-pH10	Data of the spectrophotometric measurement for the A_2020 Enzyme at pH 10	1,00		Onedrive

Measurement:

Date	Type	Sample	Replica 1	Replica 2	Replica 3	Replica 4	Replica 5	Average	Units
15/05/2020	Spectrophotometric measurement	Blank Cell	0,000	0,000	0,000			0,000	min ⁻¹
15/05/2020	Spectrophotometric measurement	ABTS-Control Cell	0,000	0,000	0,000			0,000	min ⁻¹
15/05/2020	Spectrophotometric measurement	Cell N°1 - A_2020 - pH2	0,015	0,019	0,010			0,015	min ⁻¹
15/05/2020	Spectrophotometric measurement	Cell N°2 - A_2020 - pH3	0,010	0,011	0,011			0,011	min ⁻¹
15/05/2020	Spectrophotometric measurement	Cell N°3 - A_2020 - pH4	0,038	0,048	0,042			0,043	min ⁻¹
15/05/2020	Spectrophotometric measurement	Cell N°3 - A_2020 - pH4.5	0,034	0,045	0,041			0,040	min ⁻¹
15/05/2020	Spectrophotometric measurement	Cell N°4 - A_2020 - pH5	0,008	0,014	0,020			0,014	min ⁻¹
15/05/2020	Spectrophotometric measurement	Cell N°5 - A_2020 - pH6	0,013	0,003	-0,011			0,002	min ⁻¹
15/05/2020	Spectrophotometric measurement	Cell N°5 - A_2020 - pH7	0,005	0,000	-0,001			0,001	min ⁻¹
15/05/2020	Spectrophotometric measurement	Cell N°5 - A_2020 - pH10	0,014	0,019	-0,022			0,004	min ⁻¹

Summary of results:

GOOD -> The maximum value for all the samples is lower than 1 and it has a lineal behave.



Experiment Title:

pH Stability on the enzymatic activity

Experiment Code:

pHStb.TII-JN-Exp-5

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: viernes, 15 de mayo de 2020

Finish Date: viernes, 15 de mayo de 2020

Description of data analysis:

Determine the enzymatic activity by the Lambert-Beer equation using the value of absorbance change in time obtained.

$$\text{Actividad Enzimática} \left[\frac{U}{L} \right] = \frac{\Delta \frac{ABS}{t}}{\varepsilon \cdot d} \cdot \text{Factor de dilución}$$

$$\text{Actividad Enzimática} \left[\frac{U}{L} \right] = \frac{\frac{1}{\frac{min}{min}}}{M^{-1} \cdot cm^{-1} \cdot cm} \cdot \frac{\mu t}{\mu t} = \frac{mol}{min \cdot L} = 1 \cdot 10^6 \frac{\mu mol}{min \cdot L} = 1 \cdot 10^6 \frac{L}{L}$$

$$\Delta \frac{ABS}{t} \left[\frac{1}{min} \right] = \text{Valor dado por el espectrofotómetro}$$

ε	Coeficiente de extinción	[M ⁻¹ cm ⁻¹]	29300	Factor de dilución	V.Tol/V.m	50
d	Distancia haz de luz a la muestra	cm	1	Volumen de muestra usado	[uL]	30
				Volumen Total en la celda	[uL]	1500

N°1 Calculation and/or formula: Enzymatic activity A_2020

Date	Sample	pH	Replica 1	Replica 2	Replica 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00	0,00	0,00	0,00	0,00	0,00	U/L
11/05/2020	ABTS-Control Cell	-	0,00	0,00	0,00	0,00	0,00	0,00	U/L
11/05/2020	Cell N°1 - A_2020 - pH2	2,0	25,60	32,42	17,06	25,03	7,96	7,39	U/L
11/05/2020	Cell N°2 - A_2020 - pH3	3,0	17,06	18,77	18,77	18,20	1,14	0,57	U/L
11/05/2020	Cell N°3 - A_2020 - pH4	4,0	64,85	81,91	71,67	72,81	7,96	9,10	U/L
11/05/2020	Cell N°3 - A_2020 - pH4.5	4,5	58,02	76,79	69,97	68,26	10,24	8,53	U/L
11/05/2020	Cell N°4 - A_2020 - pH5	5,0	13,65	23,89	34,13	23,89	10,24	10,24	U/L
11/05/2020	Cell N°5 - A_2020 - pH6	6,0	22,18	5,12	0,00	9,10	9,10	13,08	U/L
11/05/2020	Cell N°6 - A_2020 - pH7	7,0	8,53	0,00	0,00	2,84	2,84	5,69	U/L
11/05/2020	Cell N°7 - A_2020 - pH10	10,0	23,89	32,42	0,00	18,77	18,77	13,65	U/L

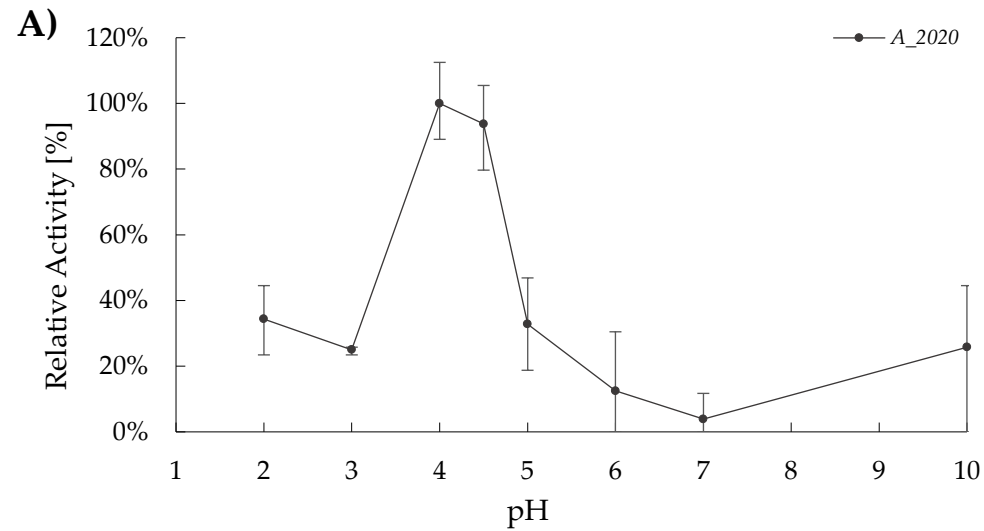
N°2 Calculation and/or formula: Relative activity A_2020

Date	Sample	pH	Relative Act. % 1	Relative Act. % 2	Relative Act. % 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	ABTS-Control Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	Cell N°1 - A_2020 - pH2	2,0	35,16%	44,53%	23,44%	34,38%	10,94%	10,16%	%
11/05/2020	Cell N°2 - A_2020 - pH3	3,0	23,44%	25,78%	25,78%	25,00%	1,56%	0,78%	%



11/05/2020	Cell N°3 - A_2020 - pH4	4,0	89,06%	112,50%	98,44%	100,00%	10,94%	12,50%	%
11/05/2020	Cell N°3 - A_2020 - pH4.5	4,5	79,69%	105,47%	96,09%	93,75%	14,06%	11,72%	%
11/05/2020	Cell N°4 - A_2020 - pH5	5,0	18,75%	32,81%	46,88%	32,81%	14,06%	14,06%	%
11/05/2020	Cell N°5 - A_2020 - pH6	6,0	30,47%	7,03%	0,00%	12,50%	12,50%	17,97%	%
11/05/2020	Cell N°6 - A_2020 - pH7	7,0	11,72%	0,00%	0,00%	3,91%	3,91%	7,81%	%
11/05/2020	Cell N°7 - A_2020 - pH10	10,0	32,81%	44,53%	0,00%	25,78%	25,78%	18,75%	%

Final table and/or graphic:





Experiment Title:

pH Stability on the enzymatic activity

Researcher(s):

Mabel Juliana Noguera Contreras

JN

Starting Date: lunes, 11 de mayo de 2020

Finish Date: viernes, 15 de mayo de 2020

Relative activity D.1 Free-Laccase

Date	Sample	pH	Relative Act. % 1	Relative Act. % 2	Relative Act. % 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	ABTS-Control Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	D.1 - pH2	2	100,57%	99,43%	100,00%	100,00%	0,57%	0,57%	%
11/05/2020	D.1 - pH3	3	95,45%	90,91%	104,55%	96,97%	6,06%	7,58%	%
11/05/2020	D.1 - pH4	4	76,70%	69,89%	74,43%	73,67%	3,79%	3,03%	%
11/05/2020	D.1 - pH4.5	4,5	71,02%	66,48%	68,75%	68,75%	2,27%	2,27%	%
11/05/2020	D.1 - pH5	5	42,05%	37,50%	38,07%	39,20%	1,70%	2,84%	%
11/05/2020	D.1 - pH6	6	2,27%	2,27%	1,70%	2,08%	0,38%	0,19%	%
11/05/2020	D.1 - pH7	7	0,00%	0,57%	0,00%	0,19%	0,19%	0,38%	%
11/05/2020	D.1 - pH10	10	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%

Relative activity SA_2020 S_Lac-Magnetite

Date	Sample	pH	Relative Act. % 1	Relative Act. % 2	Relative Act. % 3	Average	Min. error	Max. Error	Units
11/05/2020	Cell N°7 - SA_2020 - pH10	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	0	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	0	2,00	94,69%	99,41%	105,90%	100,00%	5,31%	5,90%	%
11/05/2020	0	3,00	83,78%	87,91%	96,46%	89,38%	5,60%	7,08%	%
11/05/2020	Sample	4,00	64,60%	64,60%	66,37%	65,19%	0,59%	1,18%	%
11/05/2020	Blank Cell	4,50	59,29%	59,00%	59,88%	59,39%	0,39%	0,49%	%
11/05/2020	ABTS-Control Cell	5,00	25,37%	24,78%	25,07%	25,07%	0,29%	0,29%	%
11/05/2020	Cell N°1 - SA_2020 - pH2	6,00	0,59%	1,18%	1,18%	0,98%	0,39%	0,20%	%
11/05/2020	Cell N°2 - SA_2020 - pH3	7,00	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	Cell N°3 - SA_2020 - pH4	10,00	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%



Relative activity A_2020 Lac-Magnetite

Date	Sample	pH	Relative Act. % 1	Relative Act. % 2	Relative Act. % 3	Average	Min. error	Max. Error	Units
11/05/2020	Blank Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	ABTS-Control Cell	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	%
11/05/2020	Cell N°1 - A_2020 - pH2	2,00	35,16%	44,53%	23,44%	34,38%	10,94%	10,16%	%
11/05/2020	Cell N°2 - A_2020 - pH3	3,00	23,44%	25,78%	25,78%	25,00%	1,56%	0,78%	%
11/05/2020	Cell N°3 - A_2020 - pH4	4,00	89,06%	112,50%	98,44%	100,00%	10,94%	12,50%	%
11/05/2020	Cell N°3 - A_2020 - pH4.5	4,50	79,69%	105,47%	96,09%	93,75%	14,06%	11,72%	%
11/05/2020	Cell N°4 - A_2020 - pH5	5,00	18,75%	32,81%	46,88%	32,81%	14,06%	14,06%	%
11/05/2020	Cell N°5 - A_2020 - pH6	6,00	30,47%	7,03%	0,00%	12,50%	12,50%	17,97%	%
11/05/2020	Cell N°6 - A_2020 - pH7	7,00	11,72%	0,00%	0,00%	3,91%	3,91%	7,81%	%
11/05/2020	Cell N°7 - A_2020 - pH10	10,00	32,81%	44,53%	0,00%	25,78%	25,78%	18,75%	%

Final table and/or graphic:

