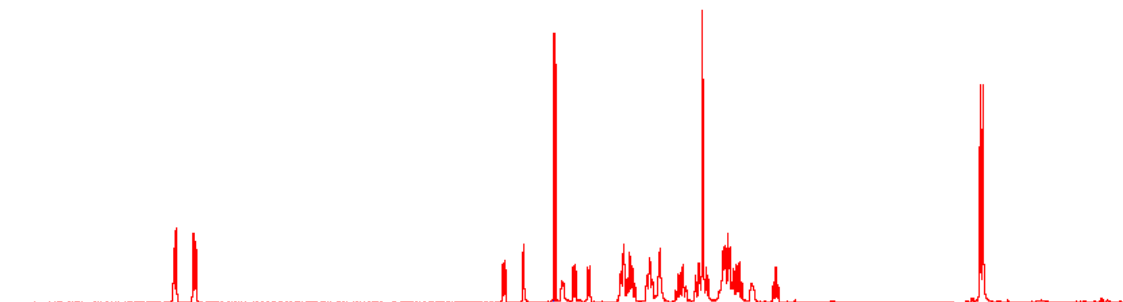


**Capítulo 4:**

➤ Análisis de los ligandos **1** y **4** con Pleiotrofina.

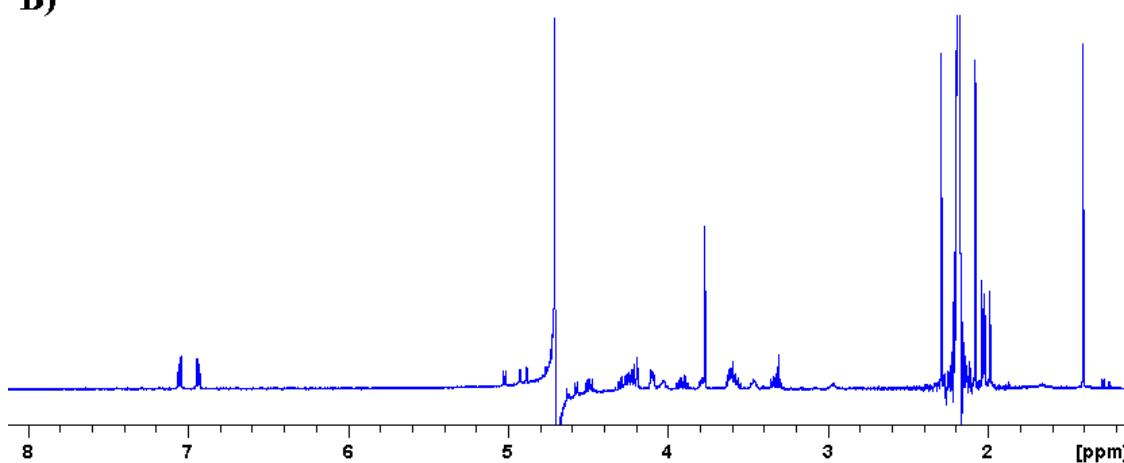
**A)**

pne136-smp-196ptn 14 1 E:\NMR\nmr600

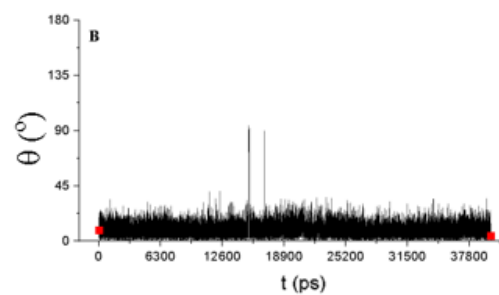
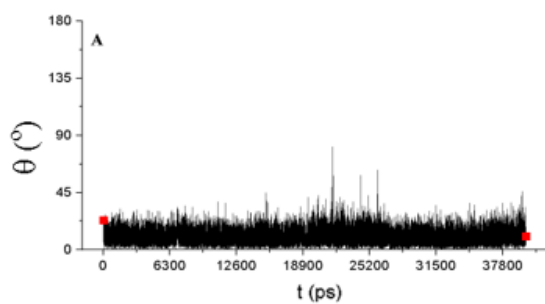


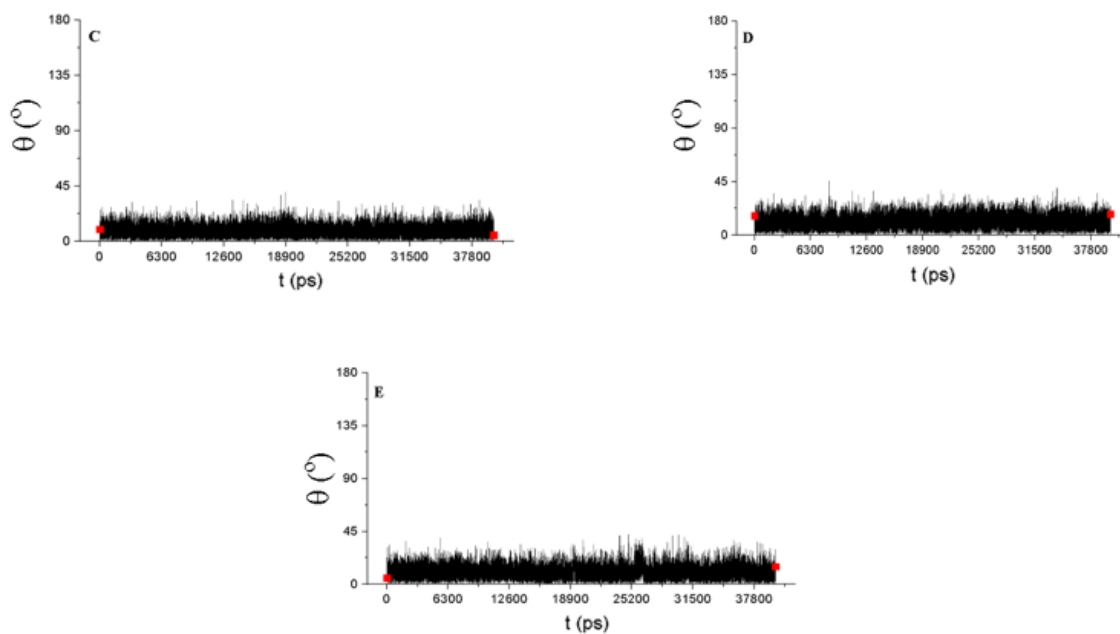
**B)**

pne135 3 1 E:\NMR\nmr600

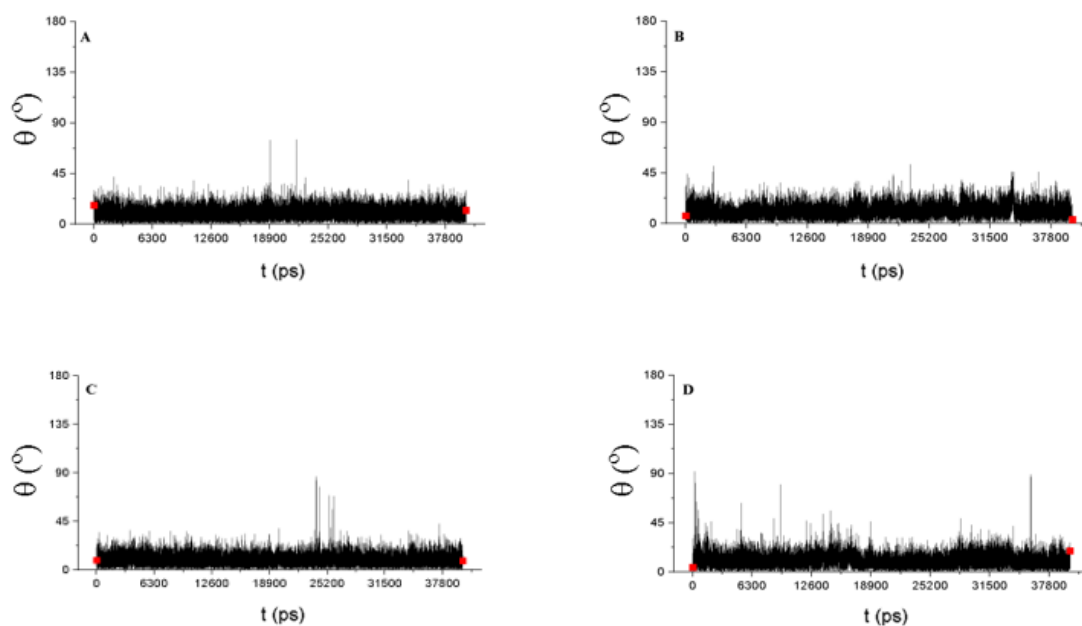


**A.1.** Espectros monodimensionales de los compuestos **4** (a) y **1** (b) a 1.5 mM y 300 K a 600 MHz, en presencia de PTN.

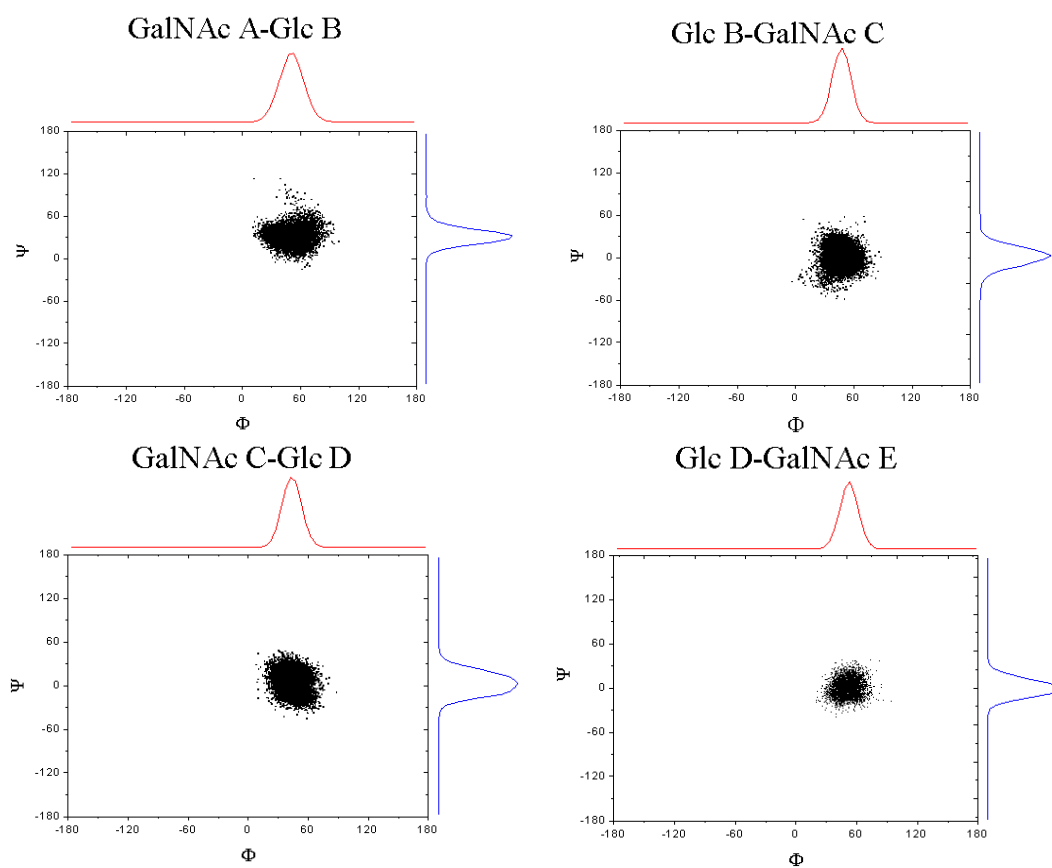




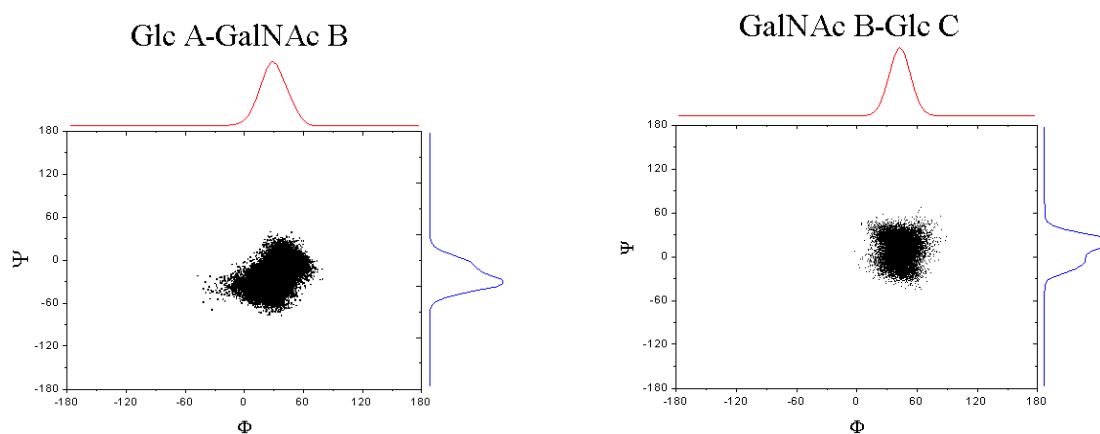
A.2. Gráficas de Cremer-Pople para el complejo 1-PTN4 para una dinámica de 200 ns.

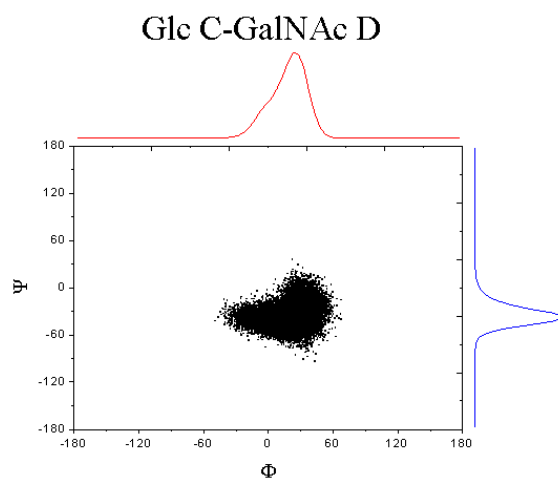


A.3. Gráficas de Cremer-Pople para el complejo 4-PTN4 para una dinámica de 200 ns.

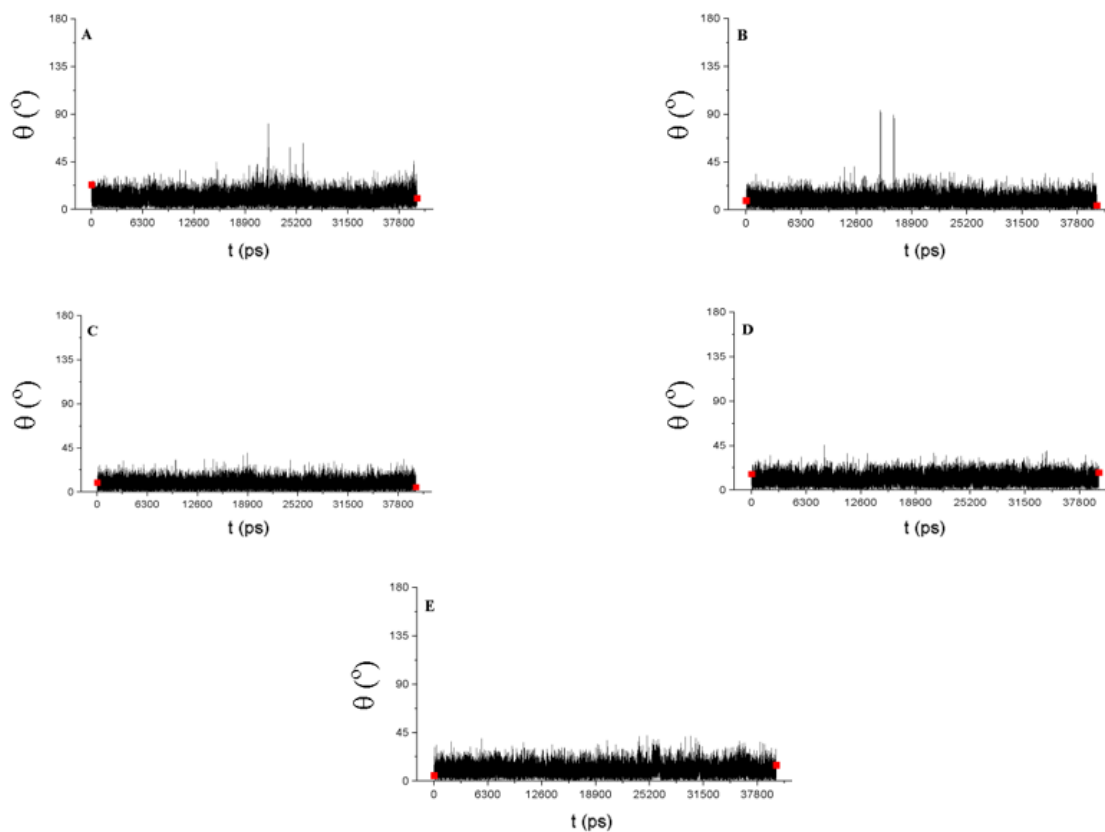


**A.4.** Trayectorias  $(\phi, \psi)$  para el complejo **1-PTN4** obtenidas de la dinámica de 200 ns.

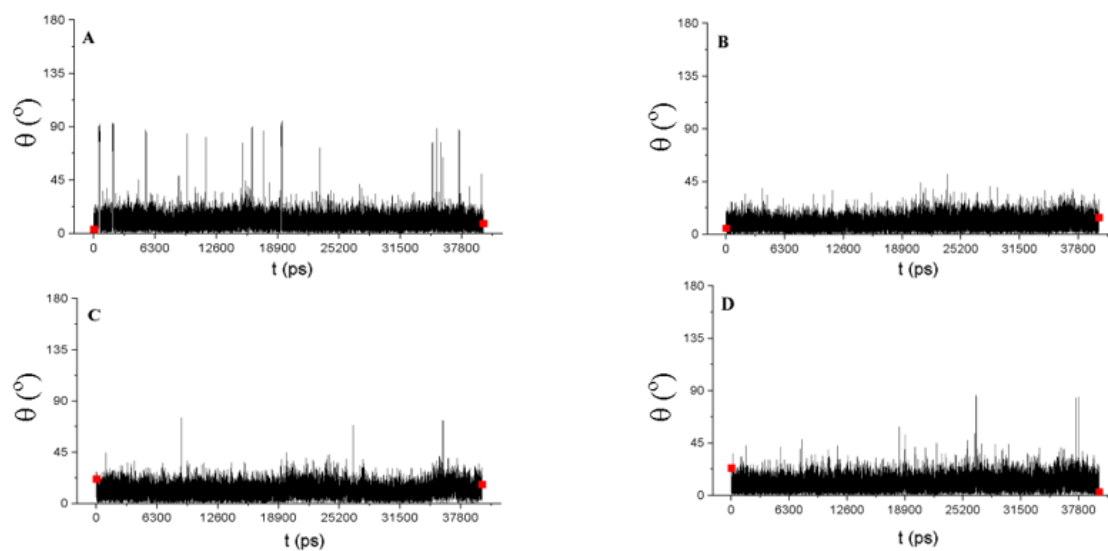




**A.5.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **4-PTN4** obtenidas de la dinámica de 200 ns.

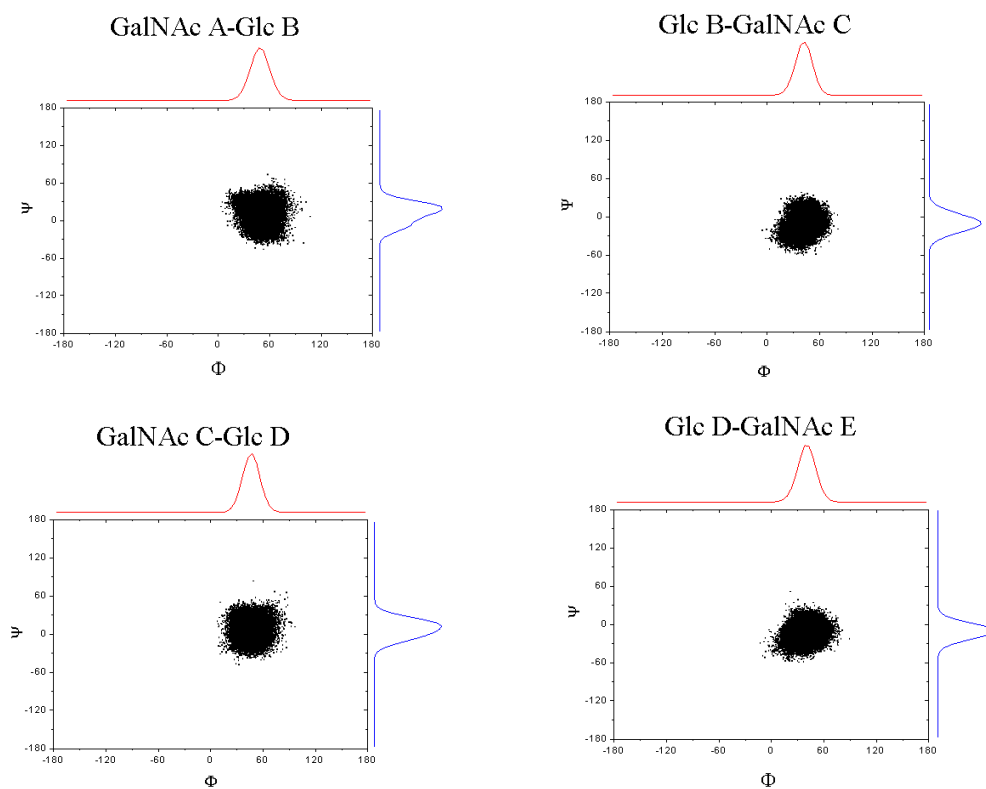


**A.6.** Gráficas de Cremer-Pople para el complejo **1-PTN3** para una dinámica de 200 ns.

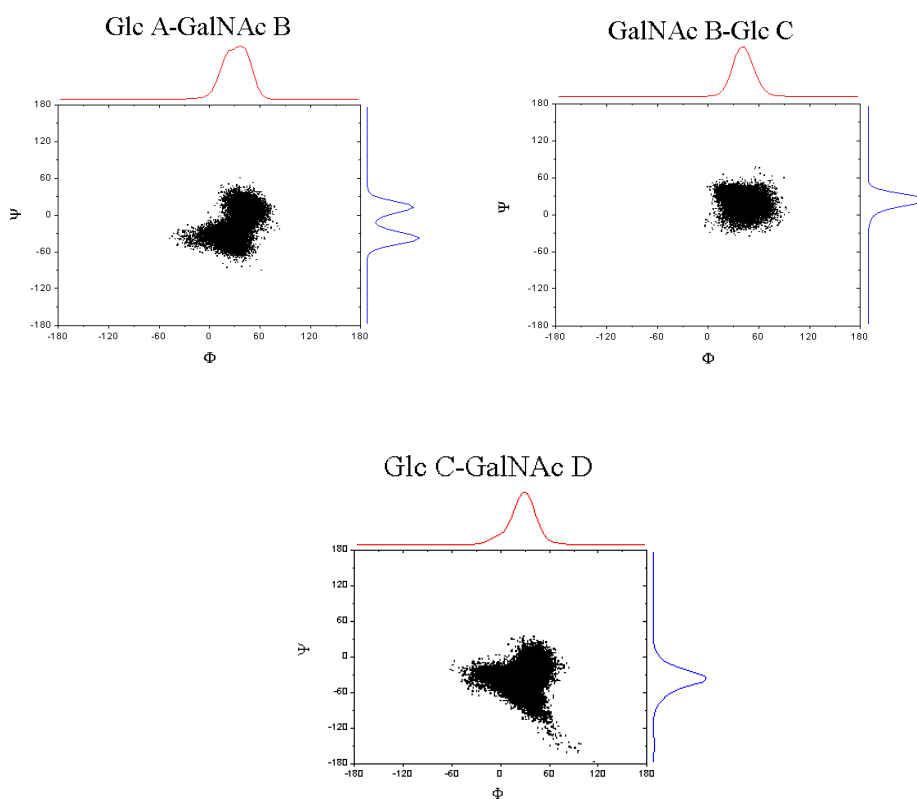


A.7. Gráficas de Cremer-Pople para el complejo 4-PTN3 para una dinámica de 200 ns.

A)

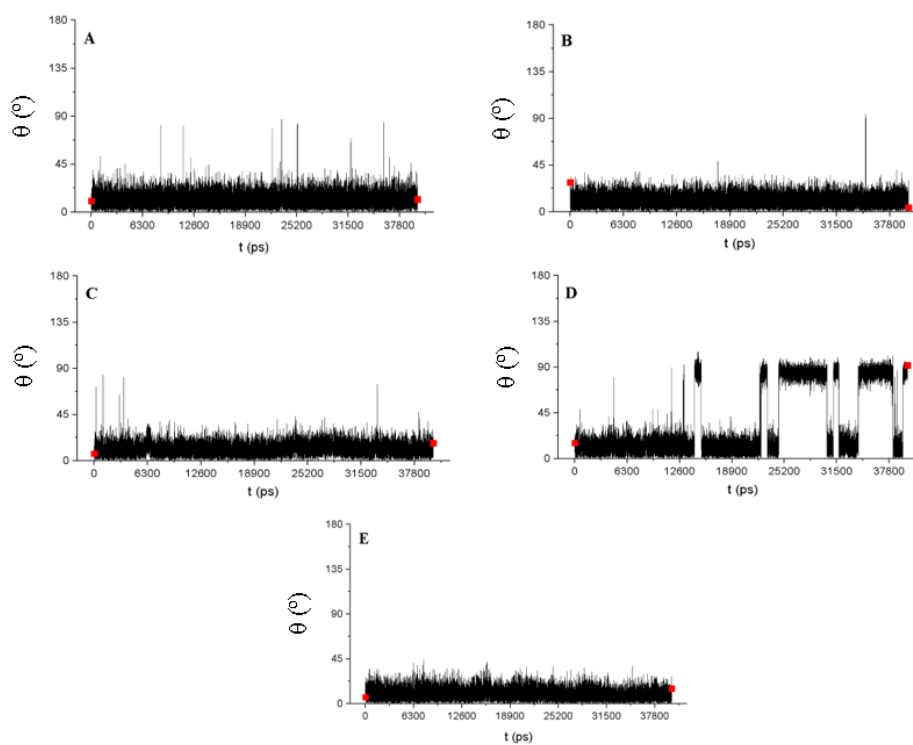


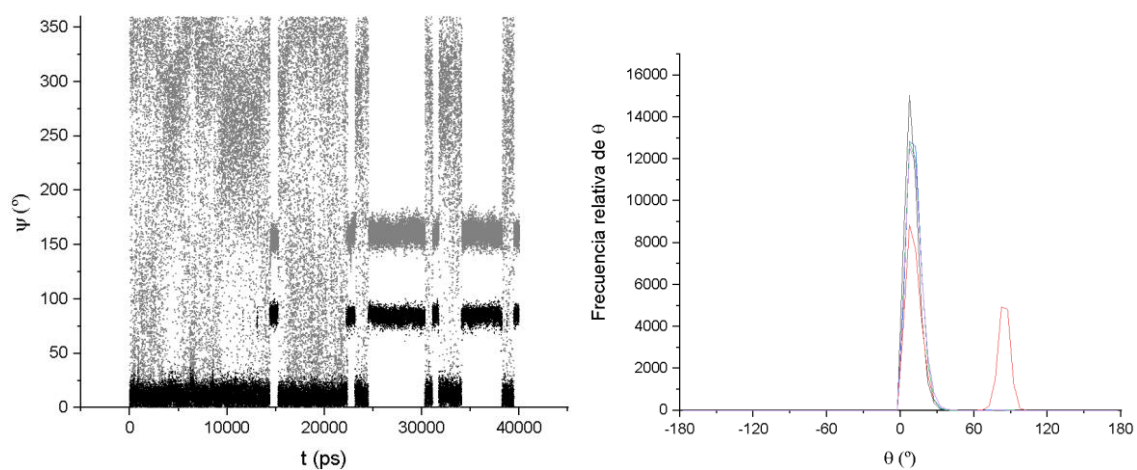
B)



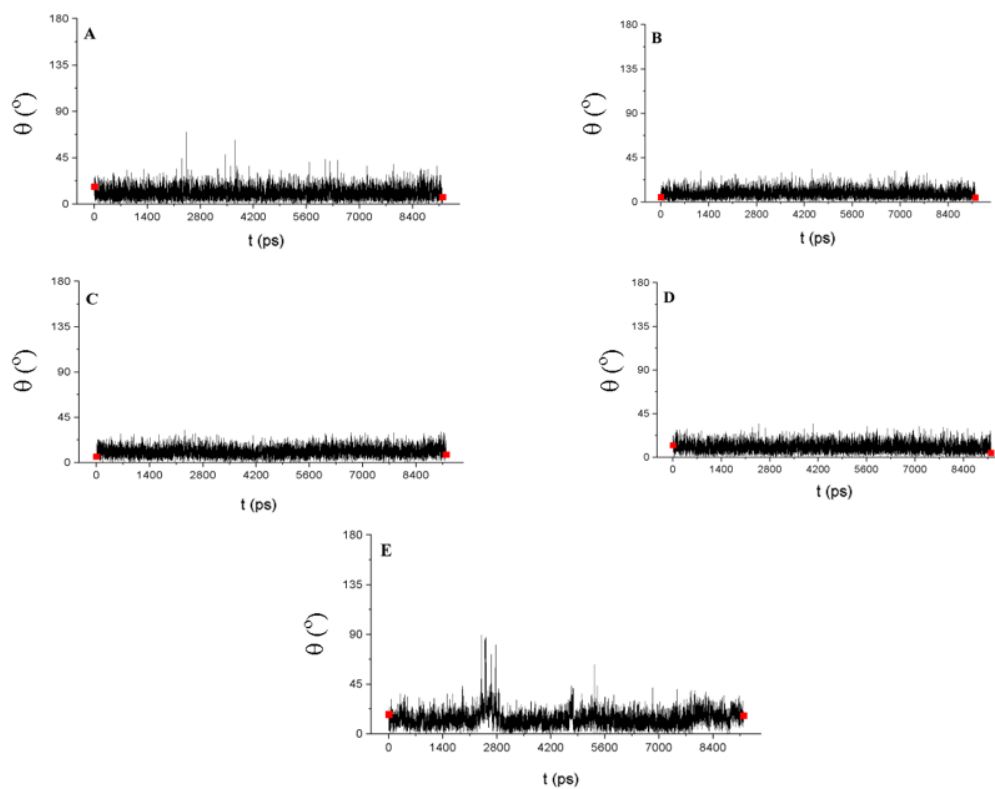
A.8. Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo 1-PTN3 (A) y 4-PTN3 (B) obtenidas de la dinámica de 200 ns.

A)



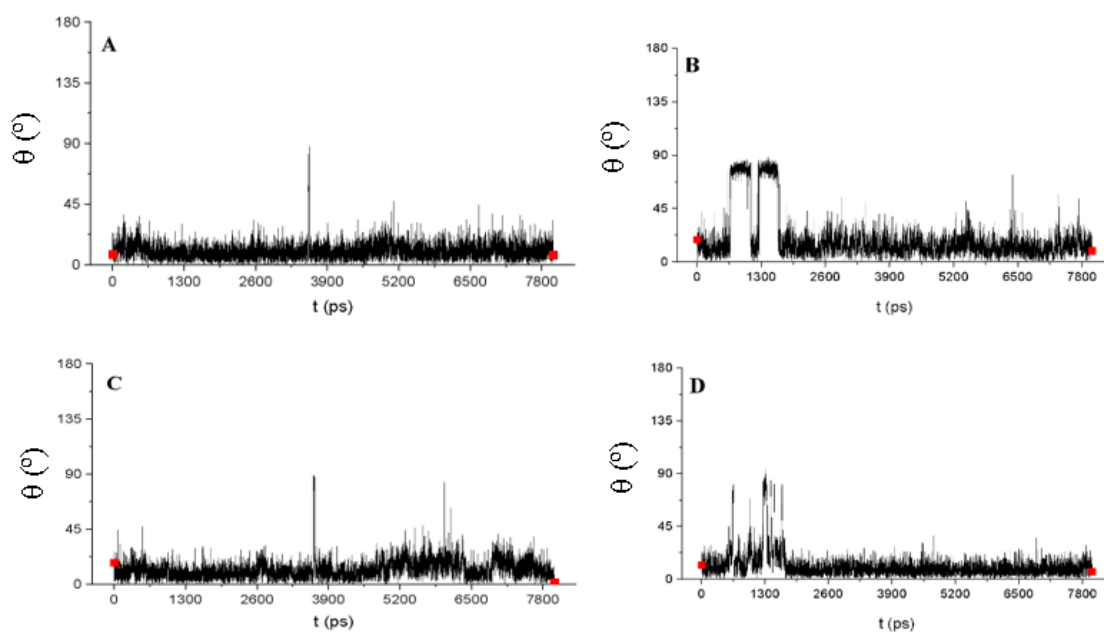


B)

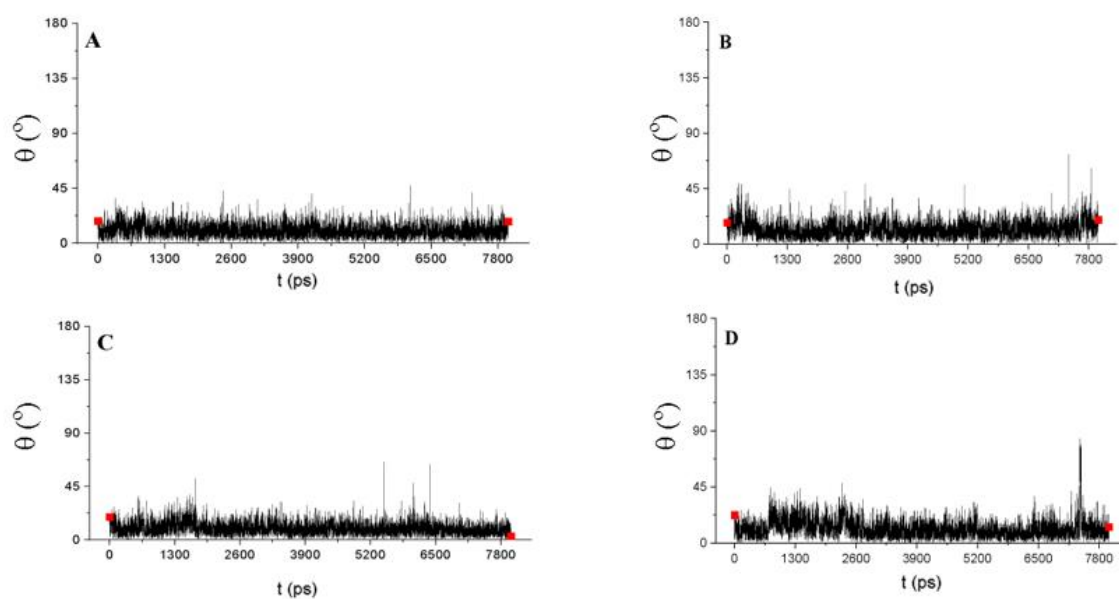


**A.9.** A) Gráficas de Cremer-Pople para el complejo **1-PTN8** para una dinámica de 200 ns. B) Corrección del azúcar **D** tras la MD-TAR de 40ns.

A)



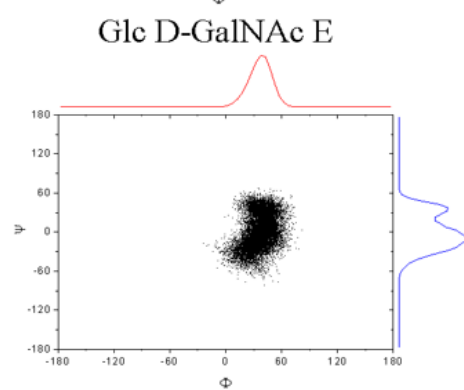
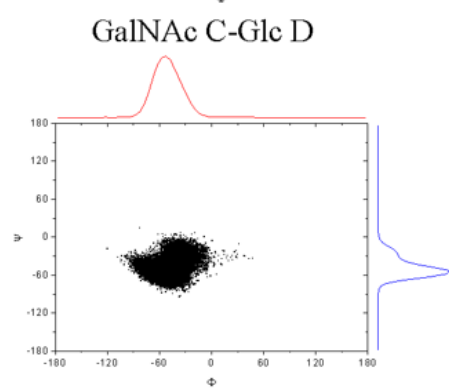
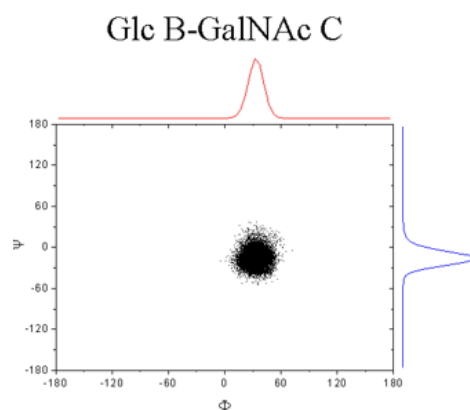
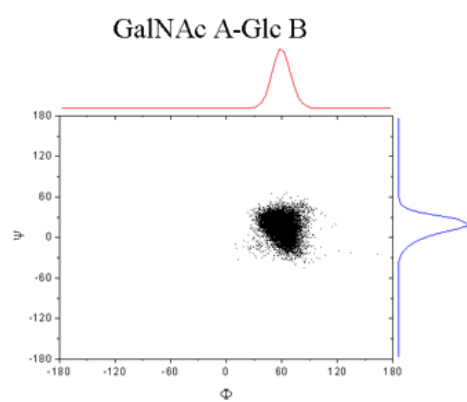
B)



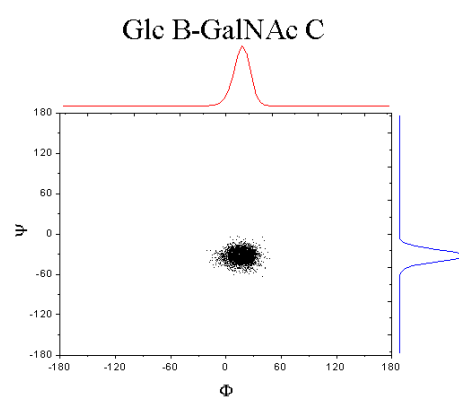
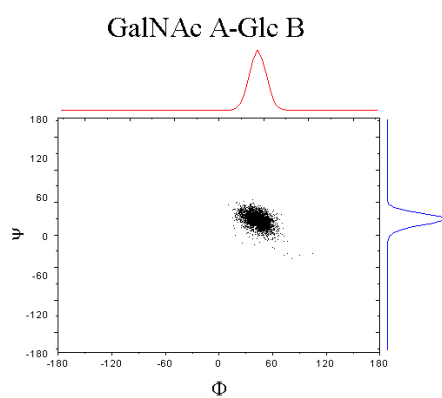
**A.10.** A) Gráficas de Cremer-Pople para el complejo 4-PTN8 para una dinámica MD-TAR de 40 ns con el primer confómero de mayor afinidad. B) Gráficas de Cremer-Pople resultado de la MD-TAR de 40 ns con el confómero 5.

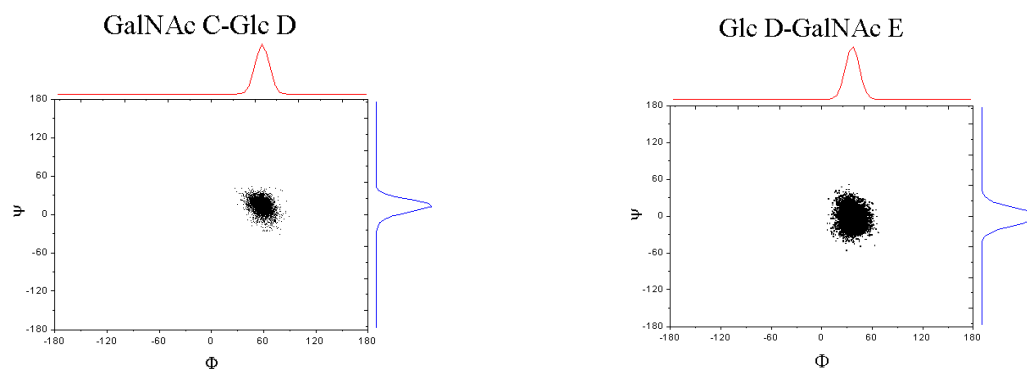


A)



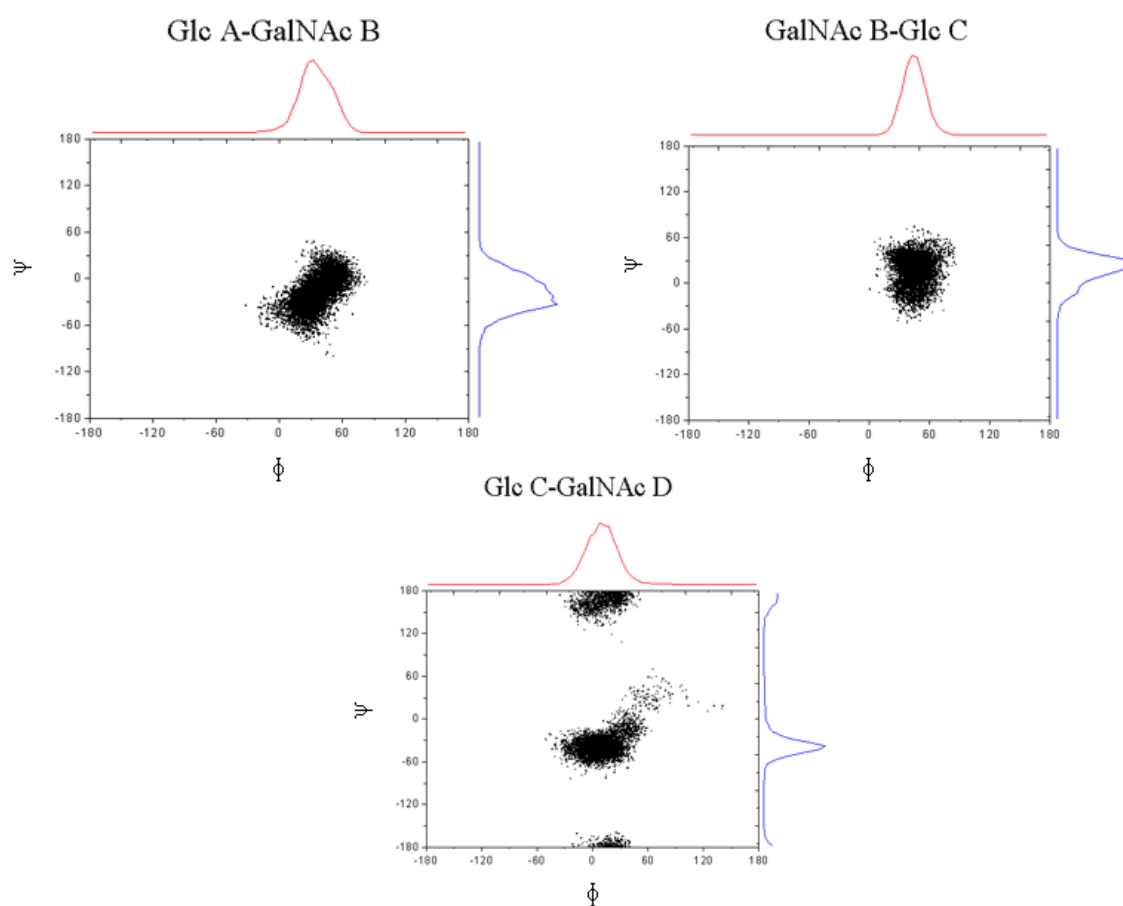
B)



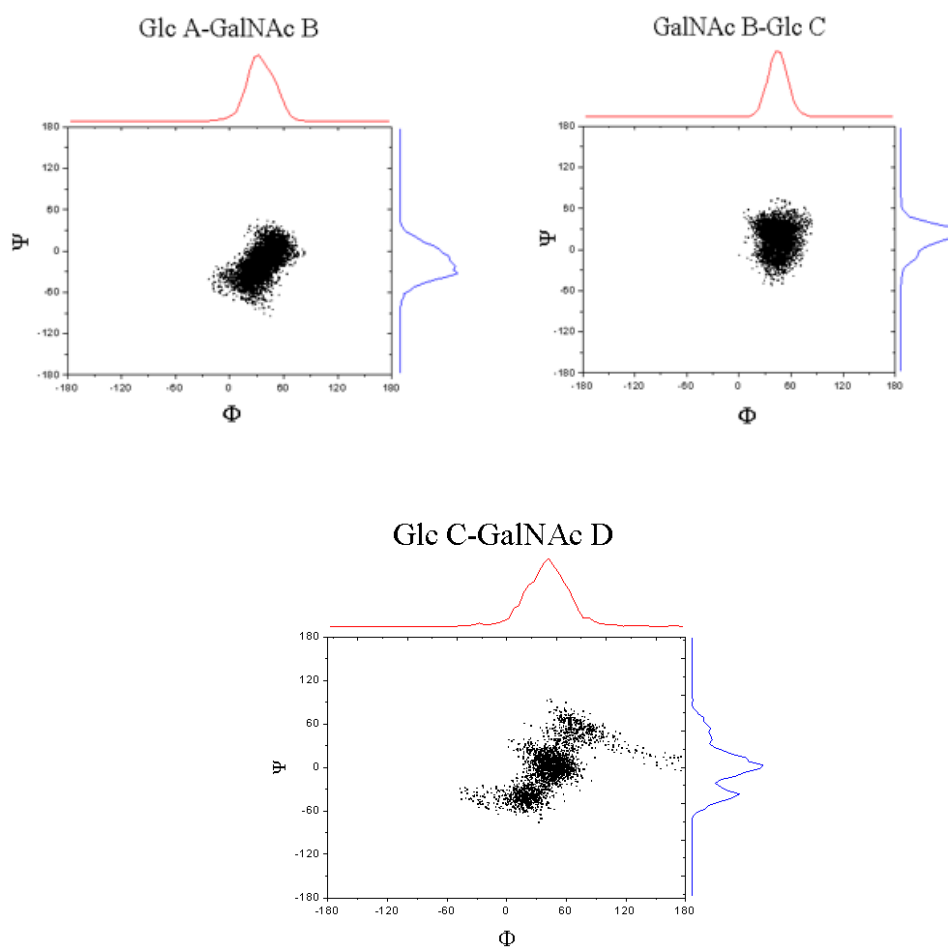


**A.11.** A) Trayectorias  $(\phi, \psi)$  para el complejo **1-PTN8** obtenidas de la dinámica de 200 ns. B) Trayectorias  $(\phi, \psi)$  obtenidas de la MD-TAR de 40 ns.

A)

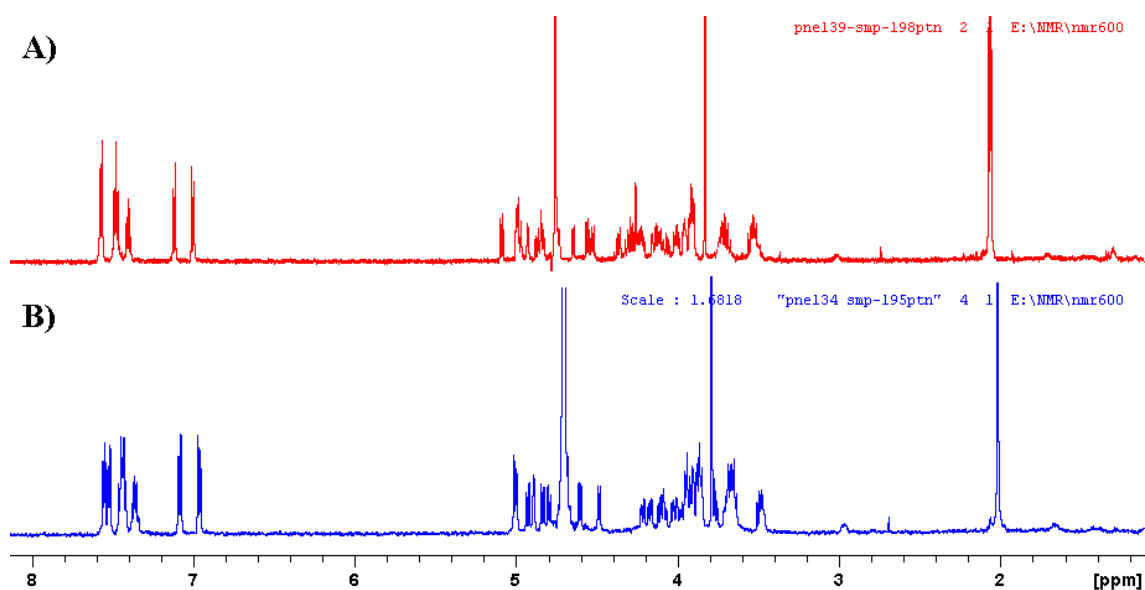


B)

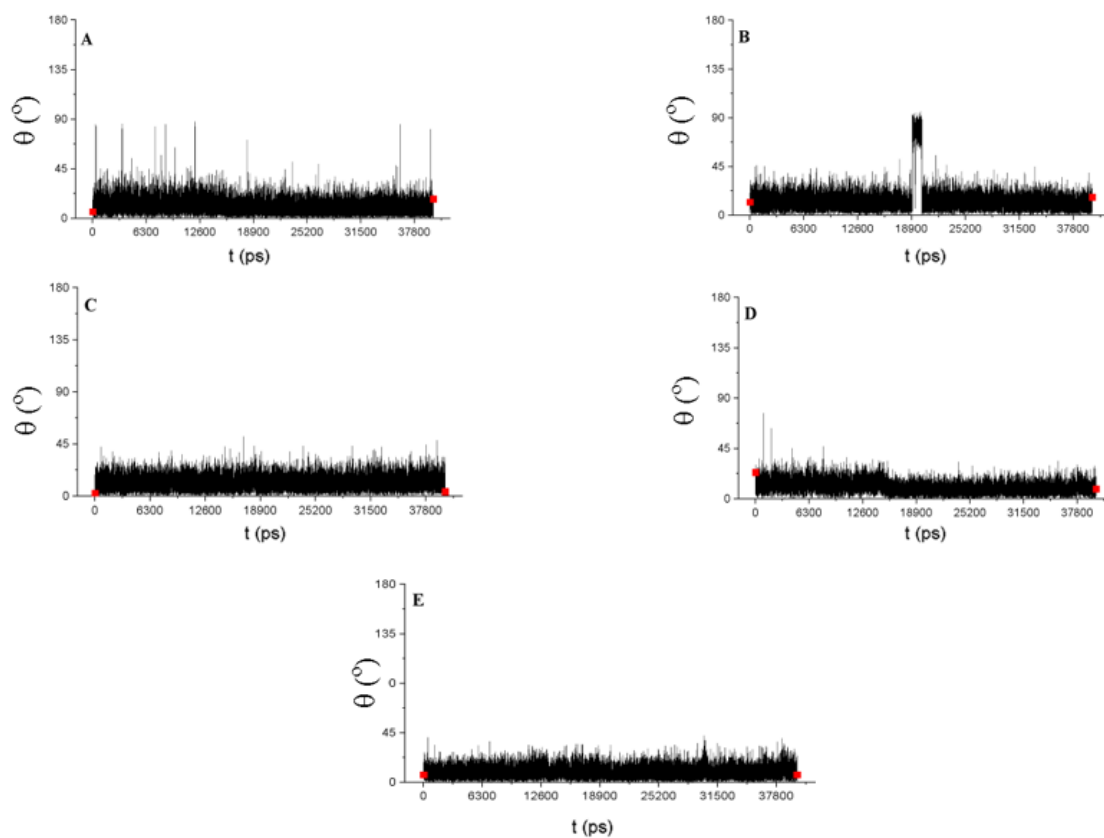


**A.12.** A) Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **4-PTN8** obtenidas de la MD-TAR de 40 ns con el primer confómero de mayor afinidad. B) Mapas ( $\phi$ ,  $\psi$ ) resultantes de la MD-TAR de 40 ns para el confómero 5.

➤ Análisis de los ligandos **2** y **5** con Pleiotrofina.

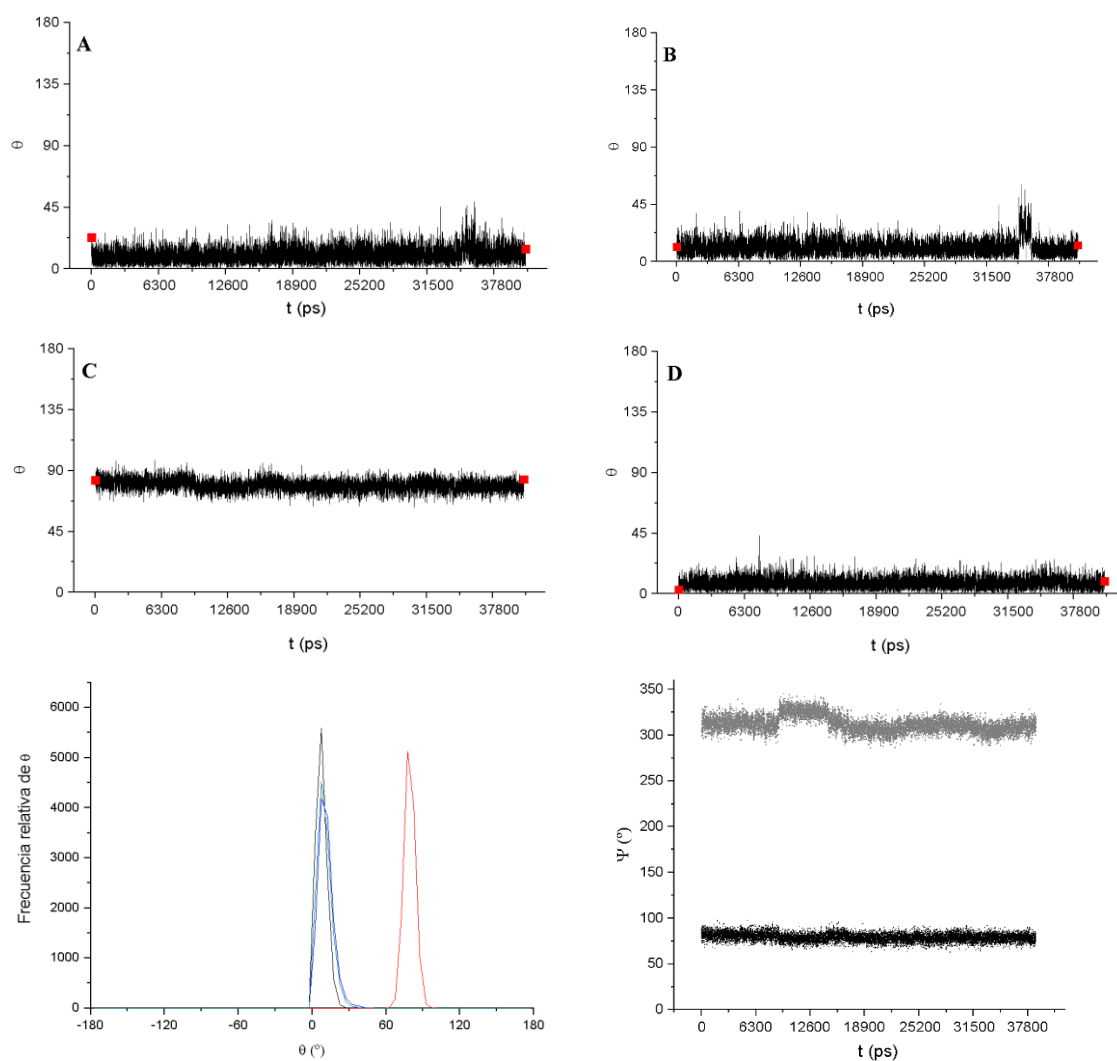


**A.13.** Espectros monodimensionales de los compuestos **2** (a) y **5** (b) a 1.5 mM y 300 K a 600 MHz, en presencia de PTN.

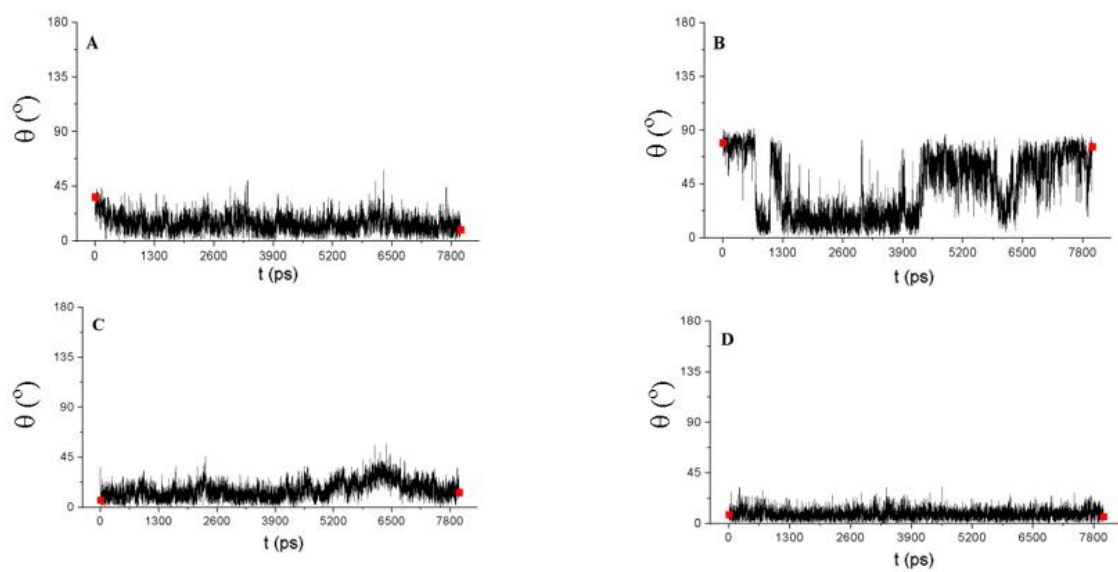


**A.14.** Gráficas de Cremer-Pople para el complejo **2-PTN4** para una dinámica de 200 ns.

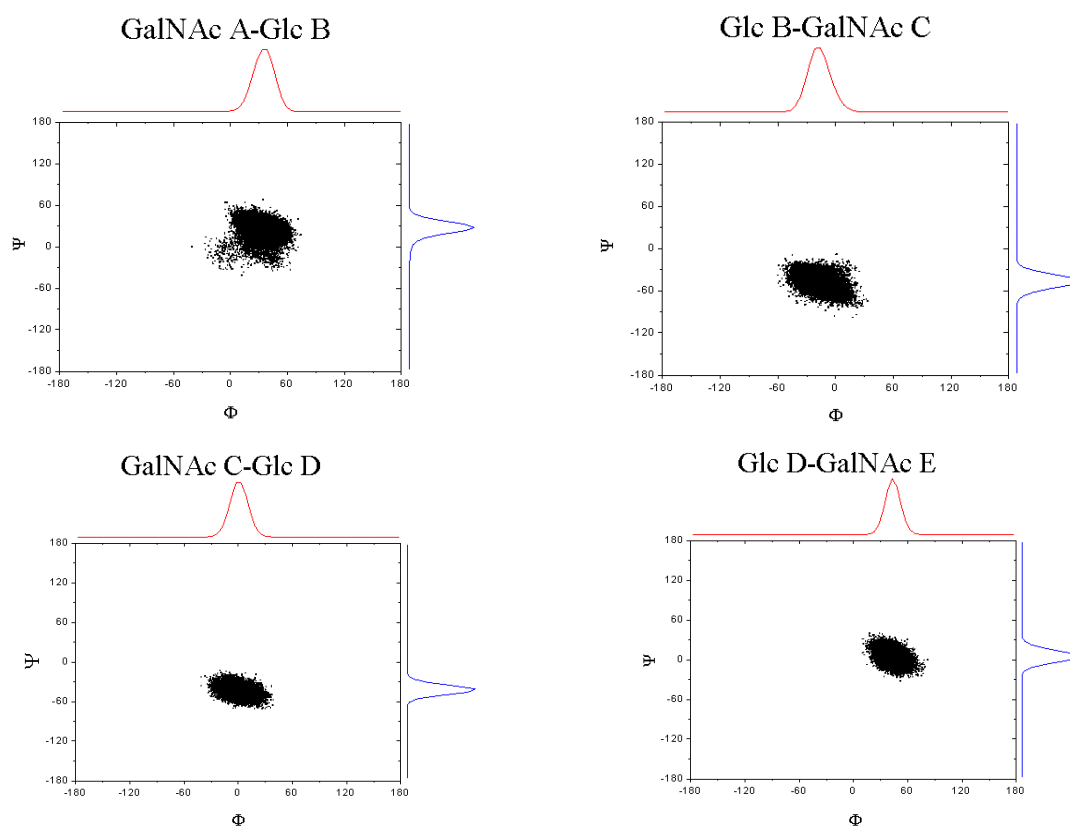
A)



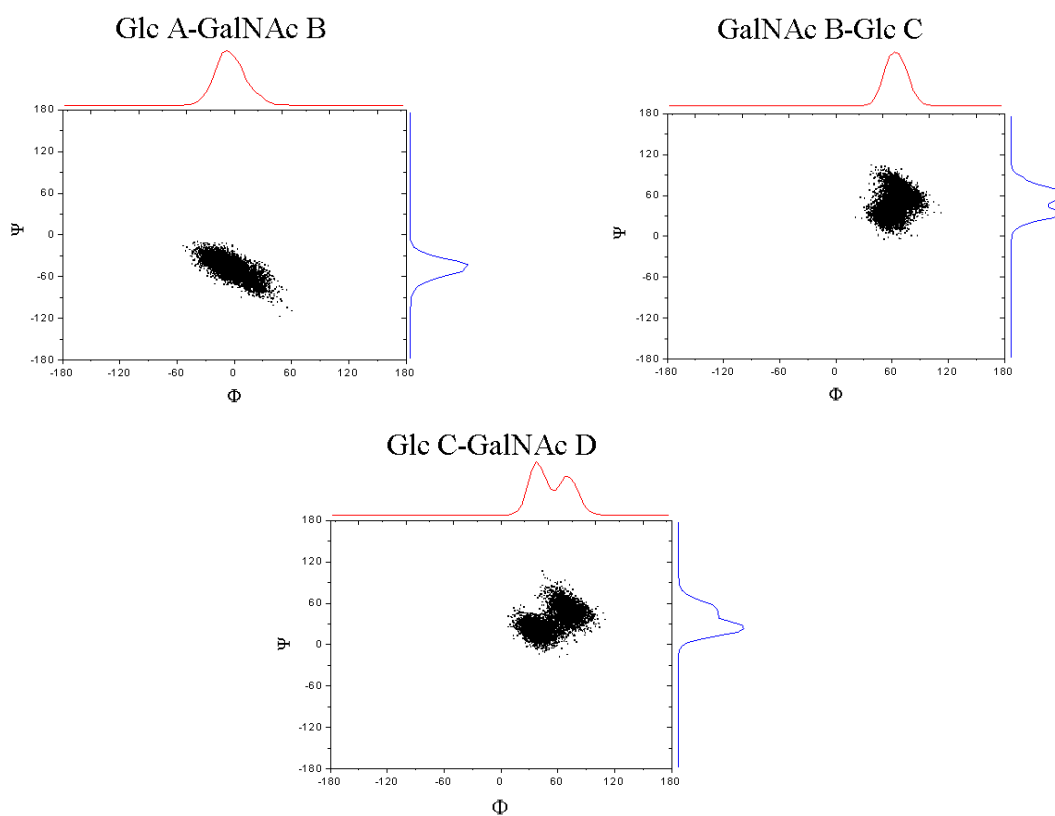
B)



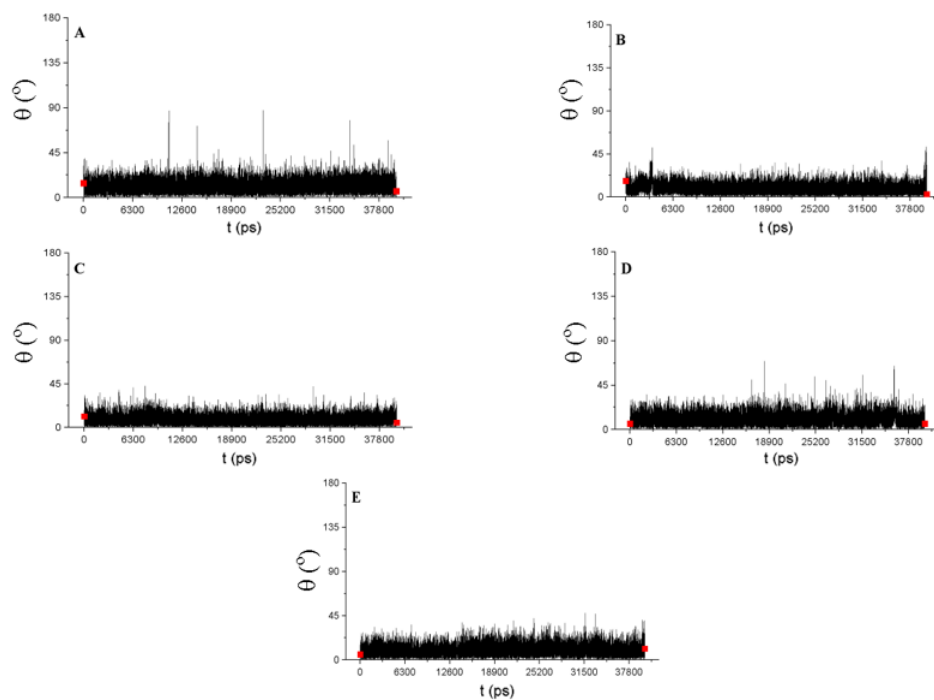
**A.15.** A) Gráficas de Cremer-Pople para el complejo **5-PTN4** para una dinámica de 200 ns. B) MD-TAR de 40 ns con una constante de fuerza  $K=50 \text{ Kcal}\cdot\text{mol}^{-1}\cdot\text{Å}^{-2}$



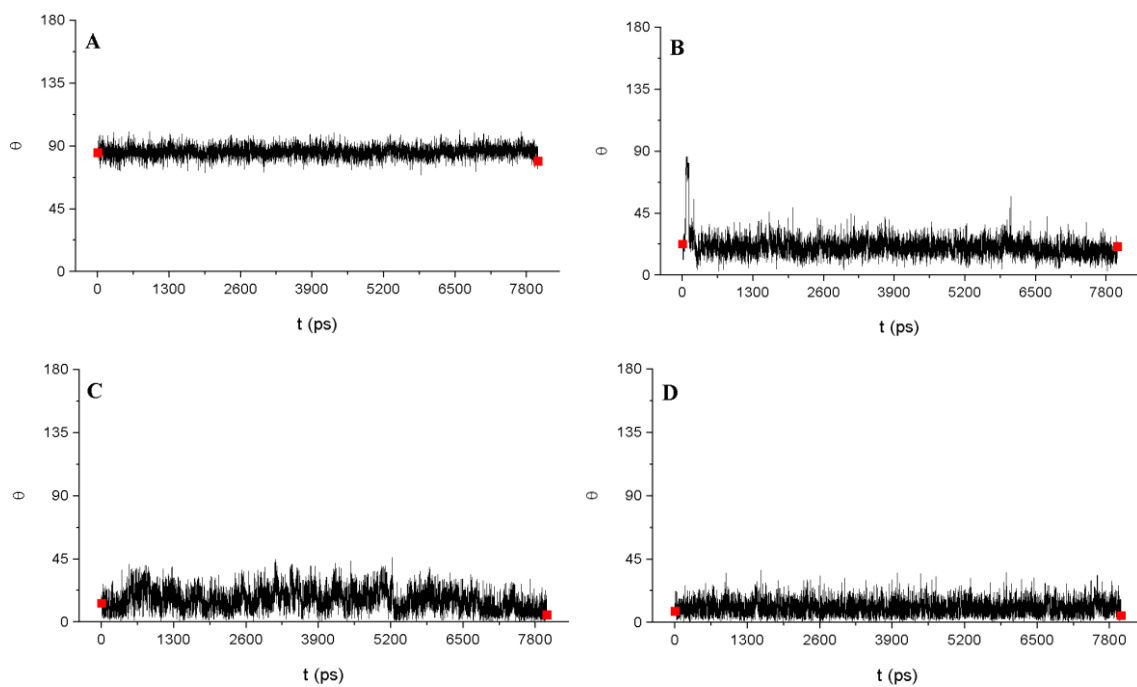
**A.16.** Trayectorias  $(\phi, \psi)$  para el complejo 2-PTN4 obtenidas de la dinámica de 200 ns.



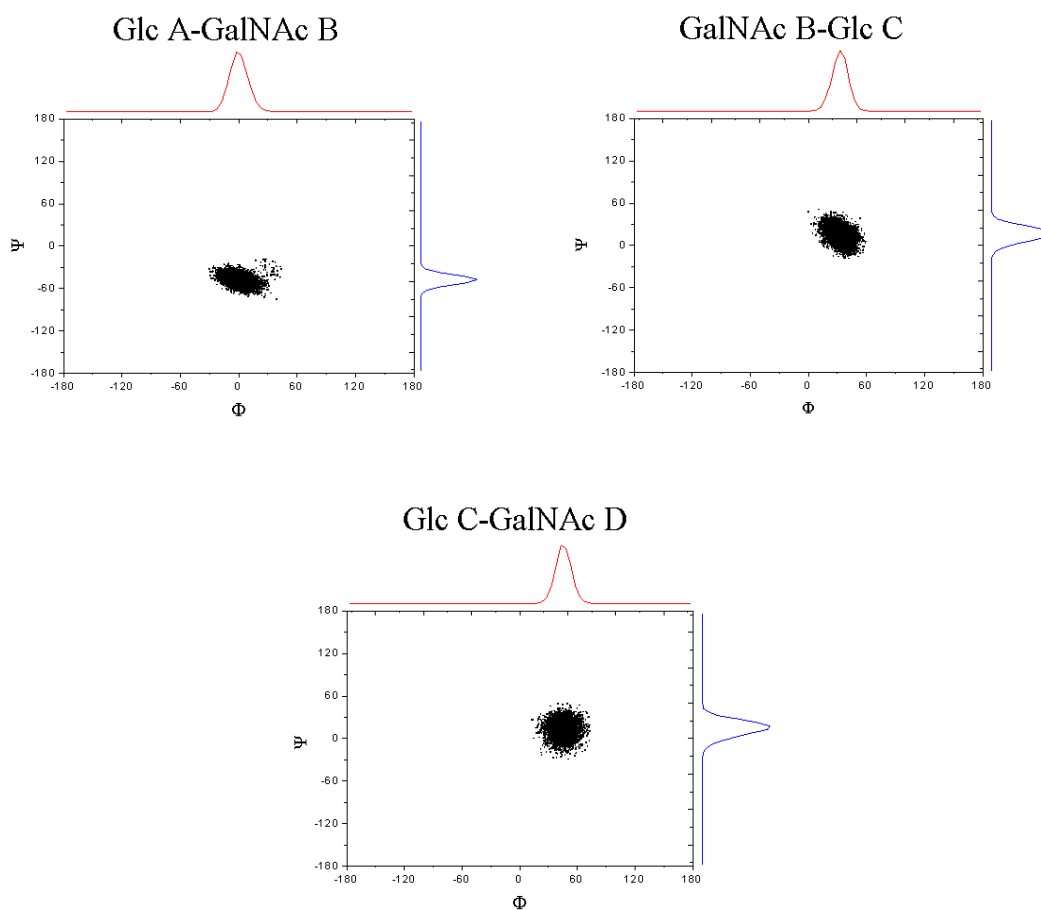
**A.17.** Trayectorias  $(\phi, \psi)$  para el complejo 5-PTN4 obtenidas de la MD-TAR de 40 ns con una constante de fuerza  $K=50 \text{ Kcal}\cdot\text{mol}^{-1}\cdot\text{\AA}^{-2}$ .



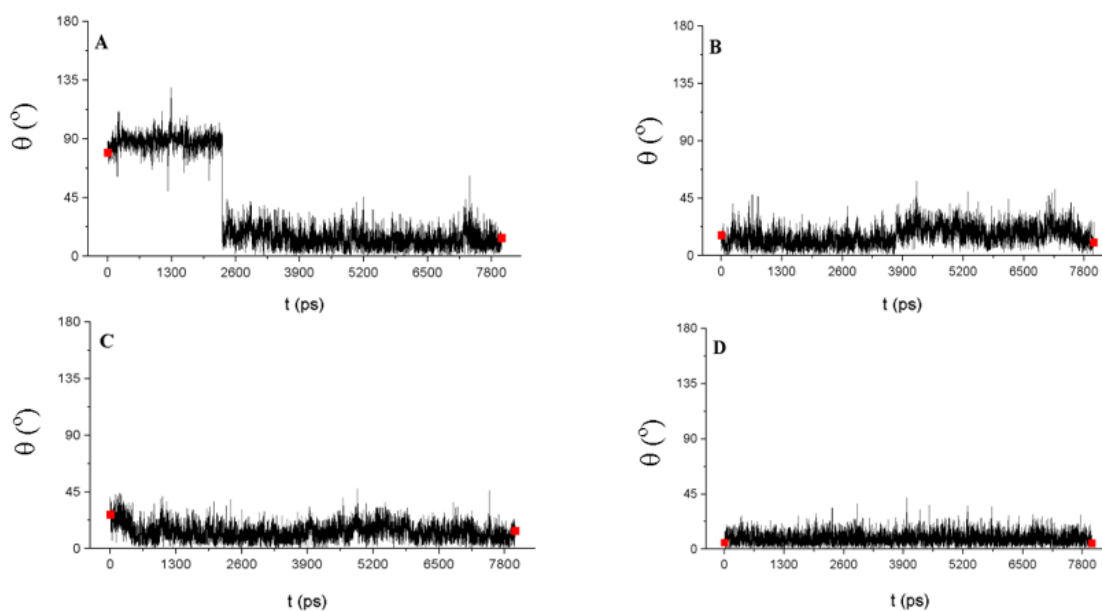
**A.18.** Gráficas de Cremer-Pople para el complejo 2-PTN3 para una dinámica de 200 ns.



**A.19.** Gráficas de Cremer-Pople para el complejo 5-PTN3 para una dinámica MD-TAR de 40 ns.

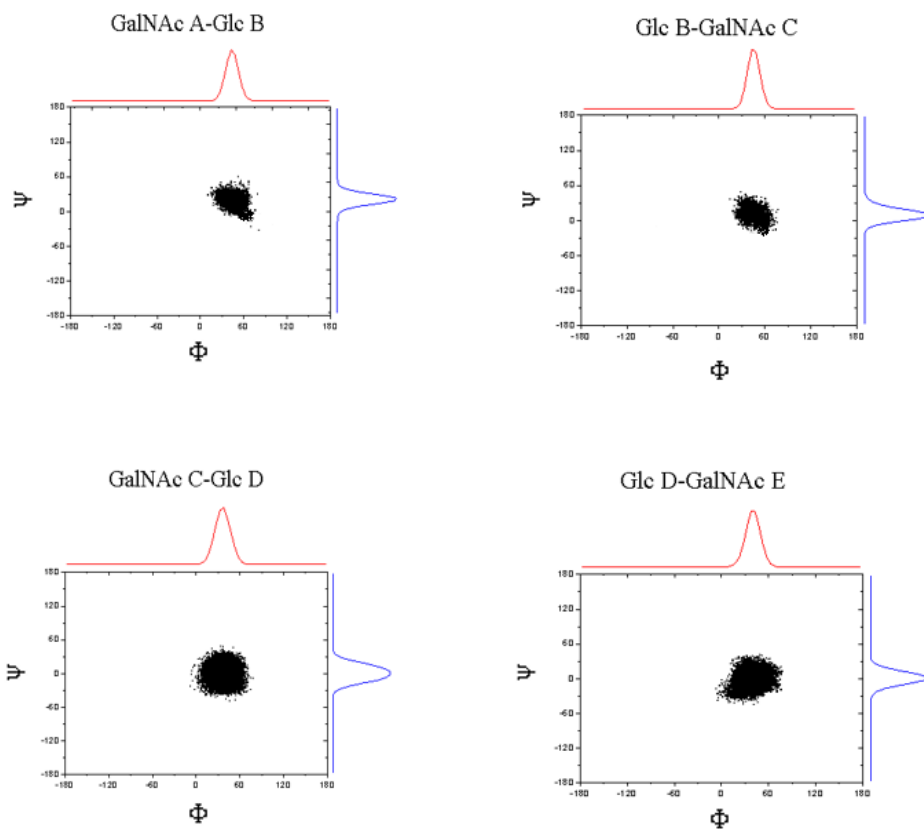


**A.20.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo 5-PTN3 obtenidas de la MD-TAR (40 ns) para el conformero 1.



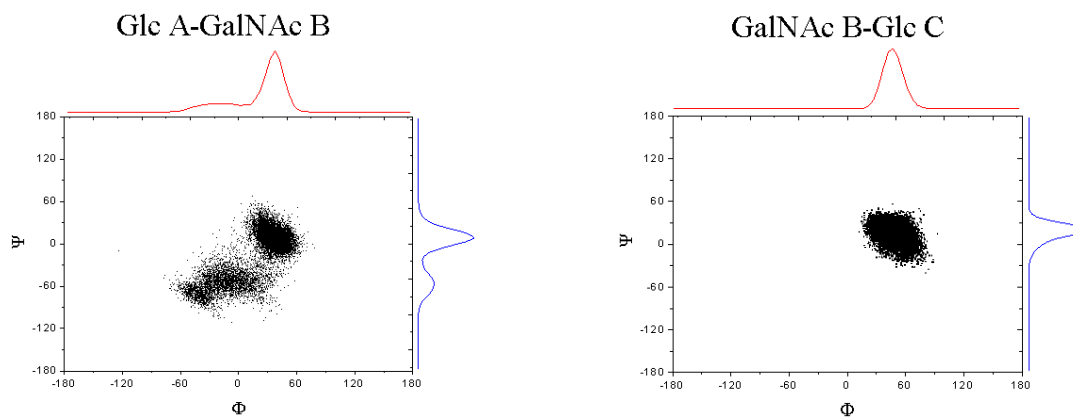
**A.21.** Gráficas de Cremer-Pople para el complejo 5-PTN3 para una dinámica de 40 ns con el conformero 2.



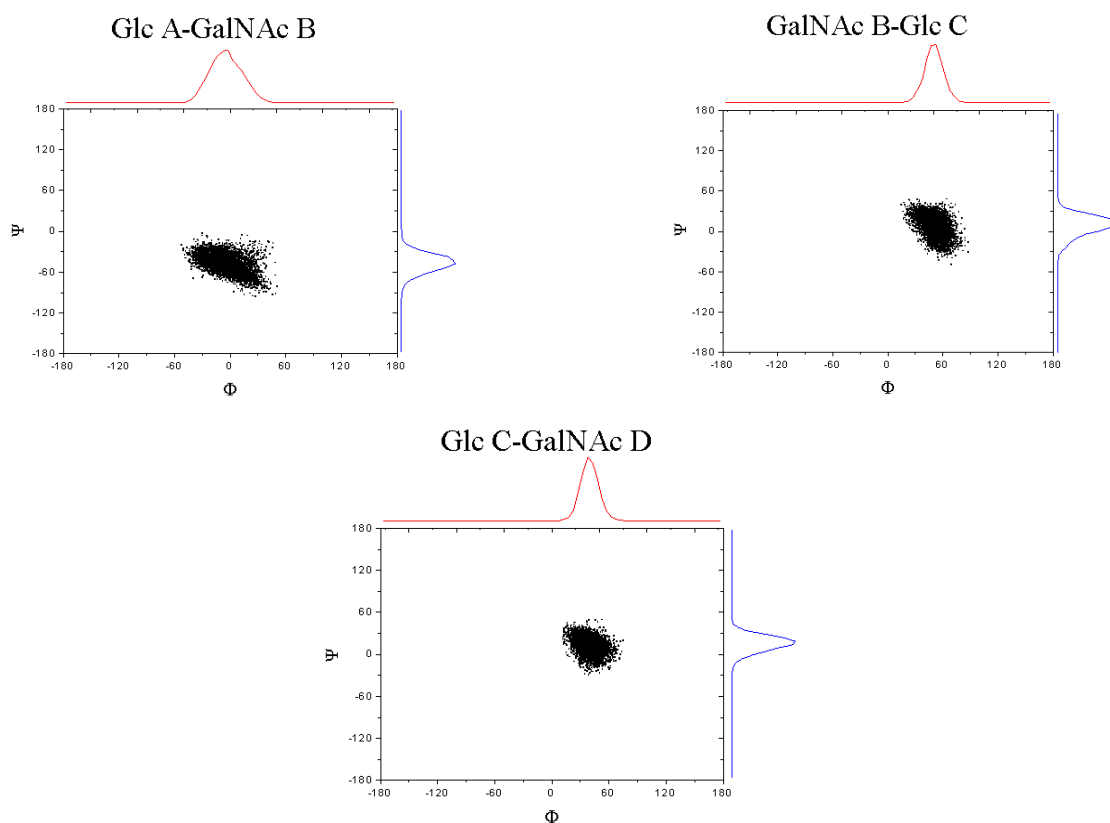


**A.22.** Trayectorias  $(\phi, \psi)$  para el complejo 2-PTN3 obtenidas de la dinámica de 200 ns.

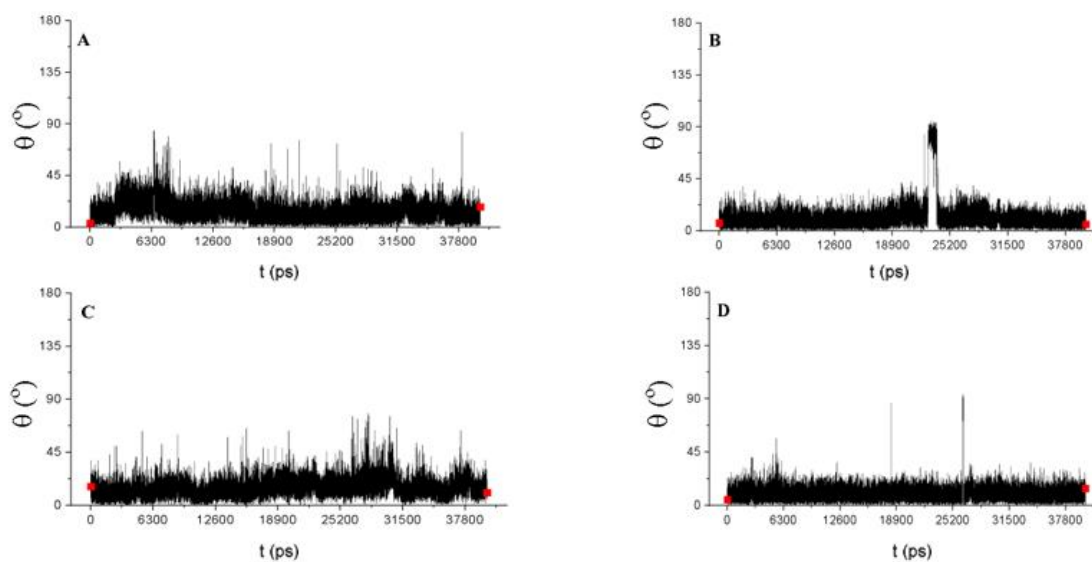
A)

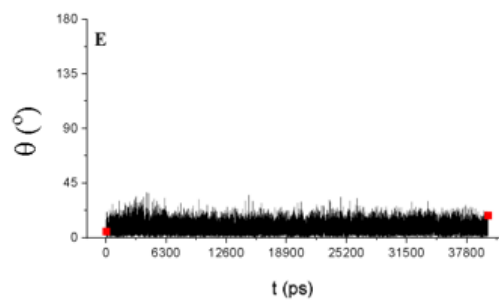


B)



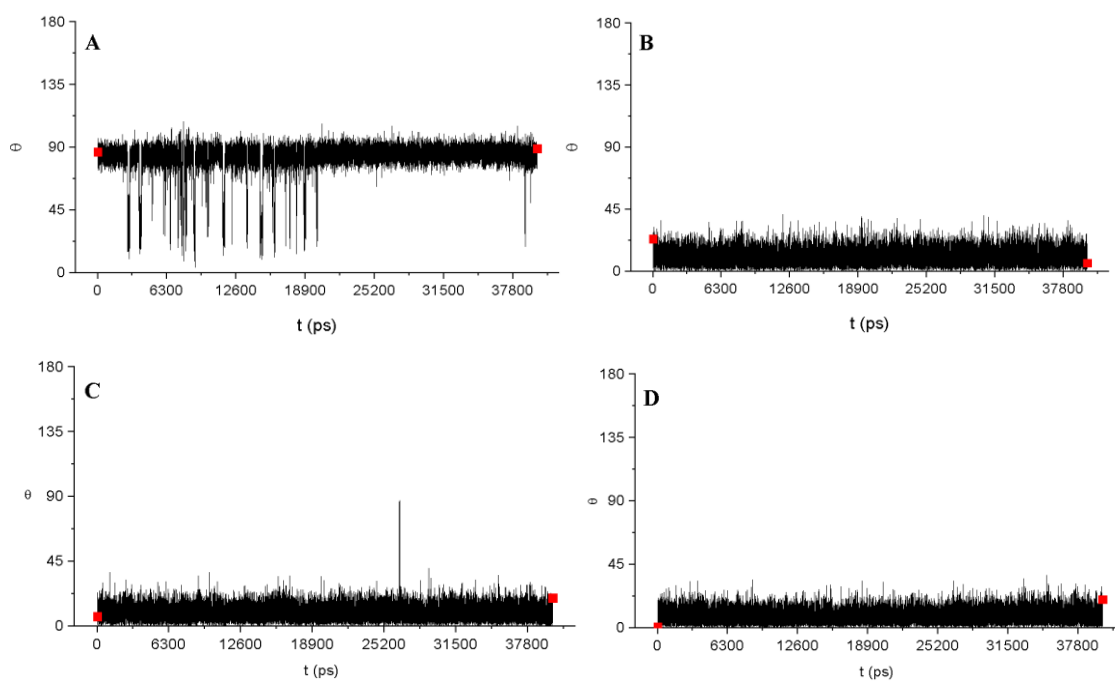
**A.23.** A) Trayectorias  $(\phi, \psi)$  para el complejo 5-PTN3 obtenidas de la dinámica de 200 ns, B) para una dinámica MD-TAR (40 ns) en ambos casos con el confómero 2.



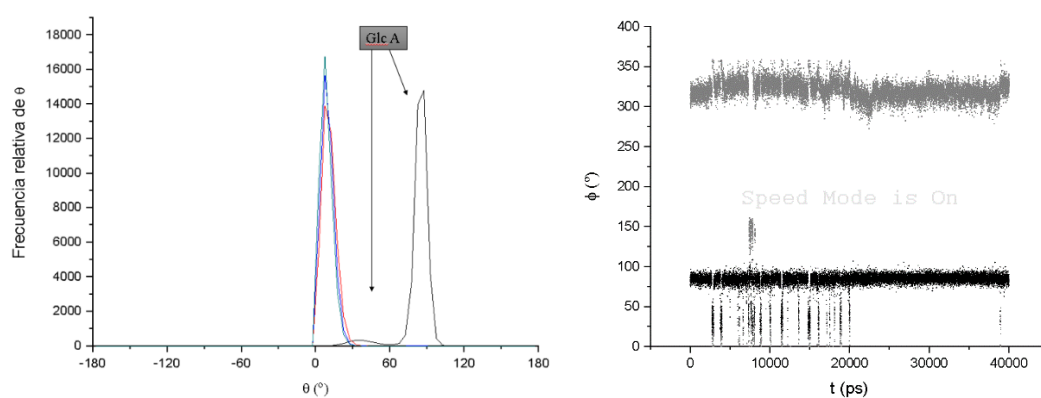


A.24. Gráficas de Cremer-Popple para el complejo 2-PTN8 para una dinámica de 200 ns.

A)

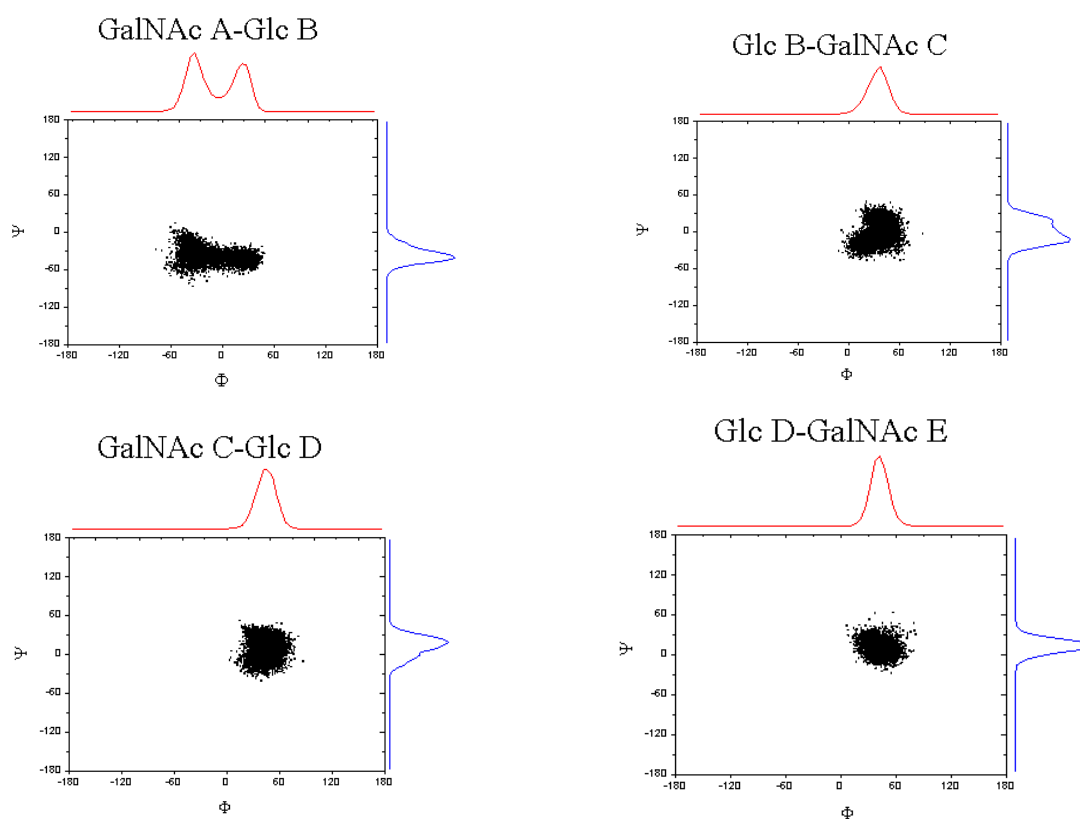


B)

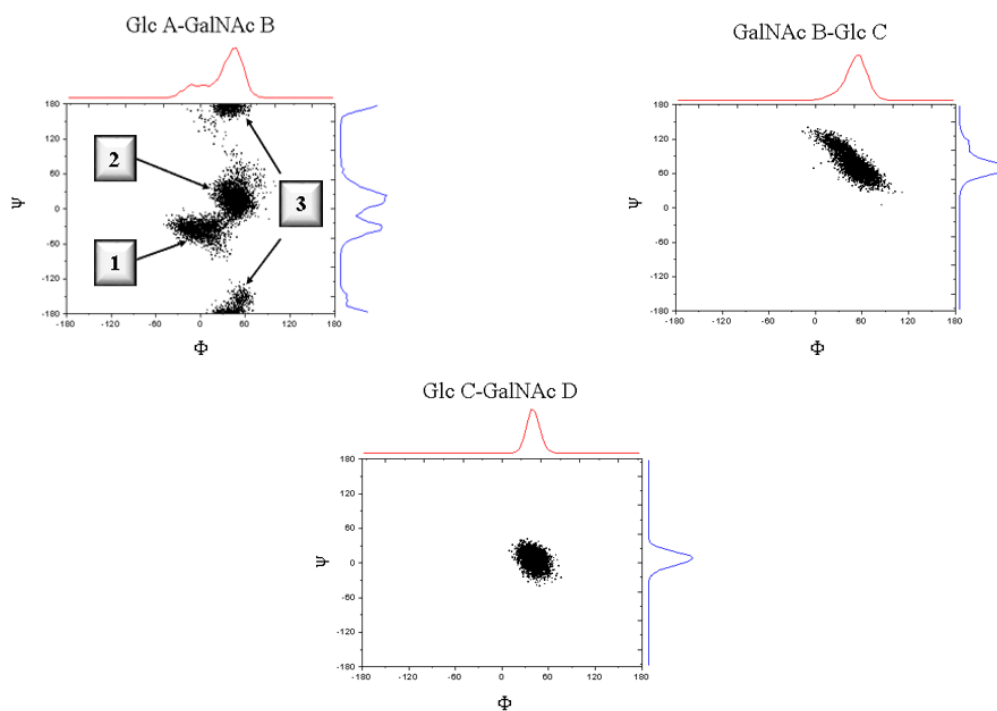


A.25. (A) Arriba, gráficas de Cremer-Popple para todos los ángulos  $\theta$  del complejo pentasacárido 5-PTN8, observándose distorsión en la Glc A.; (B) A la derecha, superposición de esta gráfica con  $\phi$  para conocer el tipo de distorsión del anillo, a la izquierda gráfica de la representación de la frecuencia relativa de  $\theta$  para todos los anillos del complejo de la dinámica sin restricciones.

A)

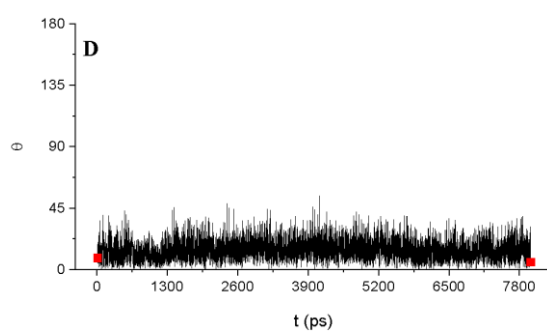
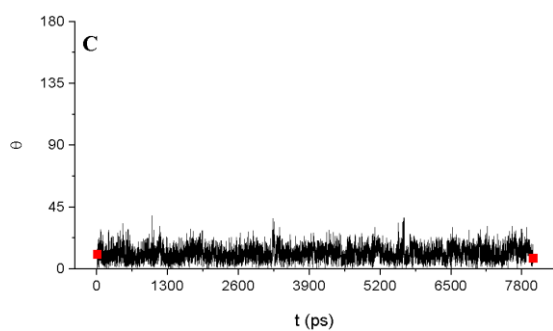
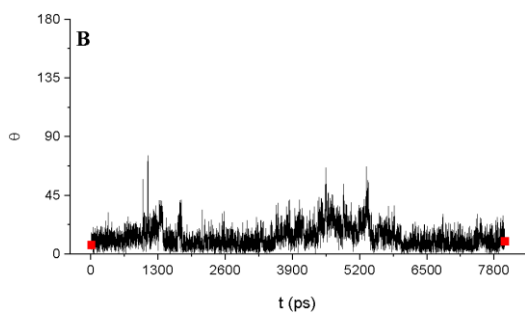
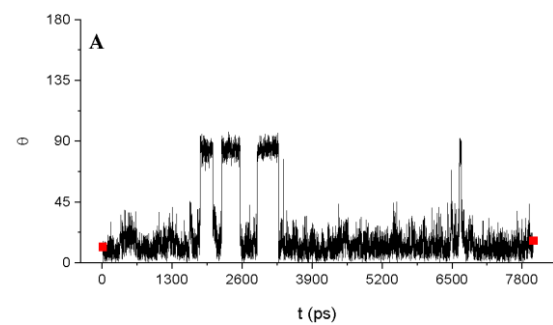


**A.26.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **2-PTN8** para una dinámica MD-TAR (40 ns) con corrección del enlace interglucosídico Glc B-GalNAc C.

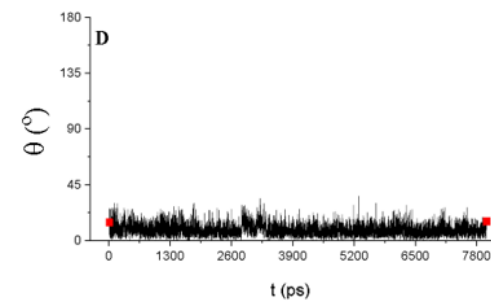
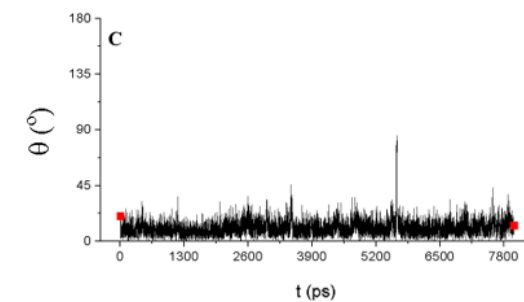
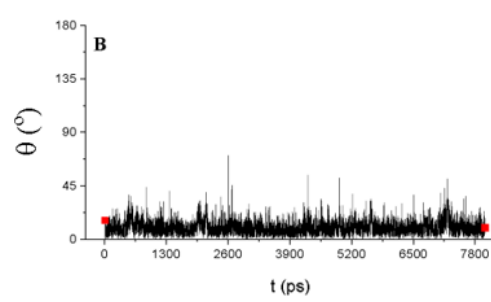
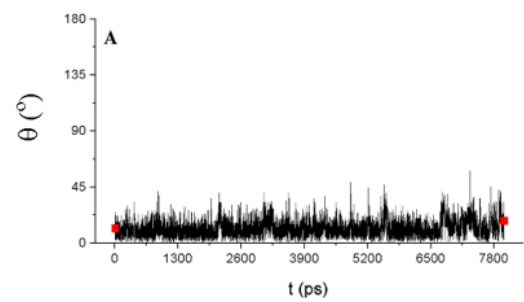


**A.27.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **5-PTN8** obtenidas de la dinámica de MD-TAR con el confórmero1 con restricciones en la Glc A y una constante de fuerza  $K=50 \text{ Kcal}\cdot\text{mol}^{-1}\cdot\text{\AA}^{-2}$ .

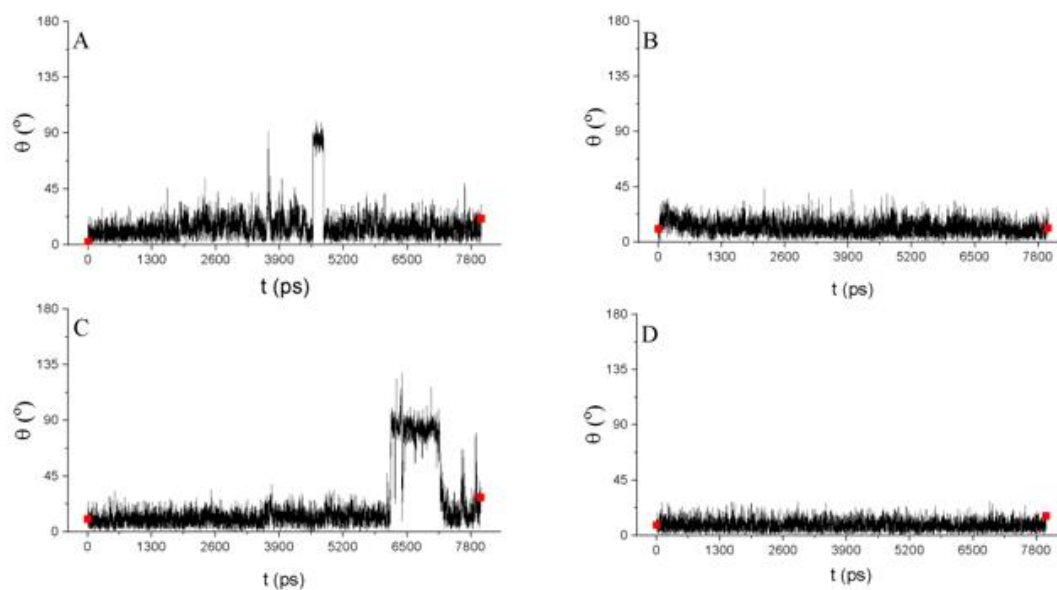
A)



B)

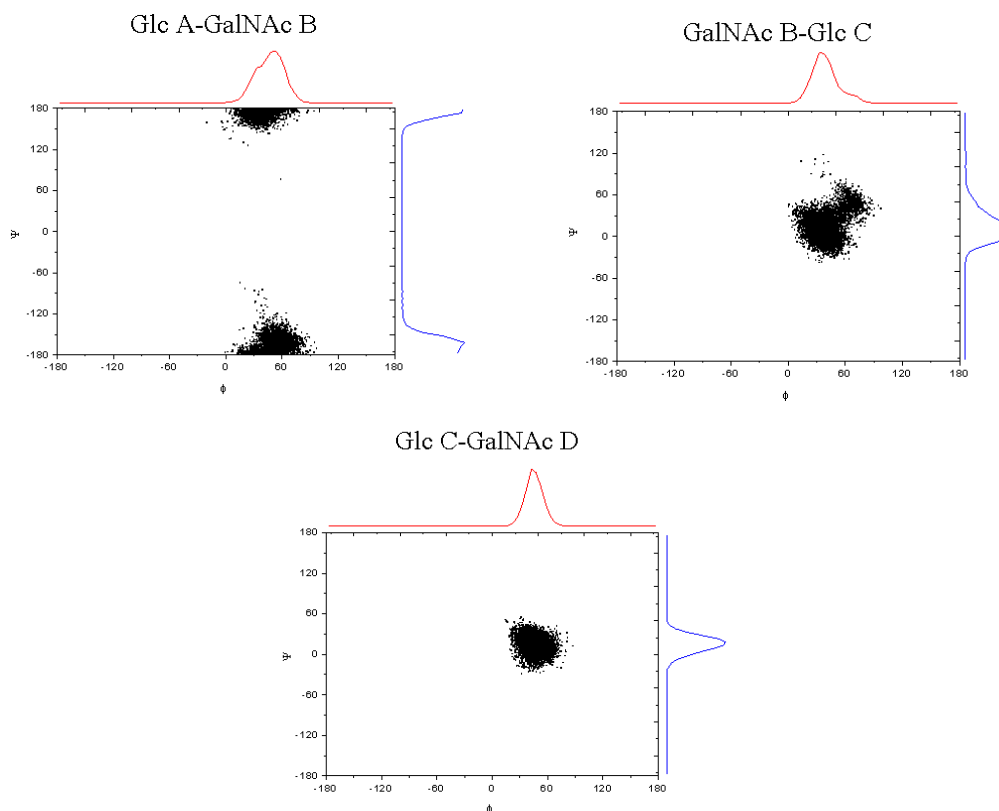


C)

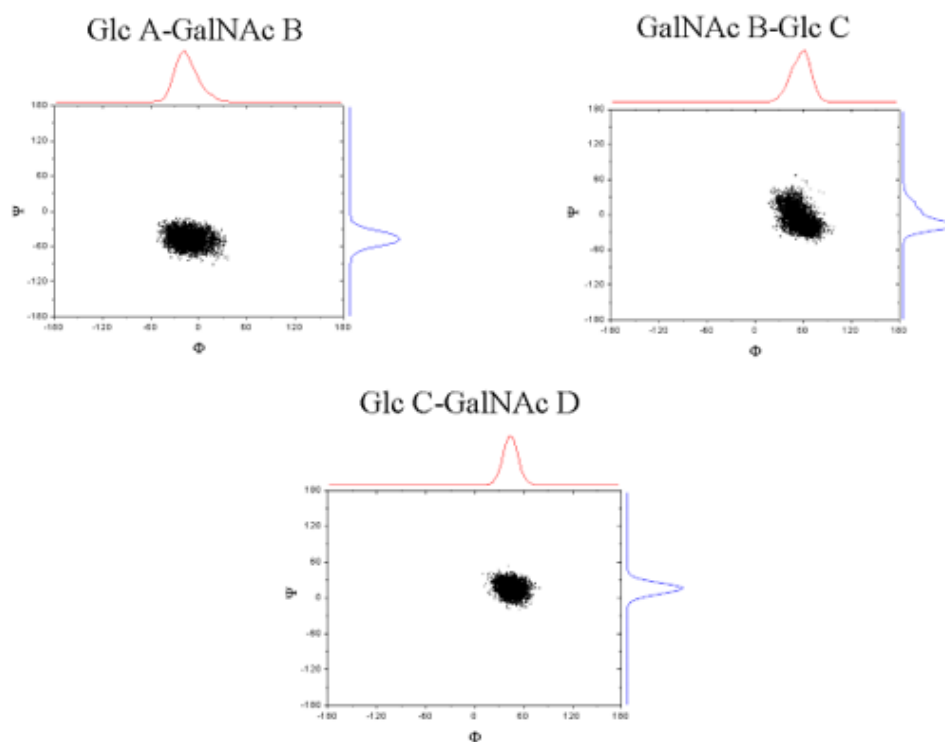


**A.28.** Gráficas de Cremer-Pople para el complejo 5-PTN8 para una dinámica MD-TAR de 40 ns con restricción en la Glc A con una constante de fuerza  $K=50$  (A); MD-TAR de 40 ns con restricción en A y en los enlaces interglucosídicos A-B y B-C (B). MD-TAR de 40 ns con restricción en A utilizando el confórmero 7.

A)

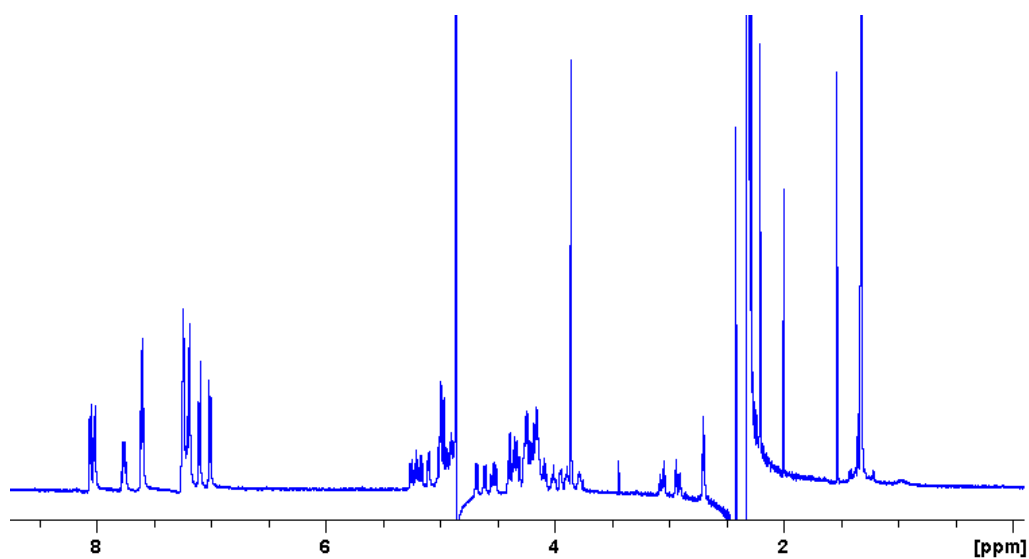


B)



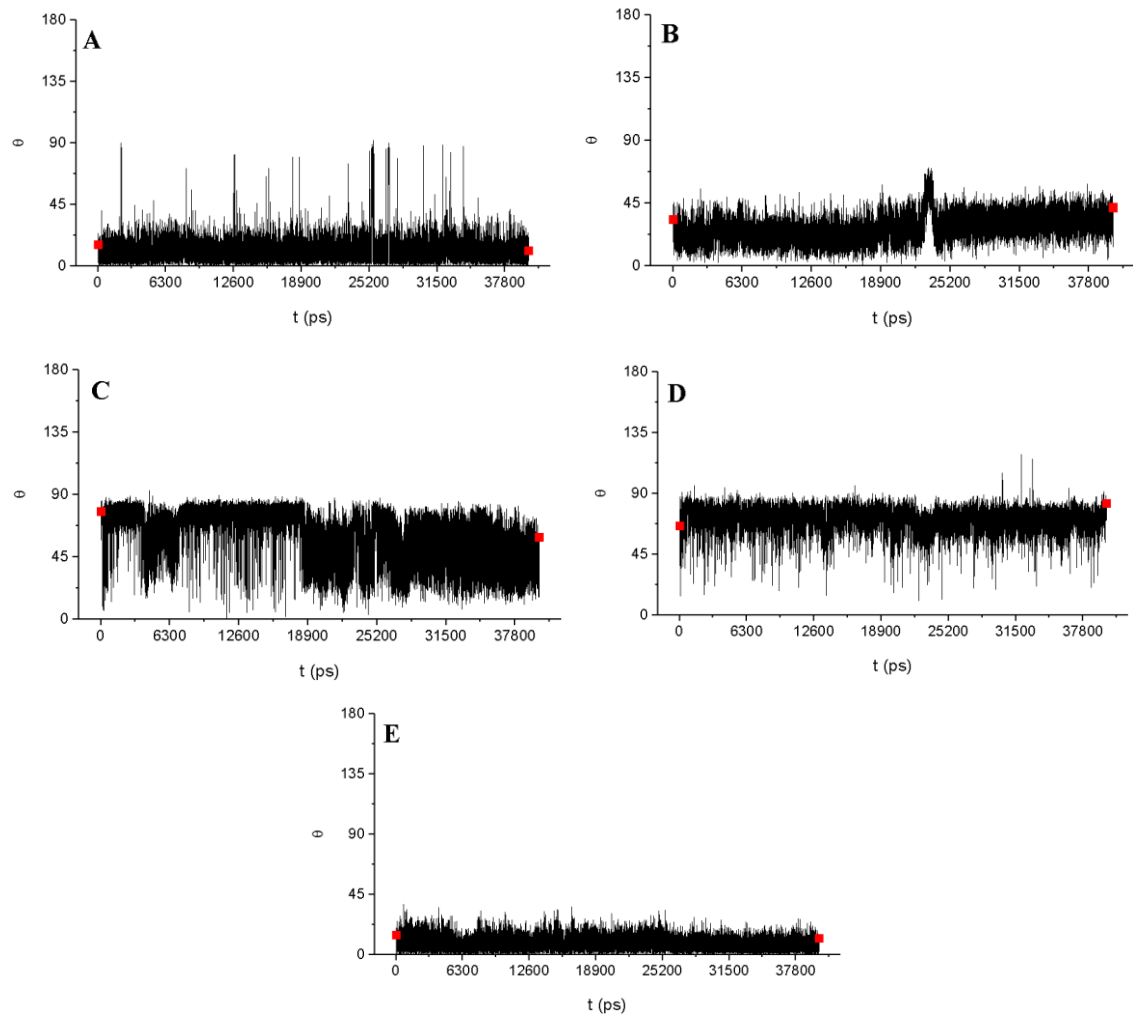
**A.29.** Mapas ( $\phi$ ,  $\psi$ ) de las trayectorias MD-TAR con restricciones en el anillo A y en los enlaces interglucosídicos A-B y B-C para el complejo 5-PTN8 (A) Repetición MD-TAR de 40 ns con restricción en A utilizando el conformero 7.

➤ Análisis del ligando **3** con Pleiotrofina.

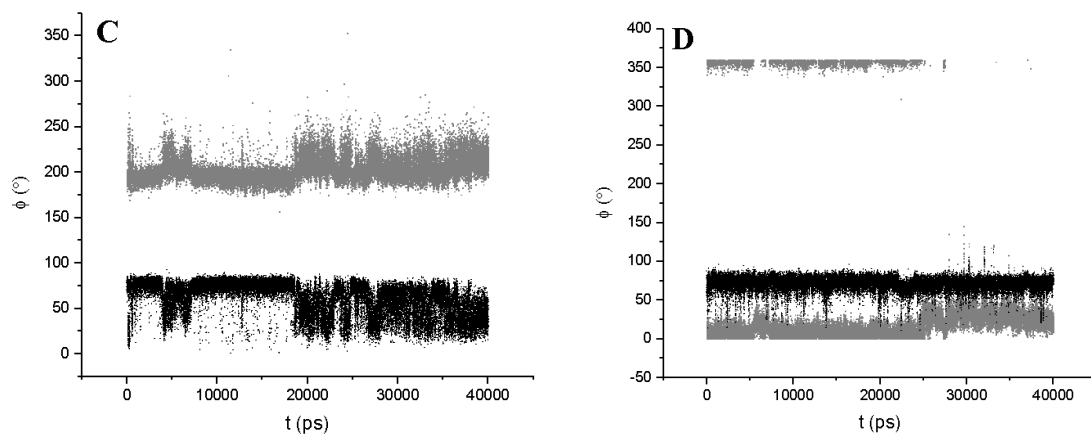


**A.30.** Espectro monodimensional del compuesto **3** a 1.5 mM y 300 K a 600 MHz, en presencia de PTN.

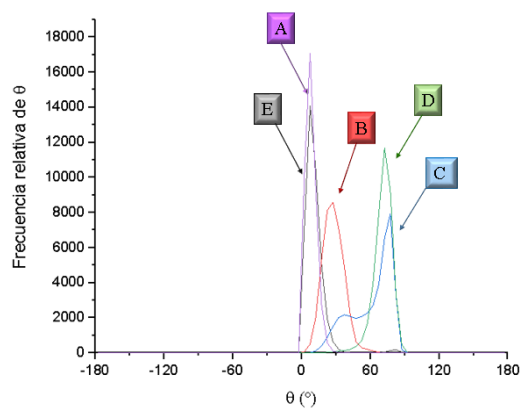
A)



B)

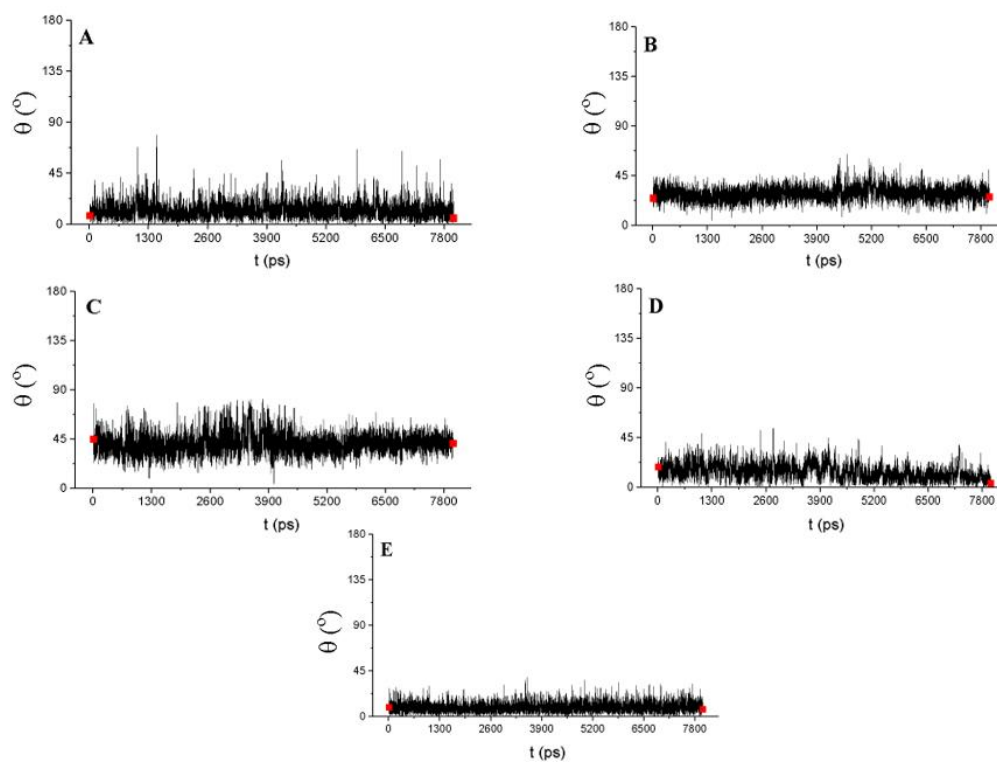




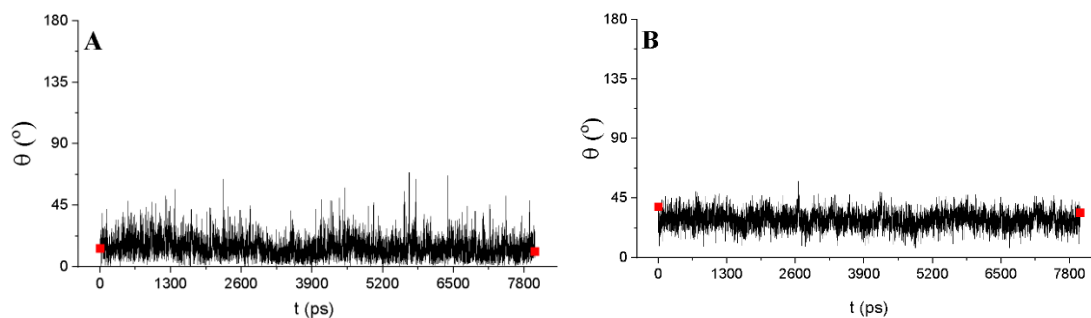


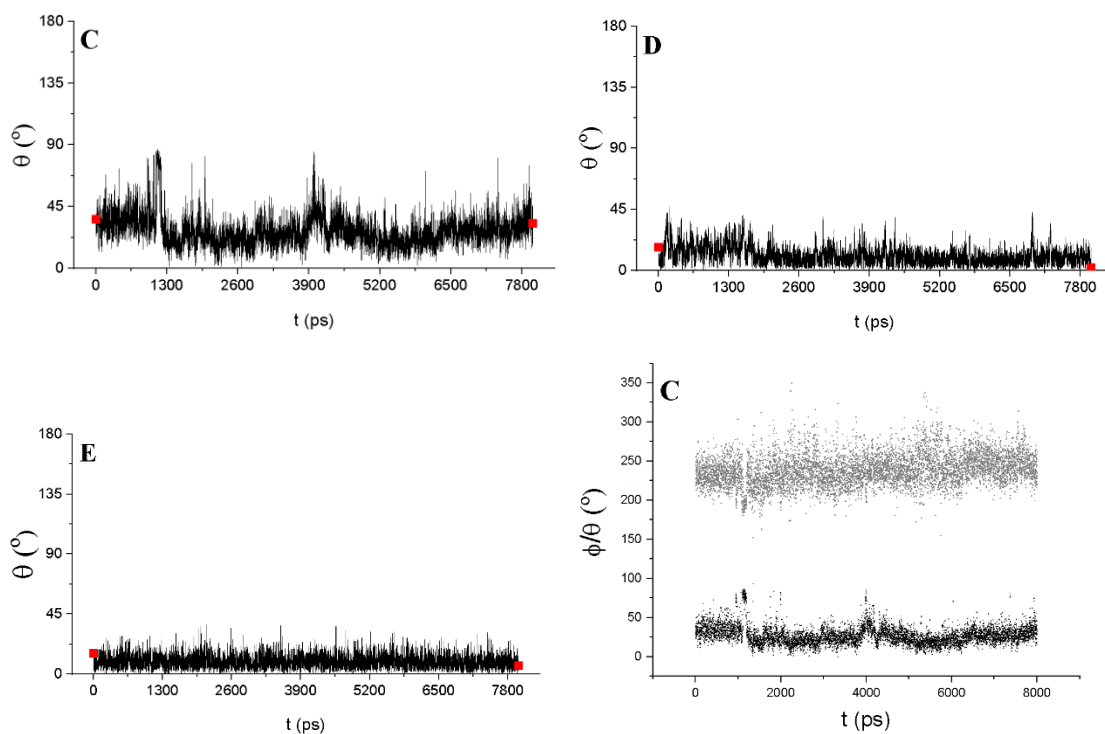
**A.31.** A) Gráficas de Cremer-Pople para el complejo **3-PTN4** para una dinámica de 200 ns. B) Representación del ángulo  $\phi$  para ambos anillos y de las frecuencias relativas de todos ellos.

A)

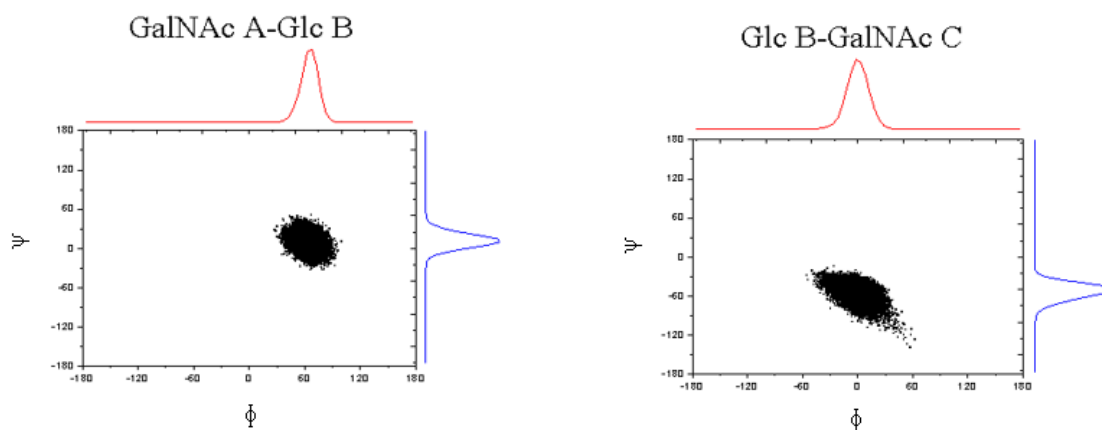


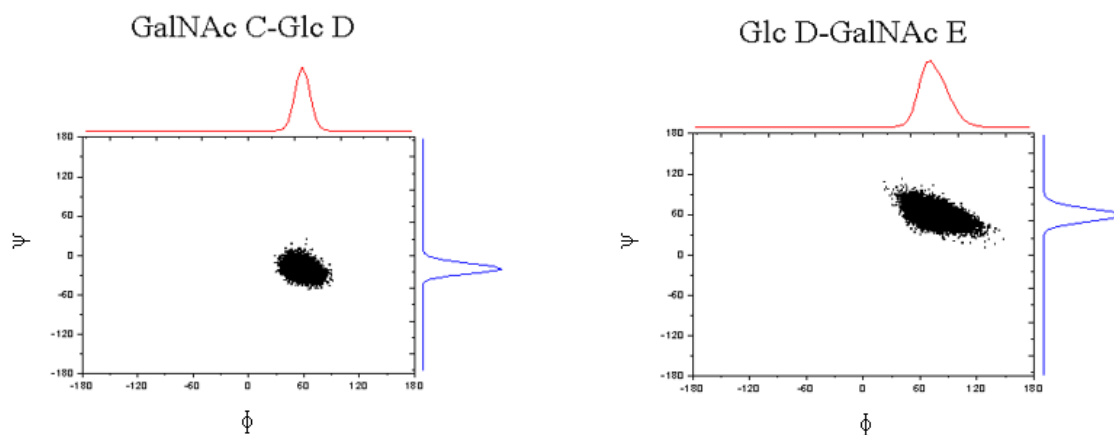
B)





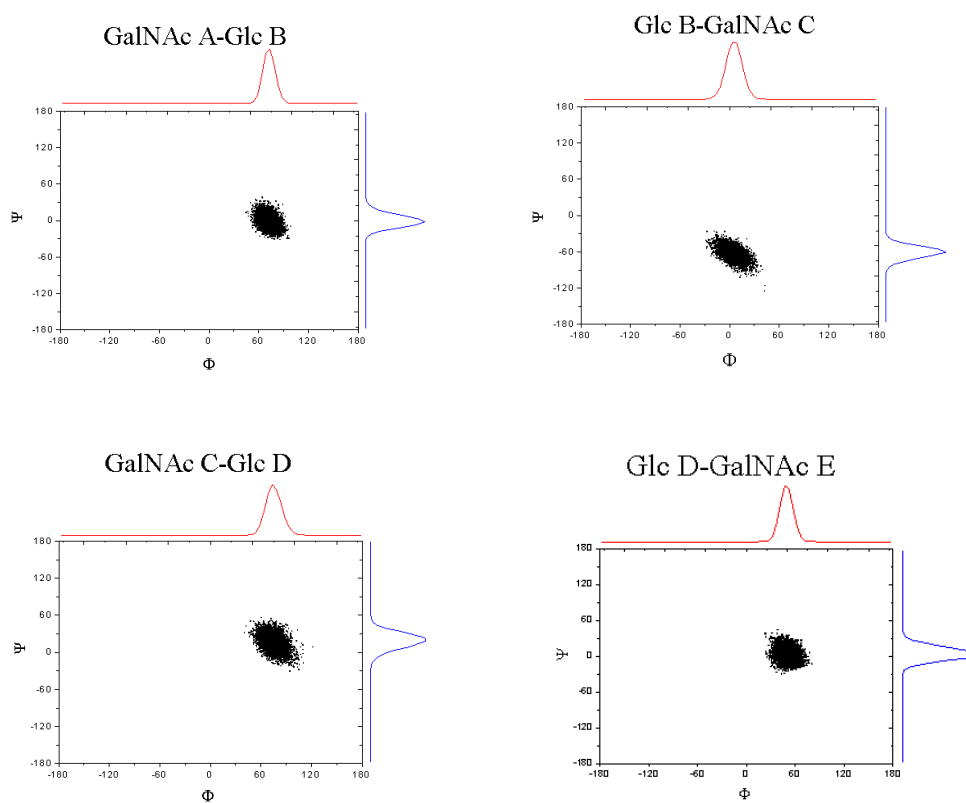
**A.32.** Gráficas de Cremer-Pople para el complejo 3-PTN4 para una dinámica MD-TAR de 40 ns para el conformero 1 (A) y el conformero 3 (B).



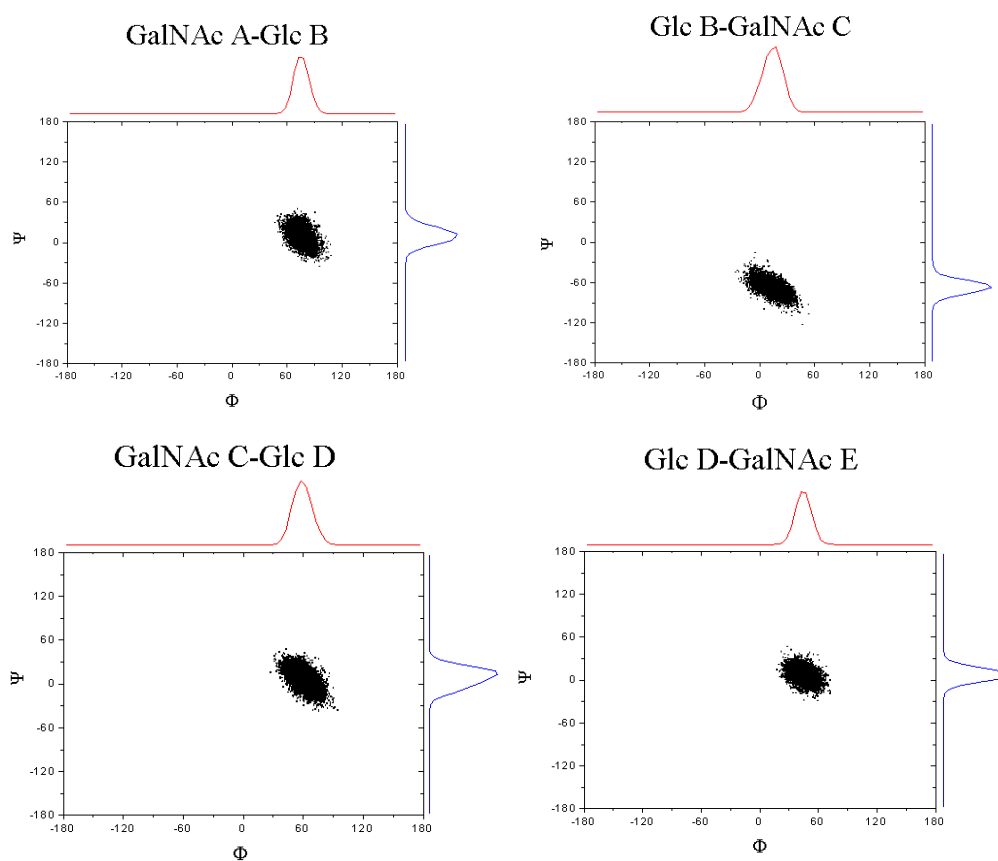


A.33. Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo 3-PTN4 obtenidas de la dinámica de 200 ns.

A)

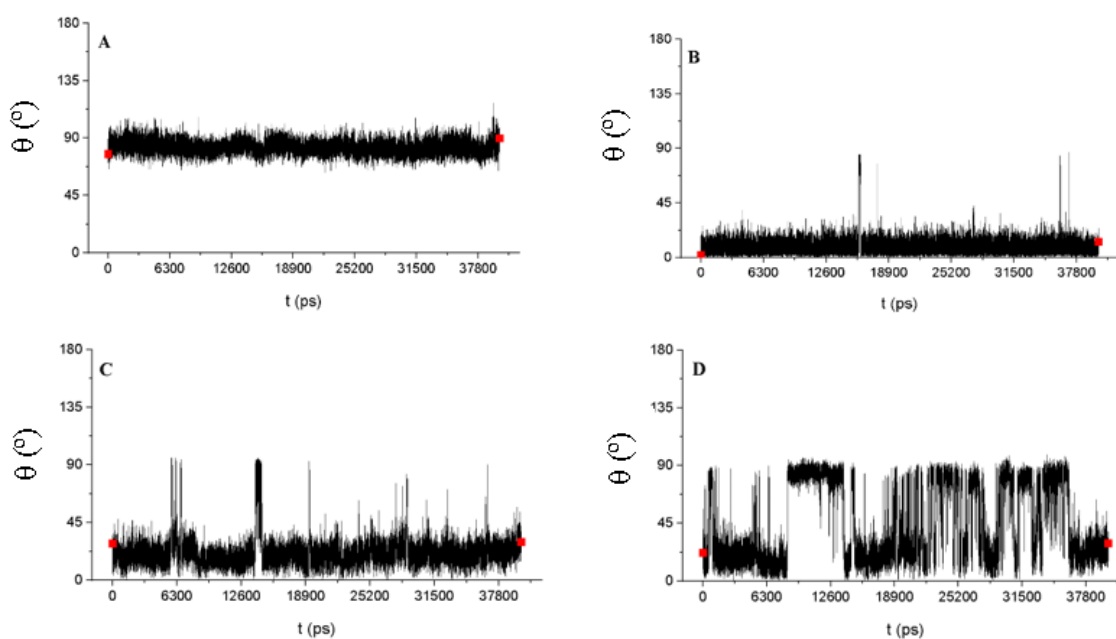


B)

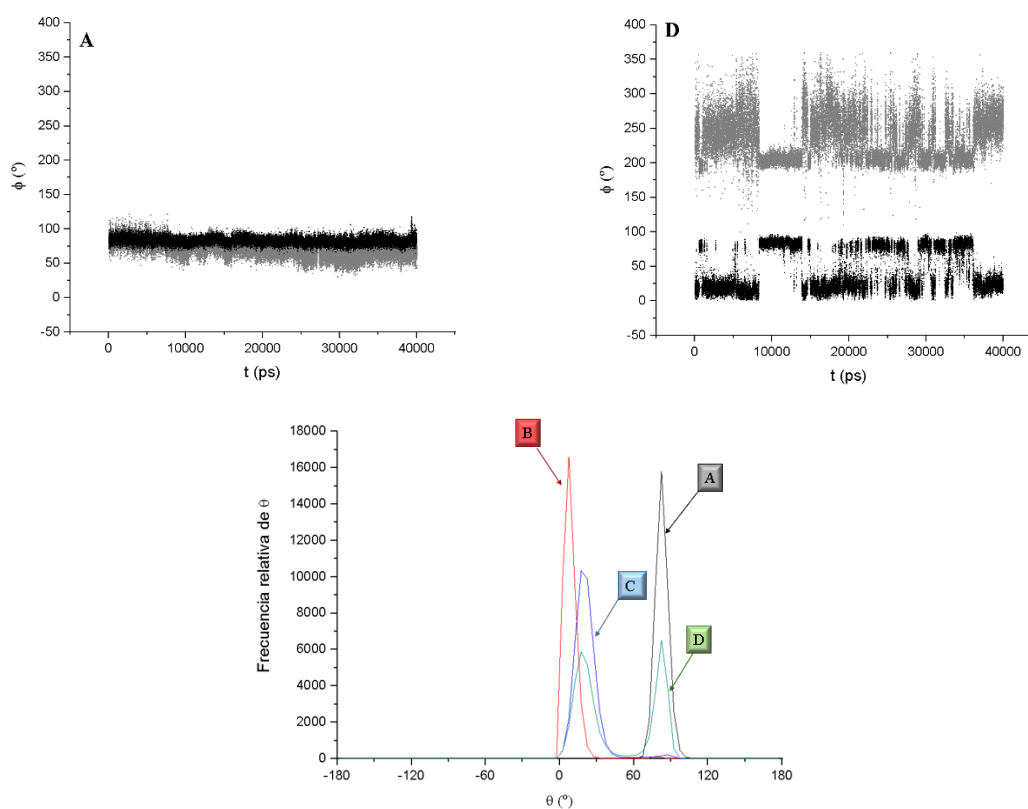


**A.34.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo 3-PTN4 obtenidas de la dinámica de 40 ns utilizando el primer conformero (A) y el conformero 3(B).

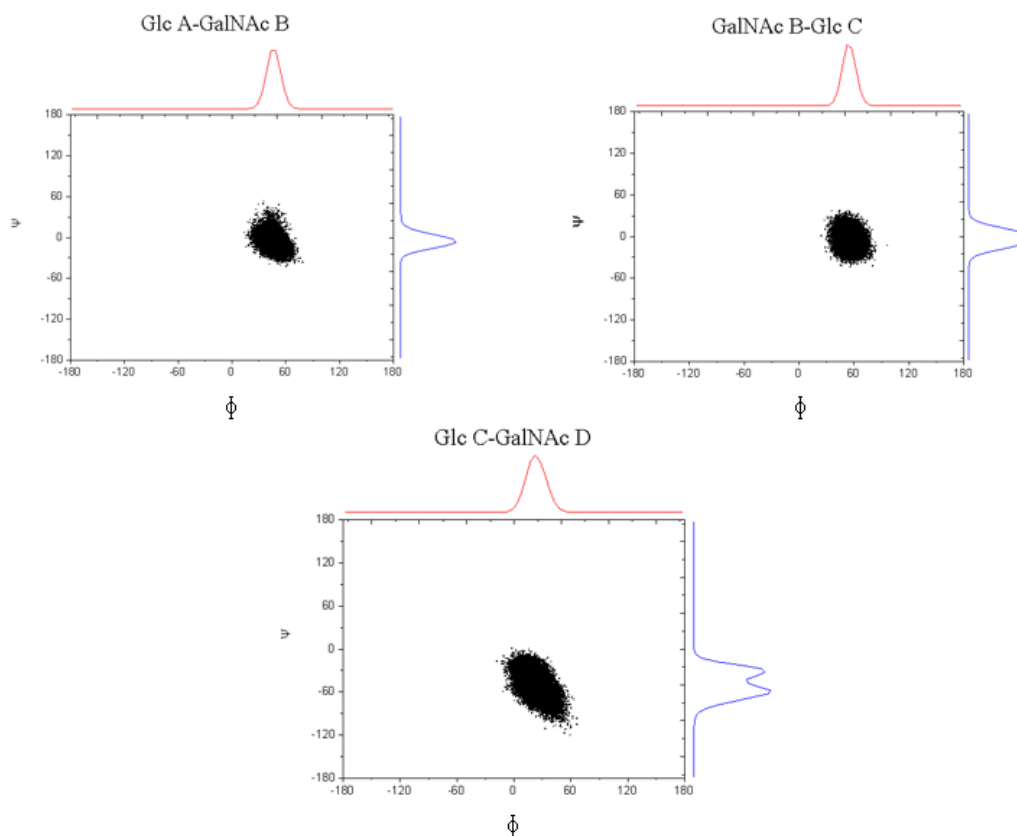
A)



B)

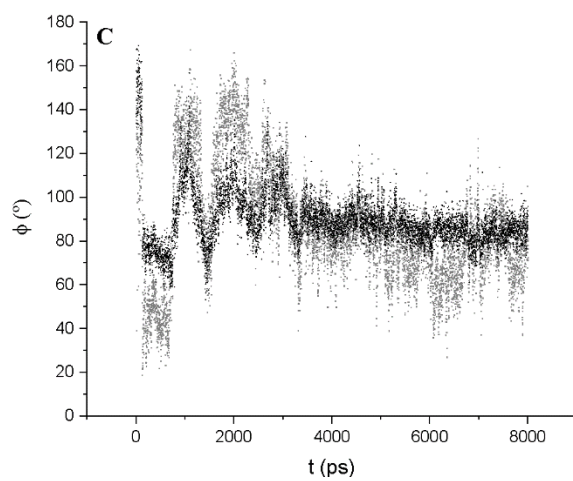
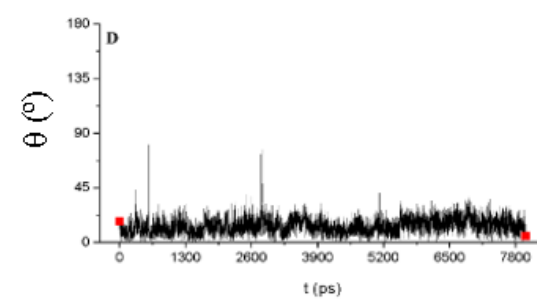
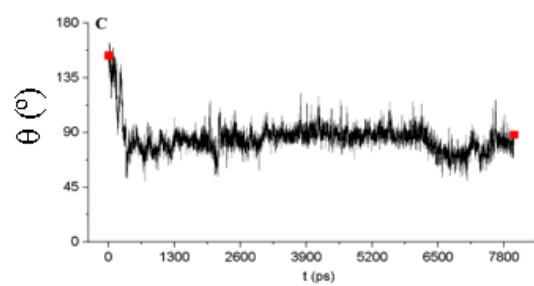
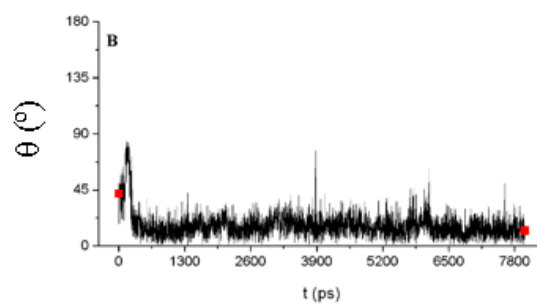
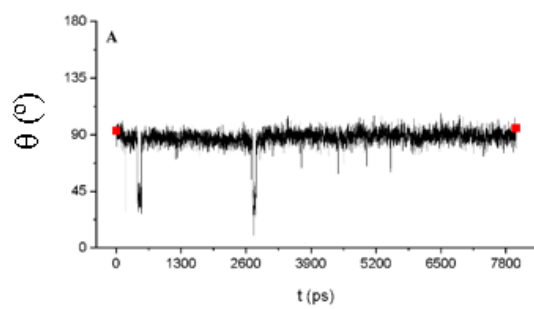


A.35. A) Gráficas de Cremer-Pople para el complejo **6-PTN4** para una dinámica de 200 ns. B) Representación del ángulo  $\psi$  para ambos anillos y de las frecuencias relativas de todos ellos.

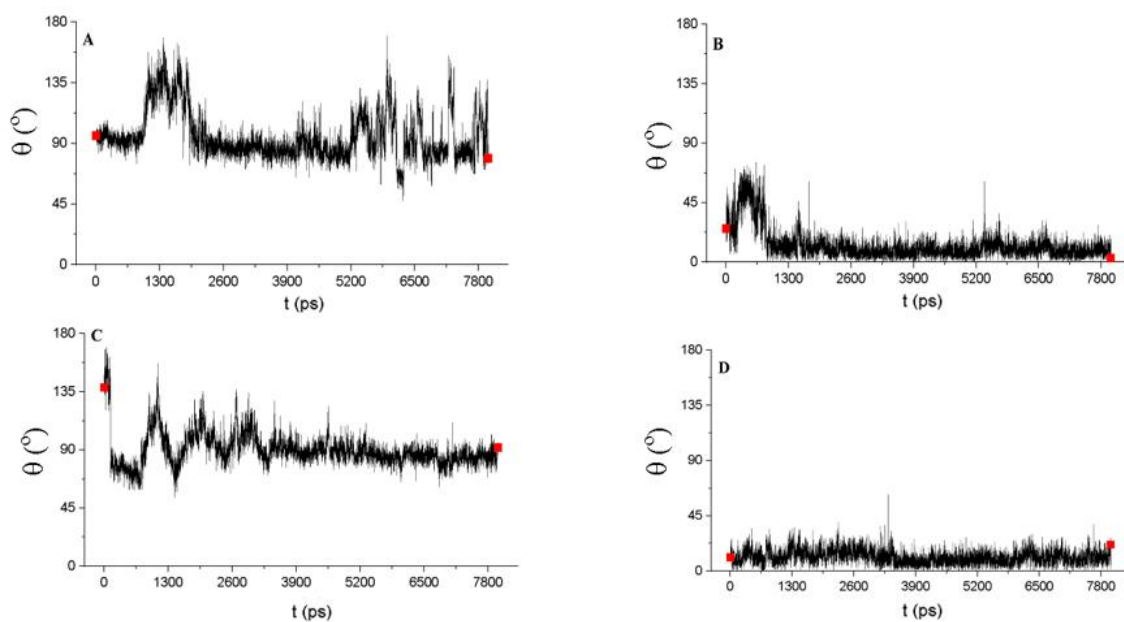


A.36. Trayectorias  $(\phi, \psi)$  para el complejo **6-PTN4** obtenidas de la dinámica de 200 ns.

A)

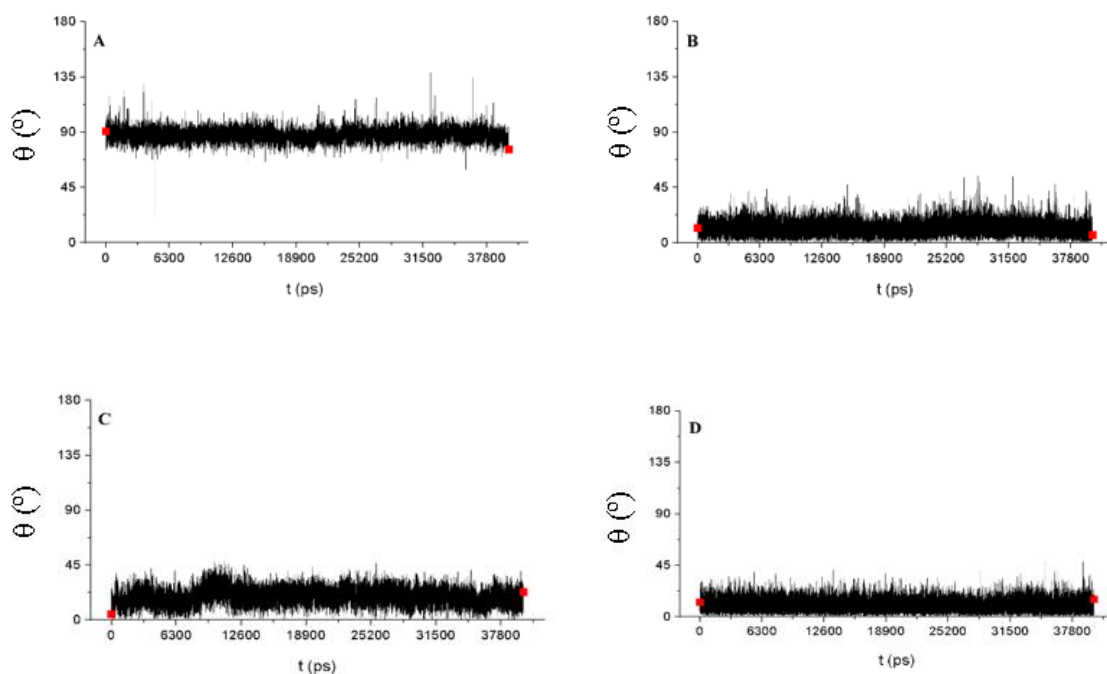


B)

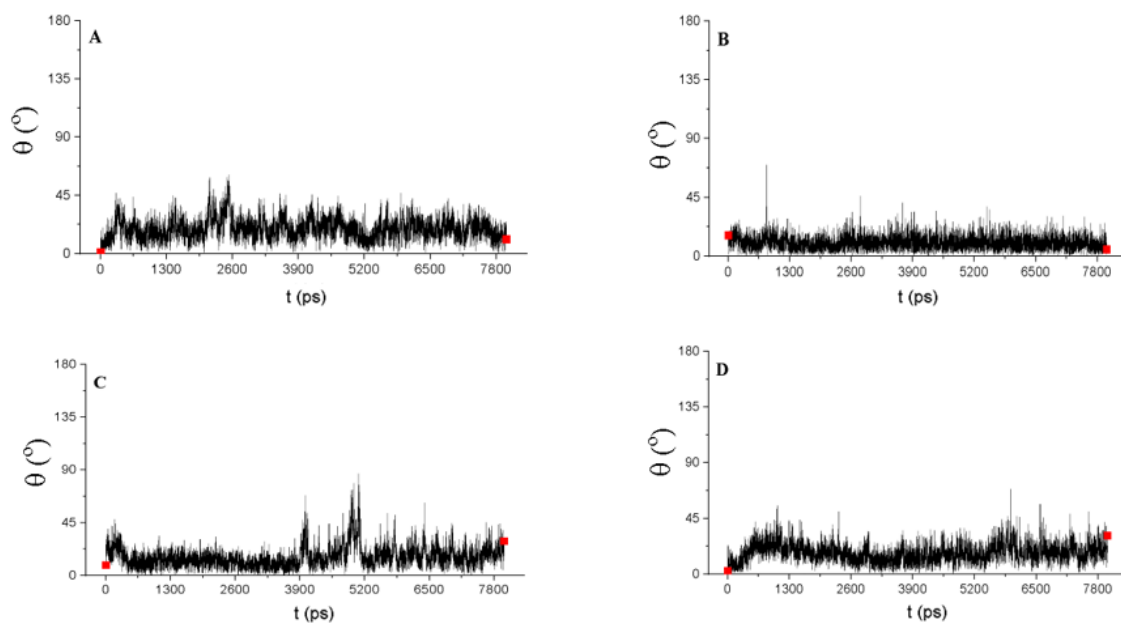


**A.37.** A) Gráficas de Cremer-Pople para el complejo **6-PTN4** para una dinámica MD-TAR de 40 ns con restricciones en los anillos A y D y representación de la nueva distorsión en el ángulo  $\phi$  del anillo C. B) Representación de la corrección para el anillo C tras la repetición de la MD-TAR de 40 ns con restricción en los anillos A y C con una constante  $K=50$ .

A)

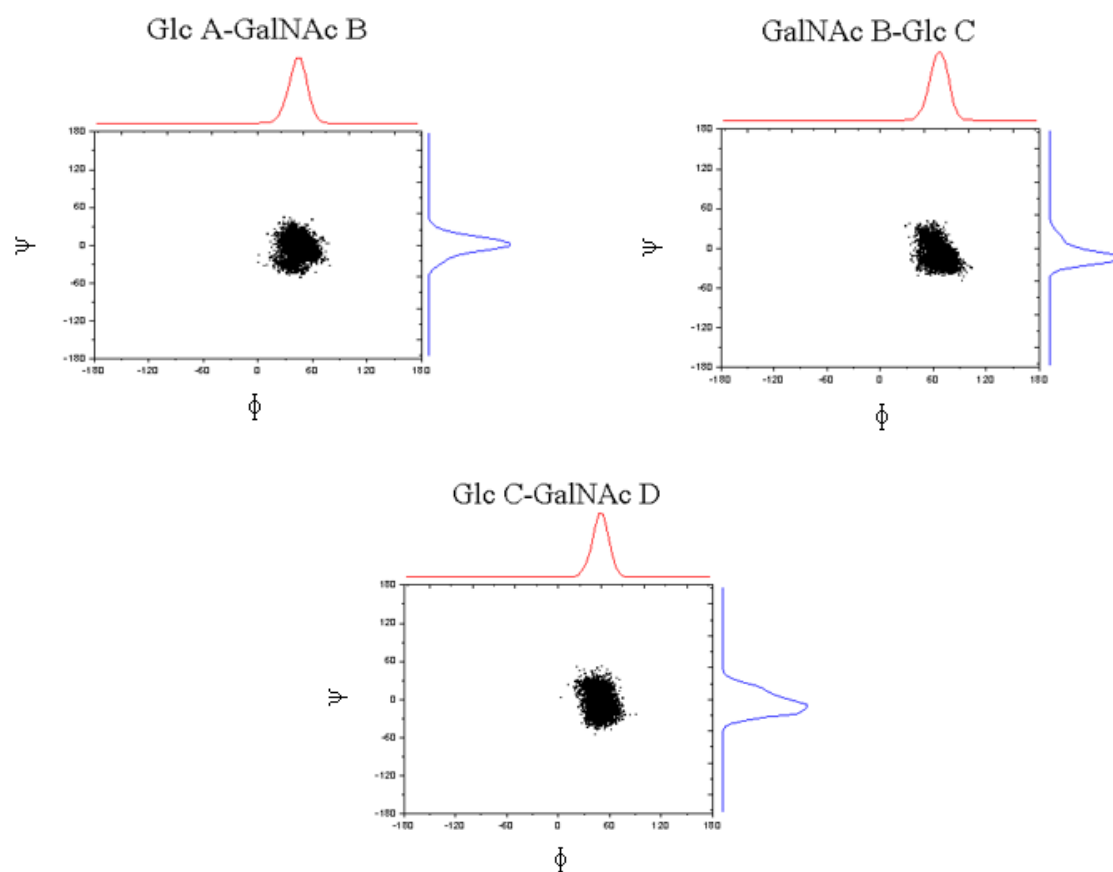


B)



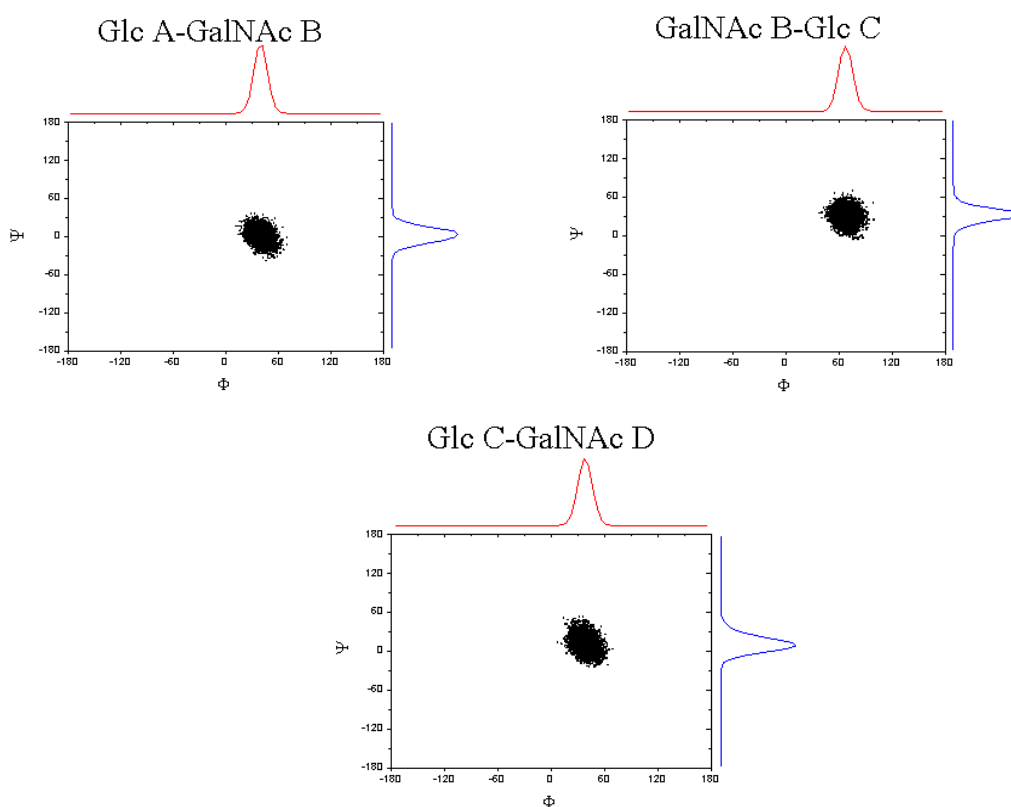
**A.38.** A) Gráficas de Cremer-Pople para el complejo **6-PTN4** para una dinámica de 200 ns con restricciones en los anillos A y C y utilizando el confómero.2. B) Repetición para una dinámica MD-TAR de 40 ns con restricciones en los anillos A y C utilizando el mismo ligando.

A)



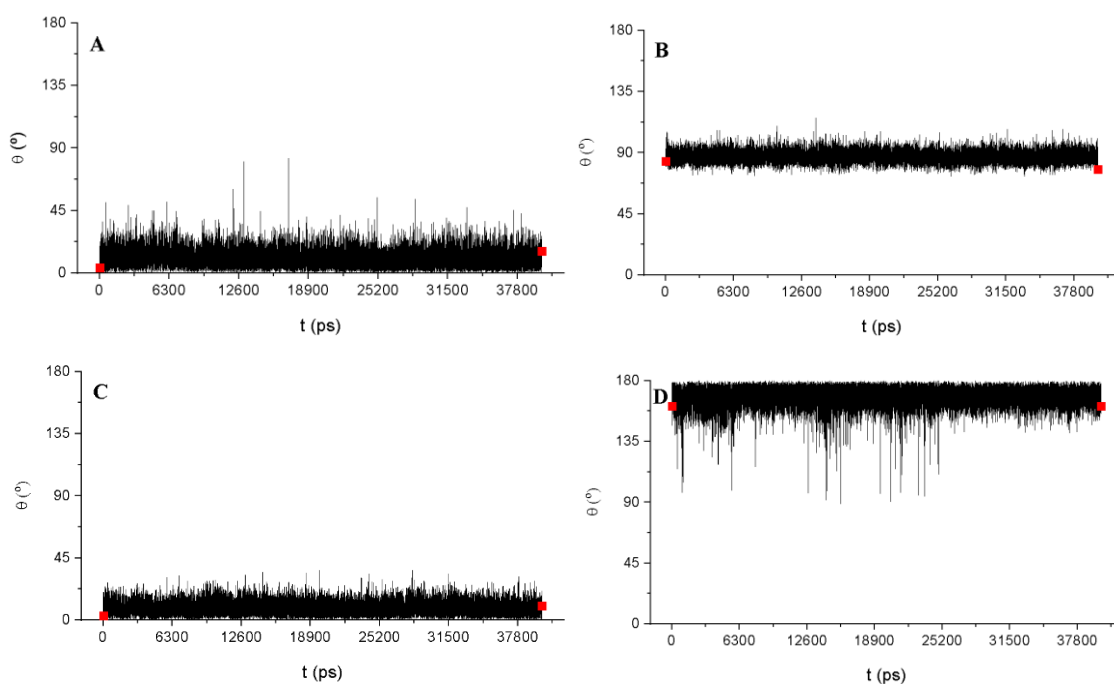


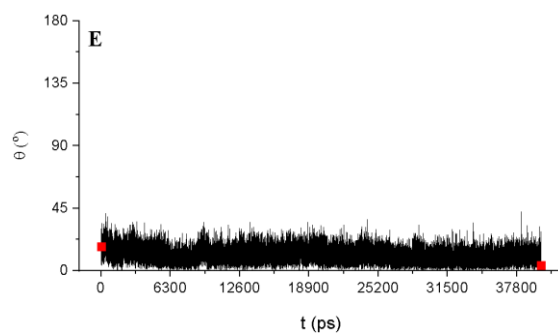
B)



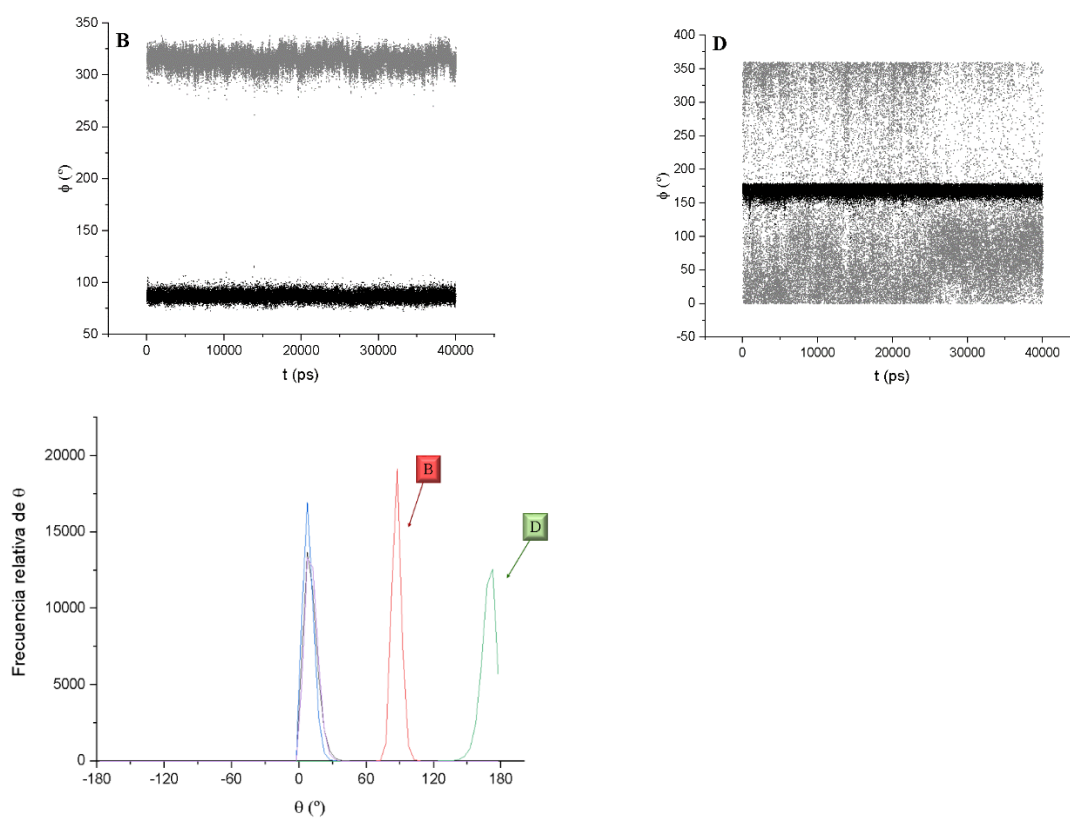
**A.39.** A) Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **6-PTN4** obtenidas de la dinámica MD-TAR de 40 ns con el confórmero 1. B) Trayectorias ( $\phi$ ,  $\psi$ ) para la repetición de la simulación de 40 ns con el confórmero 2.

A)

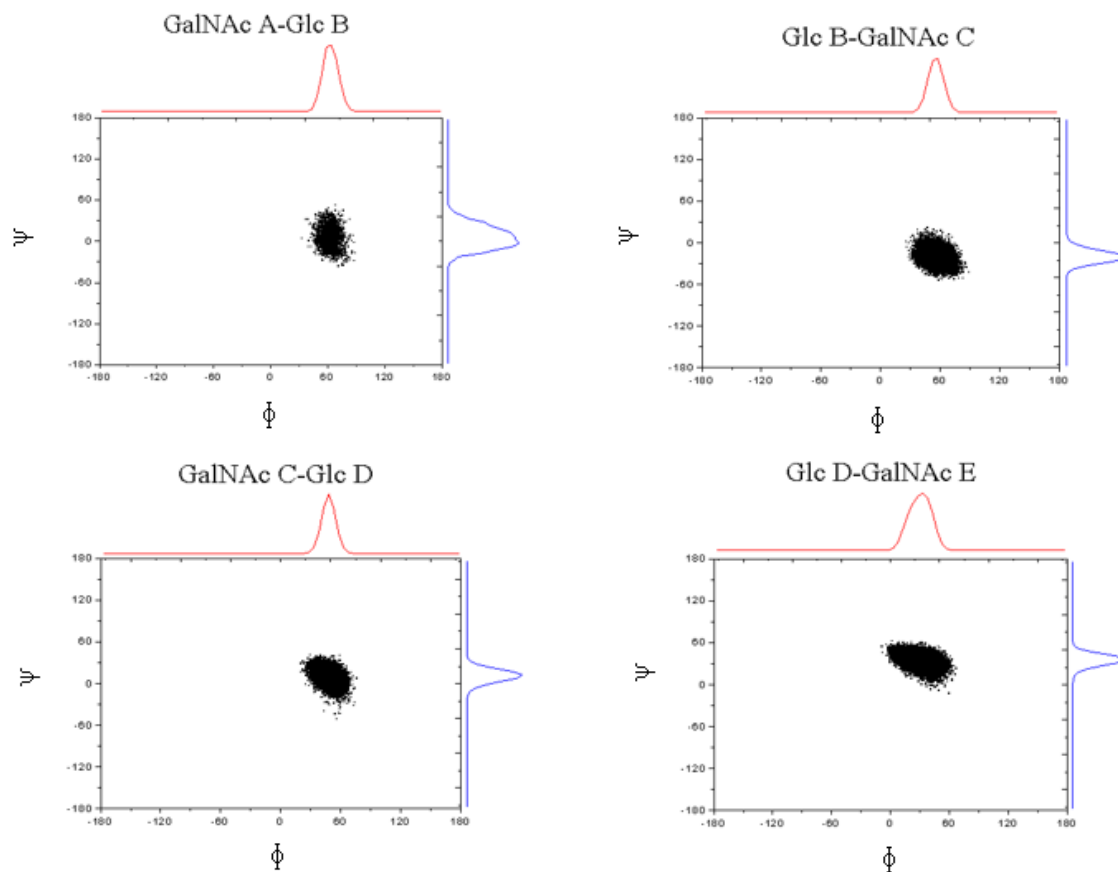




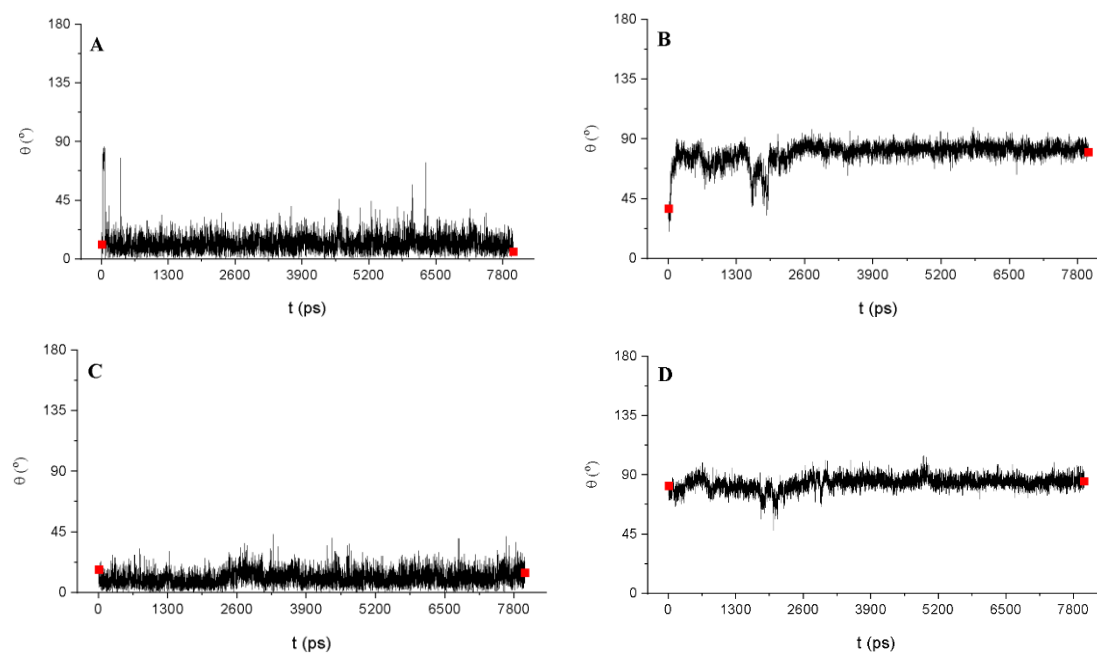
B)

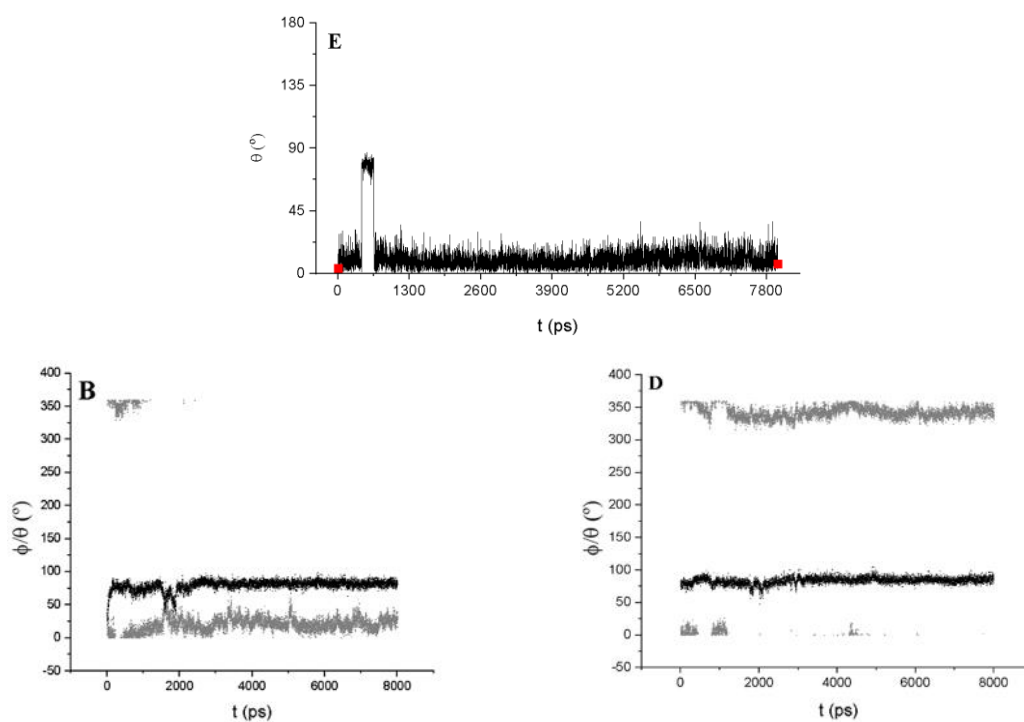


**A.40.** A) Gráficas de Cremer-Pople para el complejo **3-PTN3** para una dinámica de 200 ns. B) Representación del ángulo  $\psi$  para ambos anillos y de las frecuencias relativas de todos ellos.

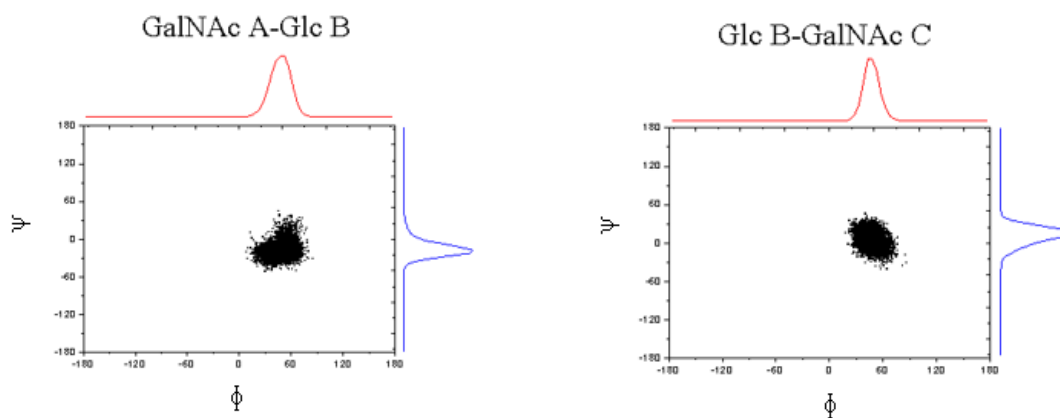


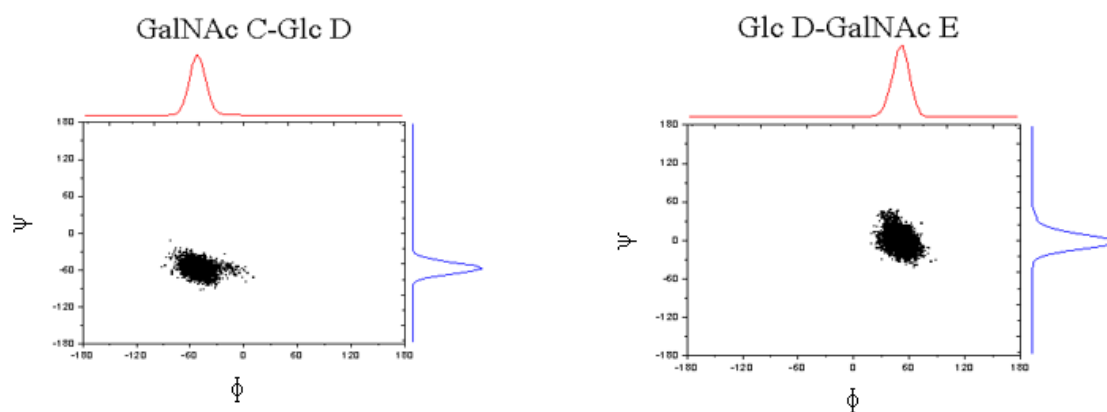
**A.41.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo 3-PTN3 obtenidas de la dinámica de 200 ns.



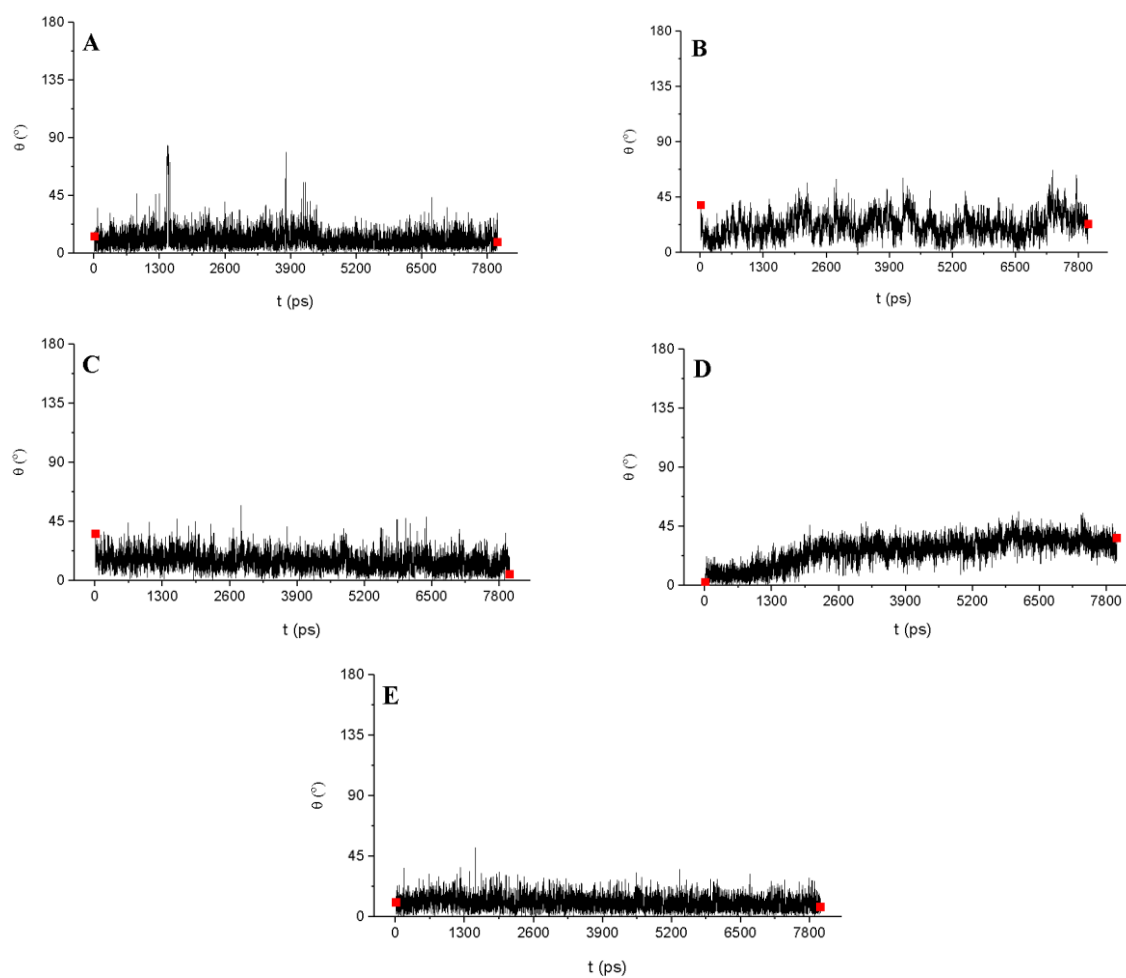


**A.42.** A) Gráficas de Cremer-Pople para el complejo 3-PTN3 para una dinámica MD-TAR de 40 ns con restricciones en los anillos B y D observándose una nueva distorsión en este último.

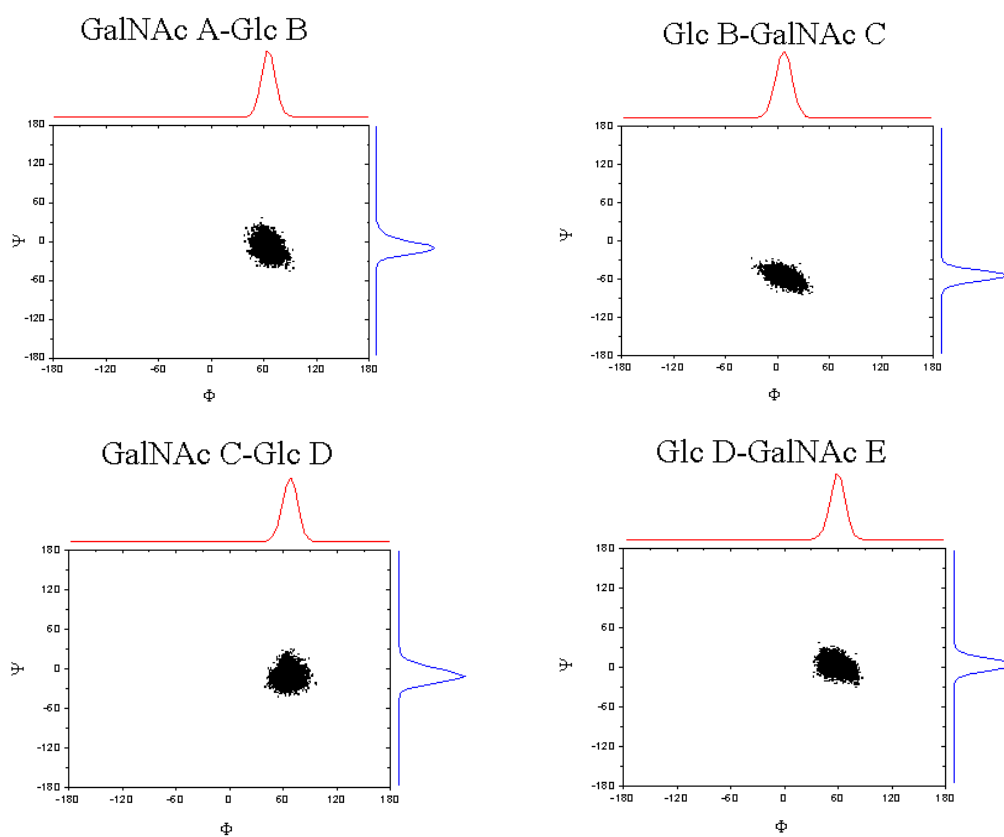




**A.43.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo 3-PTN3 obtenidas de la dinámica MD-TAR de 40 ns con restricción en los anillos B y D.

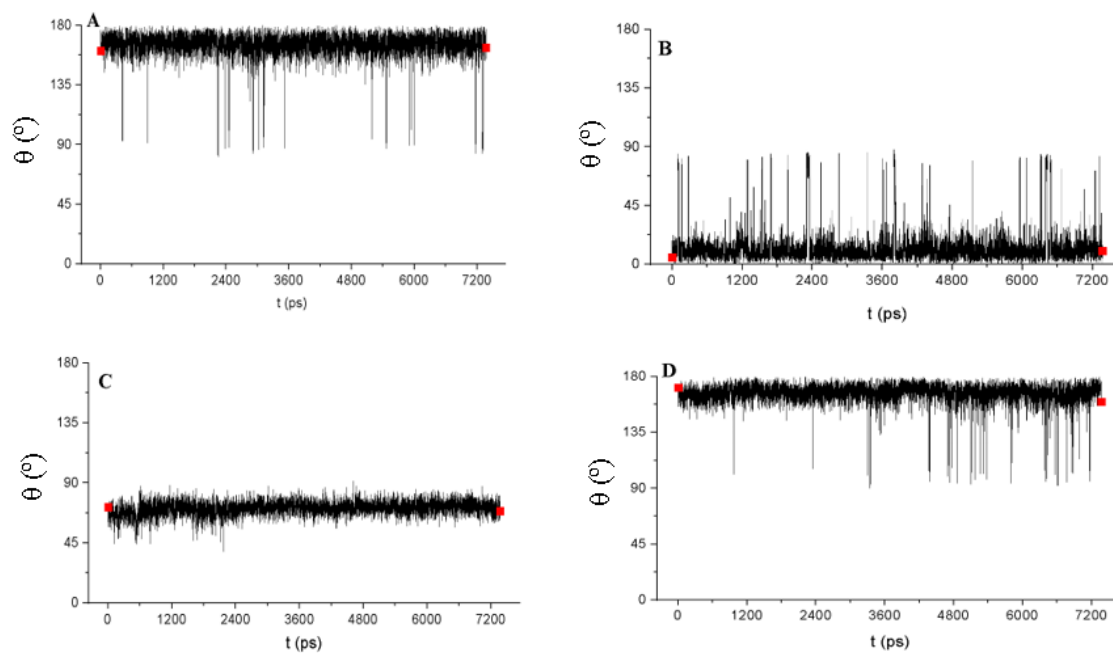


**A.44.** Gráficas de Cremer-Pople para el complejo 3-PTN3 para una dinámica MD-TAR de 40 ns utilizando el conformero 5 observándose la corrección total de B y prácticamente en D.

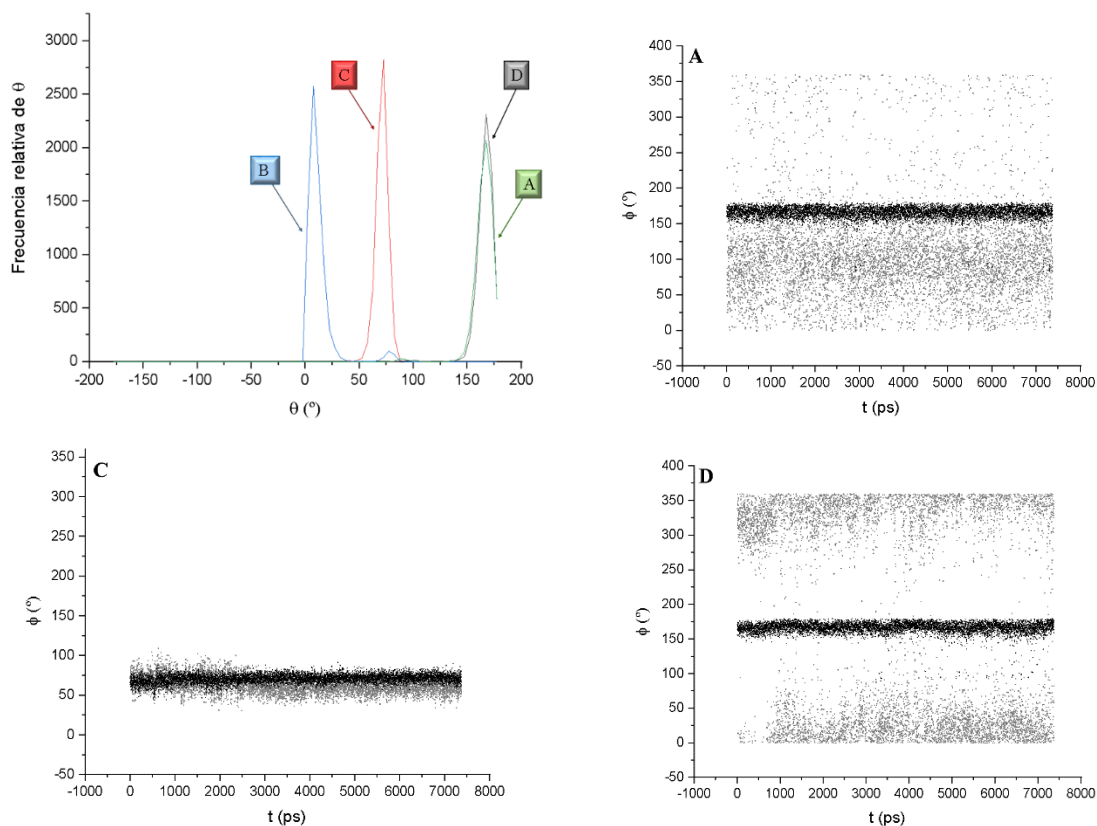


**A.45.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo 3-PTN3 obtenidas de la dinámica MD-TAR de 40 ns con restricción en los anillos B y D utilizando confórmero 5.

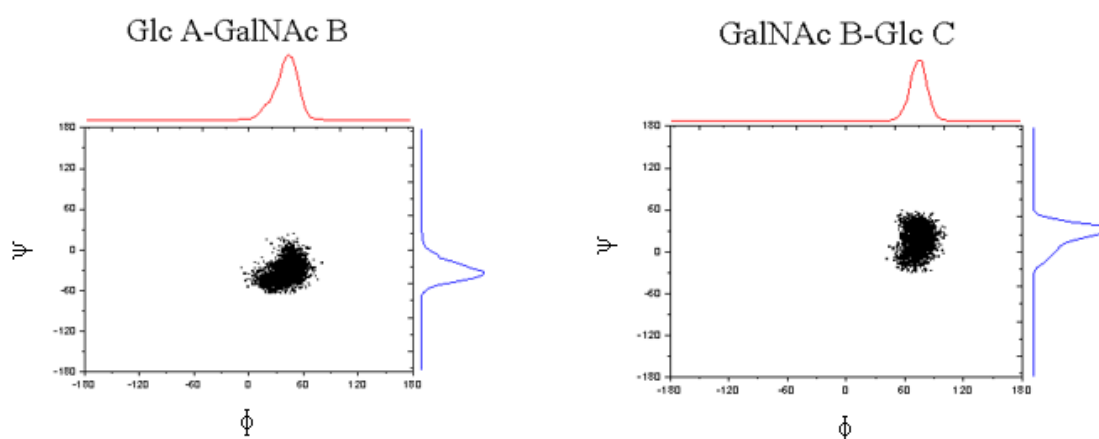
A)

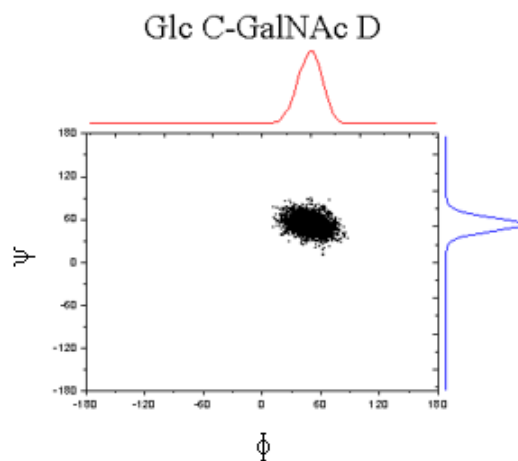


B)



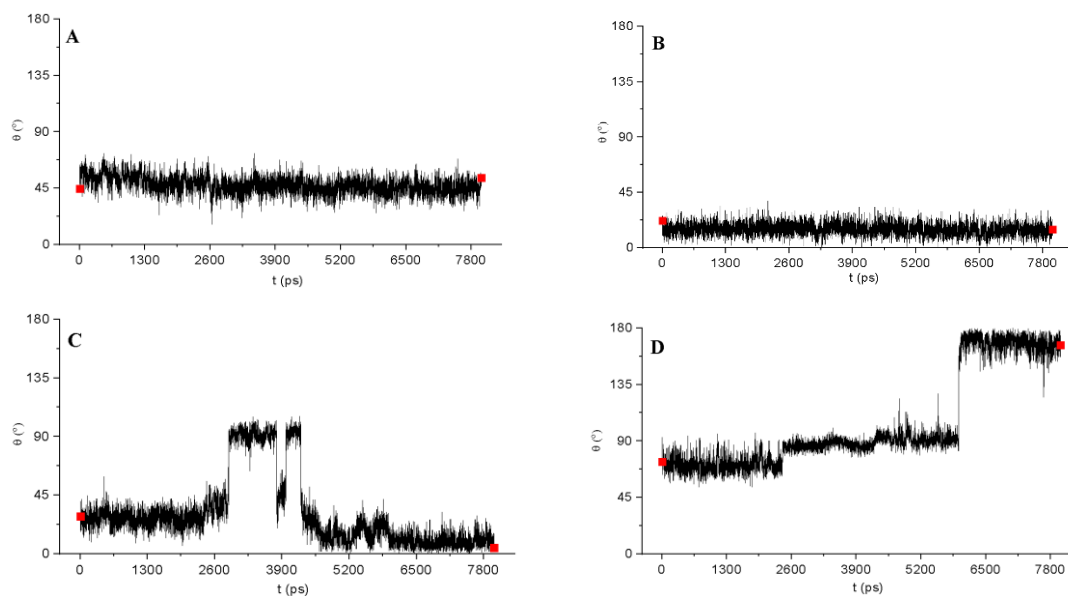
**A.46.** A) Gráficas de Cremer-Pople para el complejo **6-PTN3** para una dinámica molecular de 200 ns sin restricciones para el primer ligando más estable energéticamente (se extraen en este caso un intervalo de frames a lo largo de la trayectoria para facilitar el cálculo) observándose distorsión en los anillos A, D y C. B) Representación del ángulo  $\psi$  para los tres anillos y de las frecuencias relativas de todos ellos.



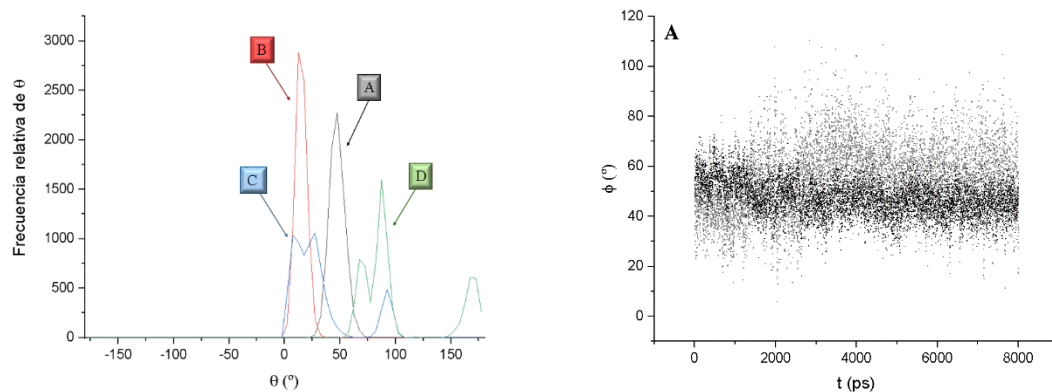


**A.47.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo 6-PTN3 obtenidas de la dinámica de 200 ns sin restricciones.

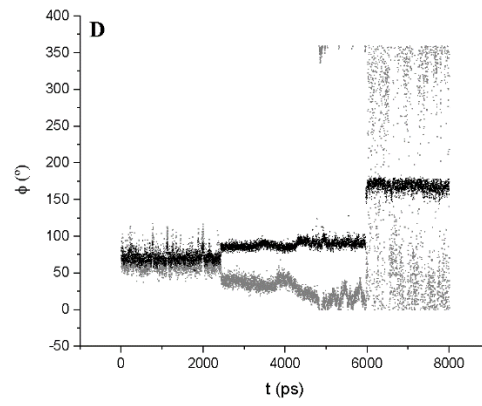
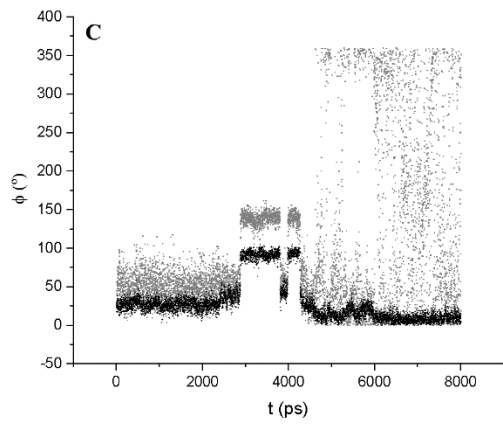
A)



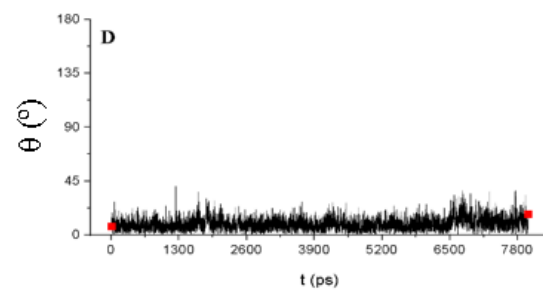
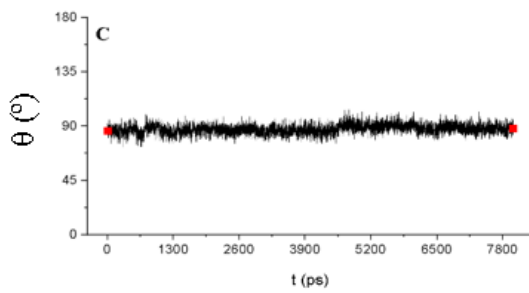
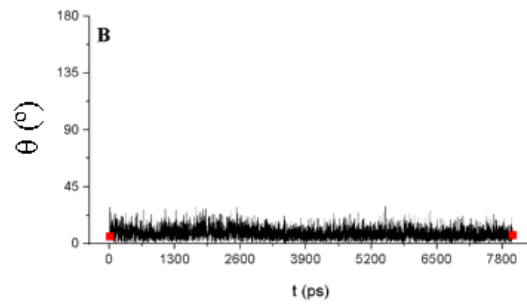
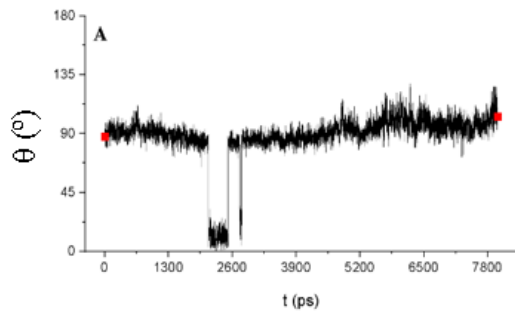
B)



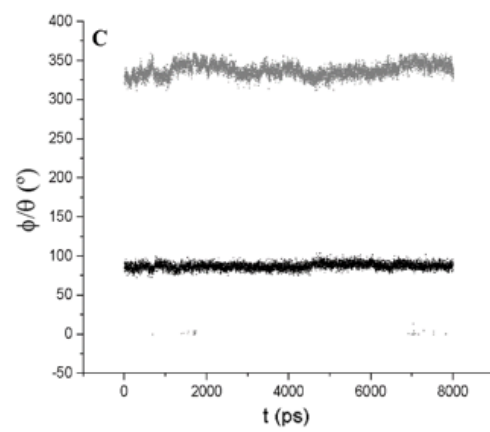
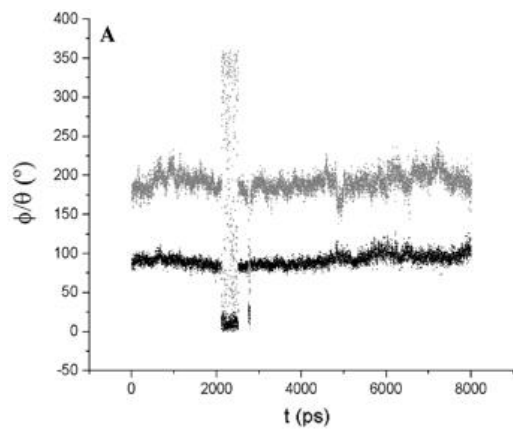


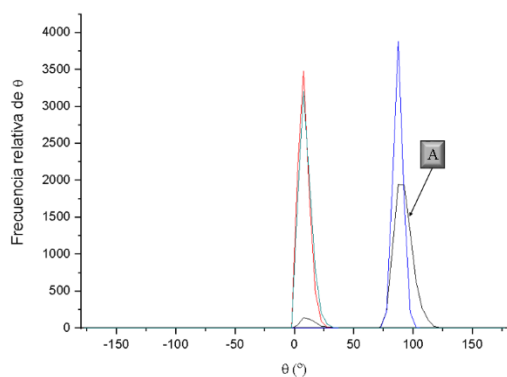


C)



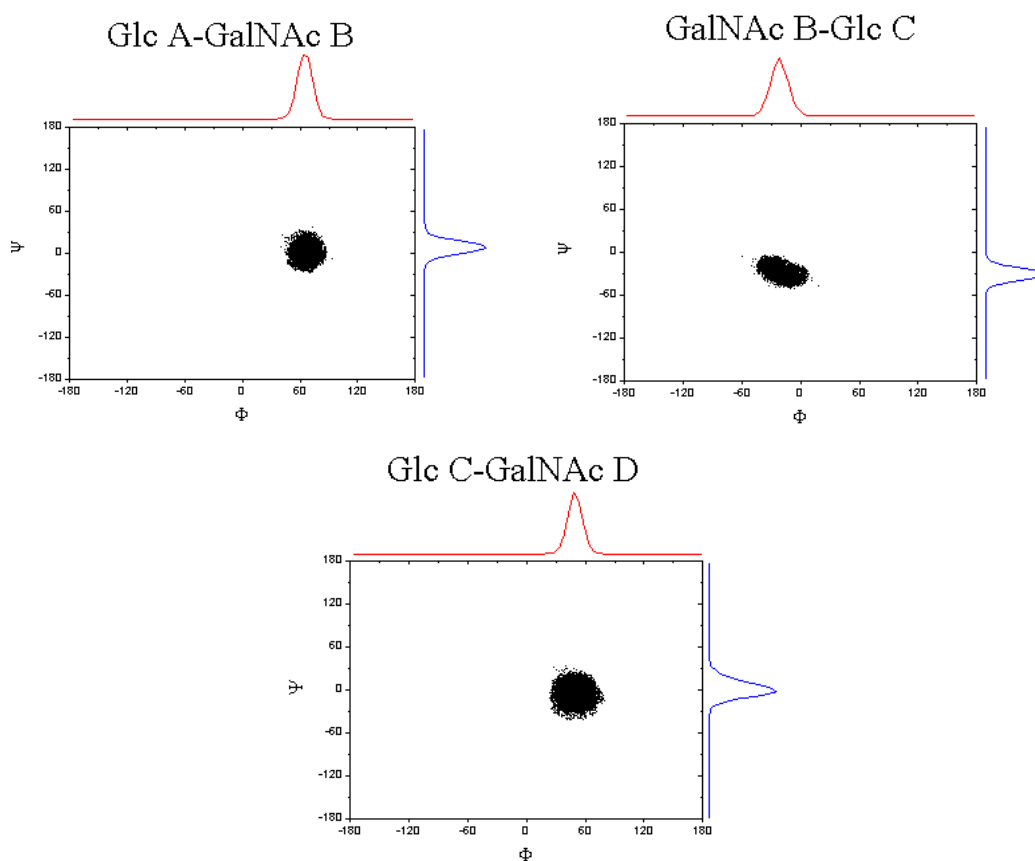
D)



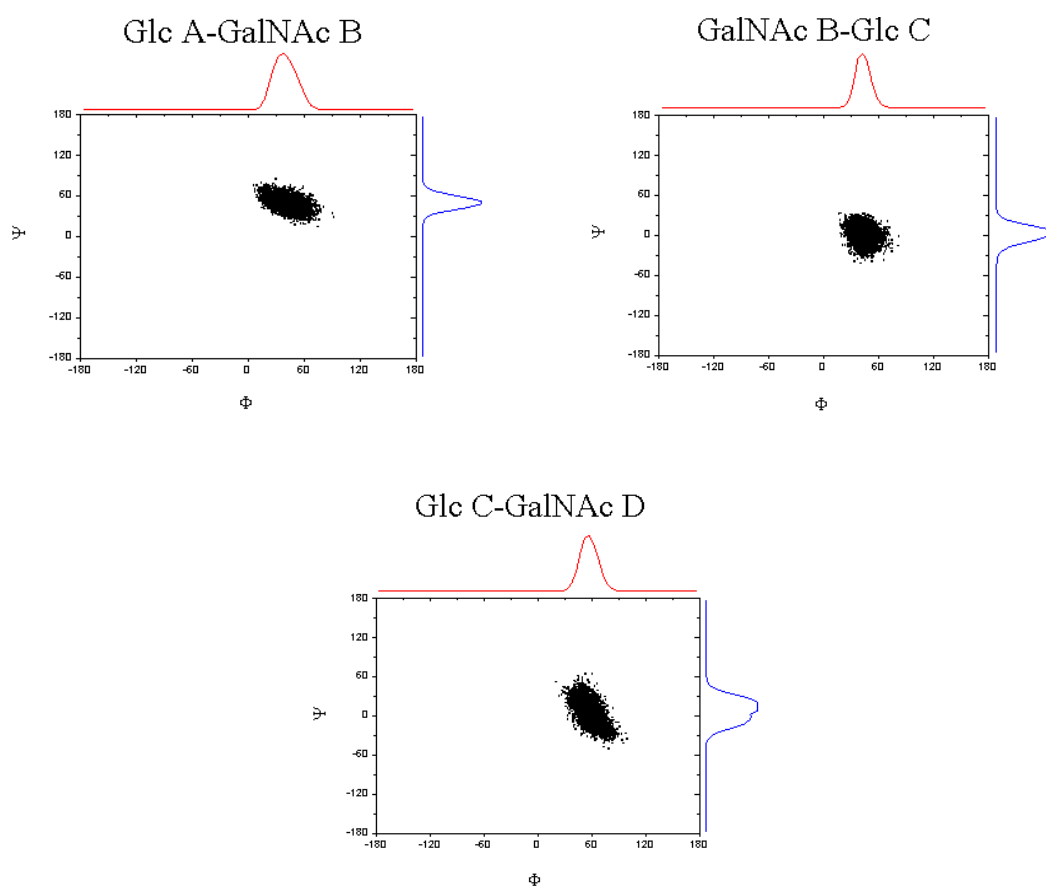


**A.48.** A) Gráficas de Cremer-Pople para el complejo **6-PTN3** para una dinámica MD-TAR de 40 ns con restricciones en los anillos A y C utilizando el conformero 1 observándose distorsión en los anillos A, D y parcialmente en C. B) Representación del ángulo  $\psi$  para los tres anillos y de las frecuencias relativas de todos ellos. C) Repetición de MD-TAR con las mismas restricciones, pero usando el conformero 3 distorsionándose de nuevo A y C. D) Representación del ángulo  $\psi$  para ambos anillos y de las frecuencias relativas de todos ellos.

A)

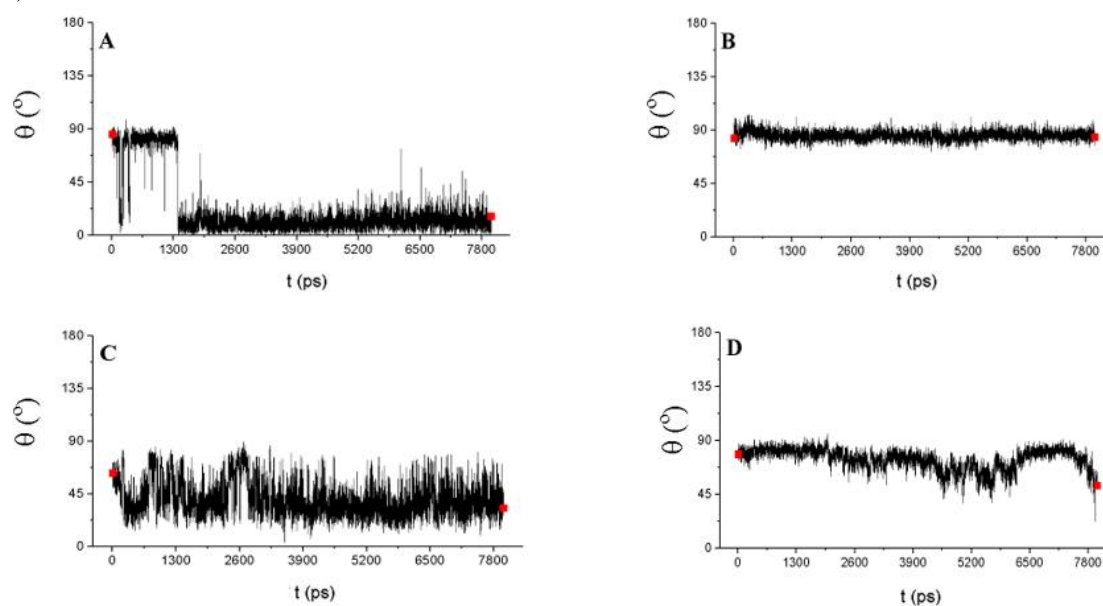


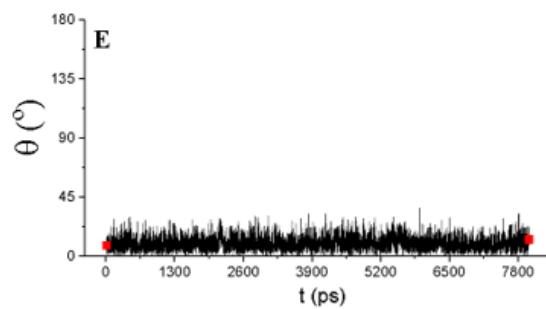
B)



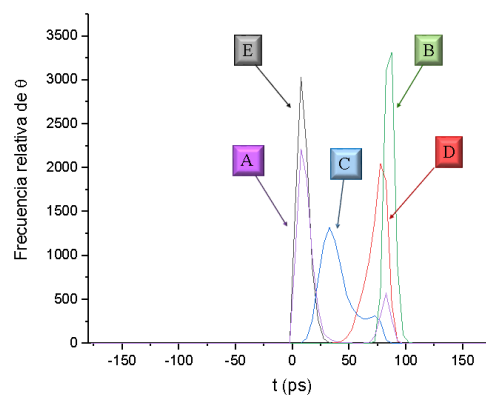
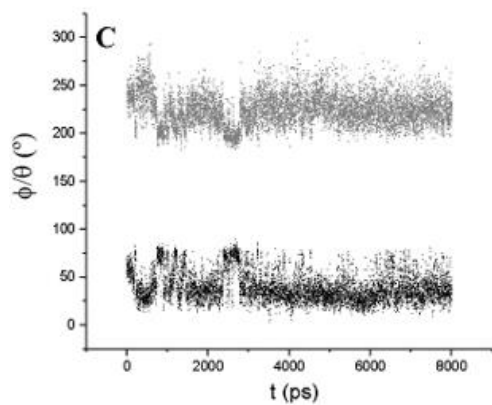
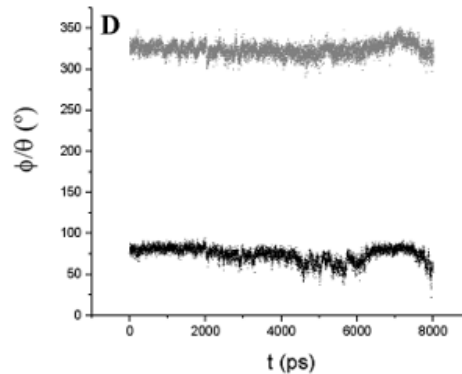
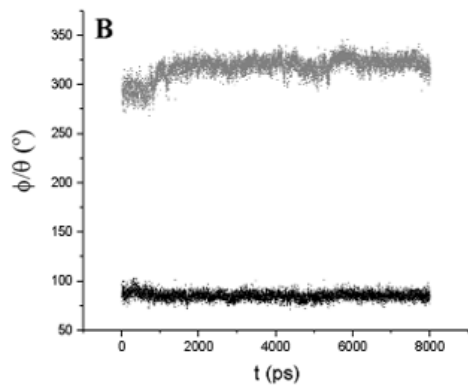
**A.49.** A) Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **6-PTN3** obtenidas de la dinámica MD-TAR de 40ns con restricción en los anillos B y D utilizando el conformero 1. B) Repetición de la dinámica con las mismas restricciones utilizando el conformero 3.

A)

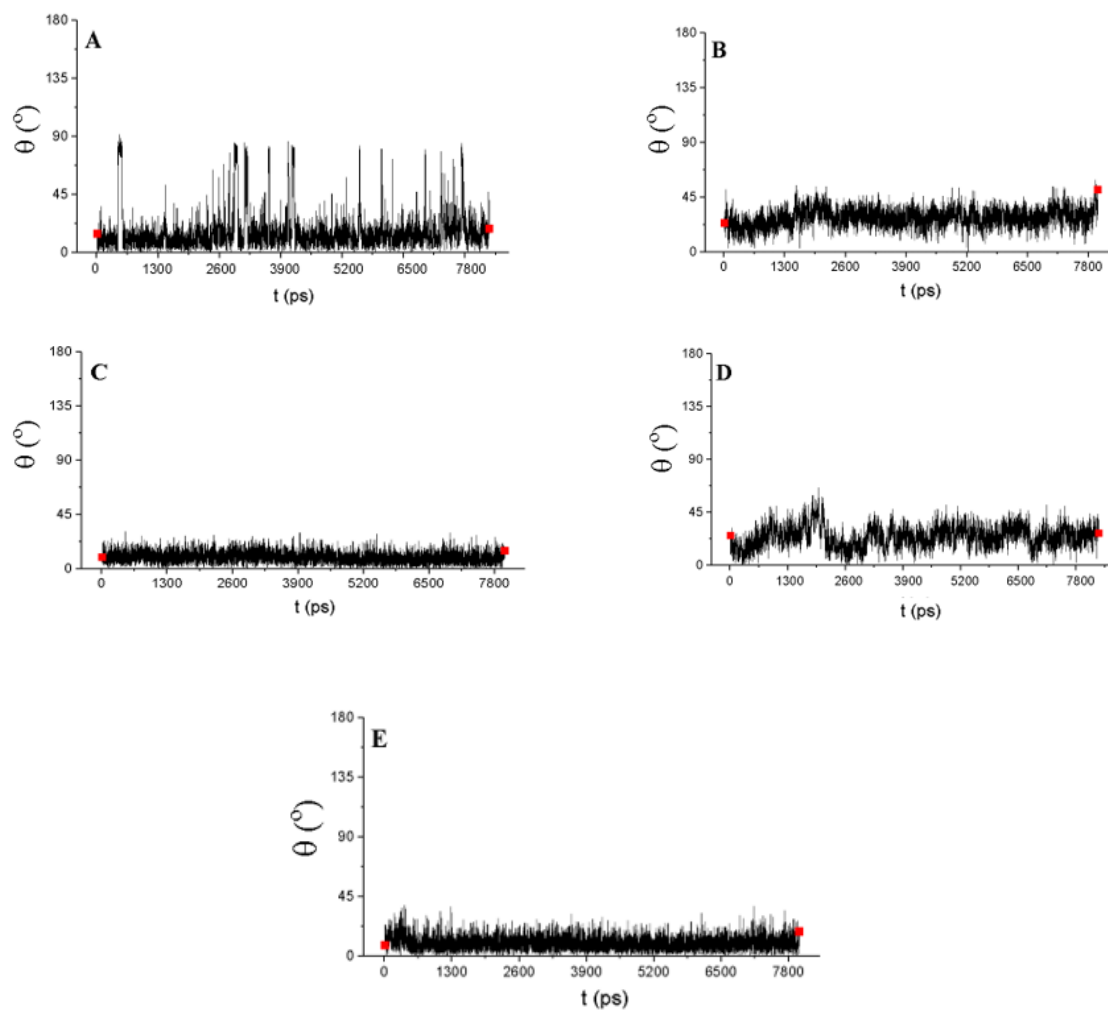




B)

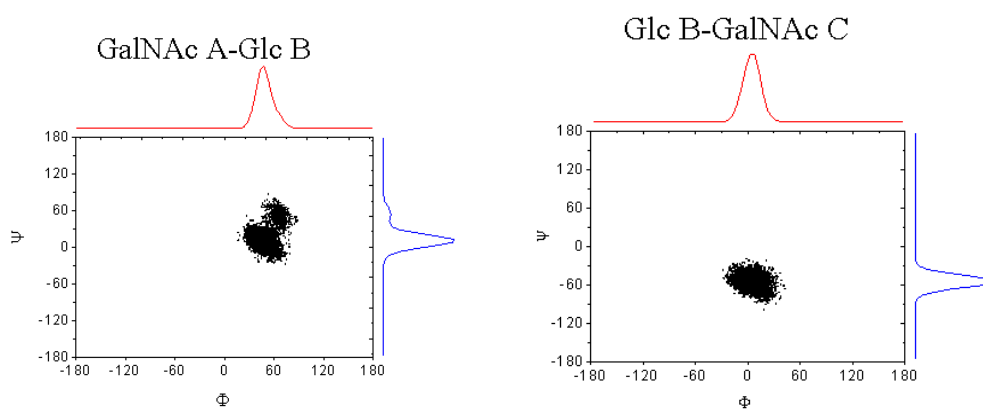


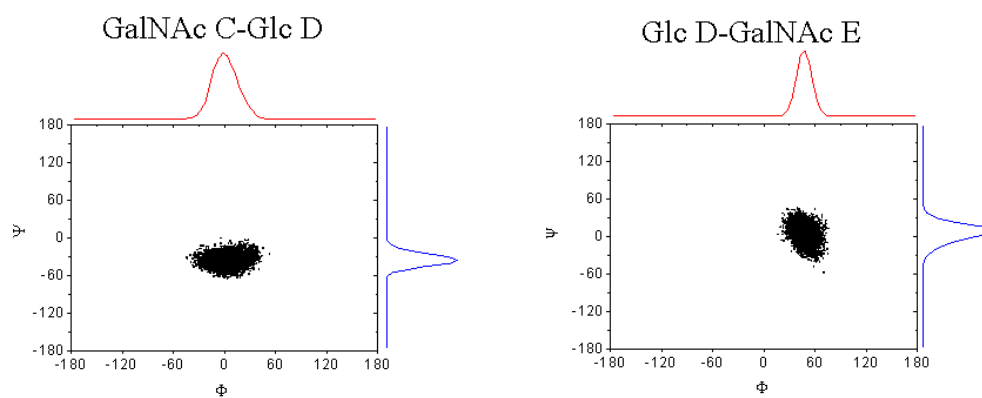
C)



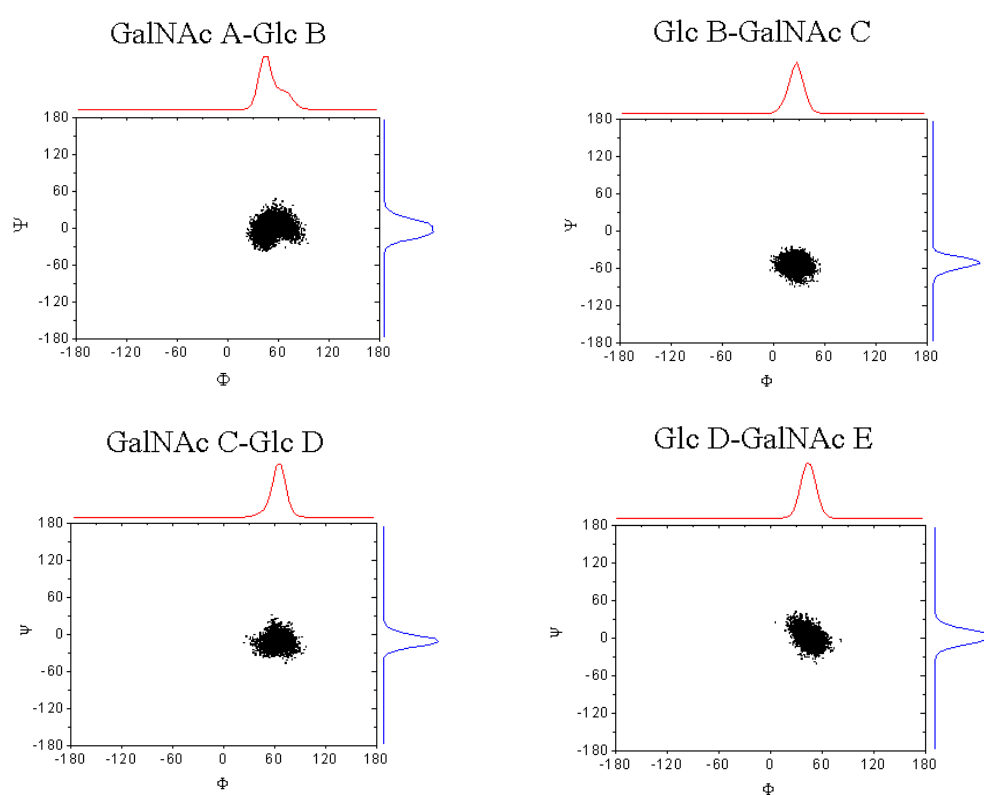
**A.50.** A) Gráficas de Cremer-Pople para el complejo 3-PTN8 para una dinámica MD-TAR con restricciones en los anillos B y D. B) Representación del ángulo  $\psi$  para ambos anillos y de las frecuencias relativas de todos ellos. C) Repetición de la dinámica MD-TAR con restricciones en los anillos B y D utilizando el conformero 2.

A)

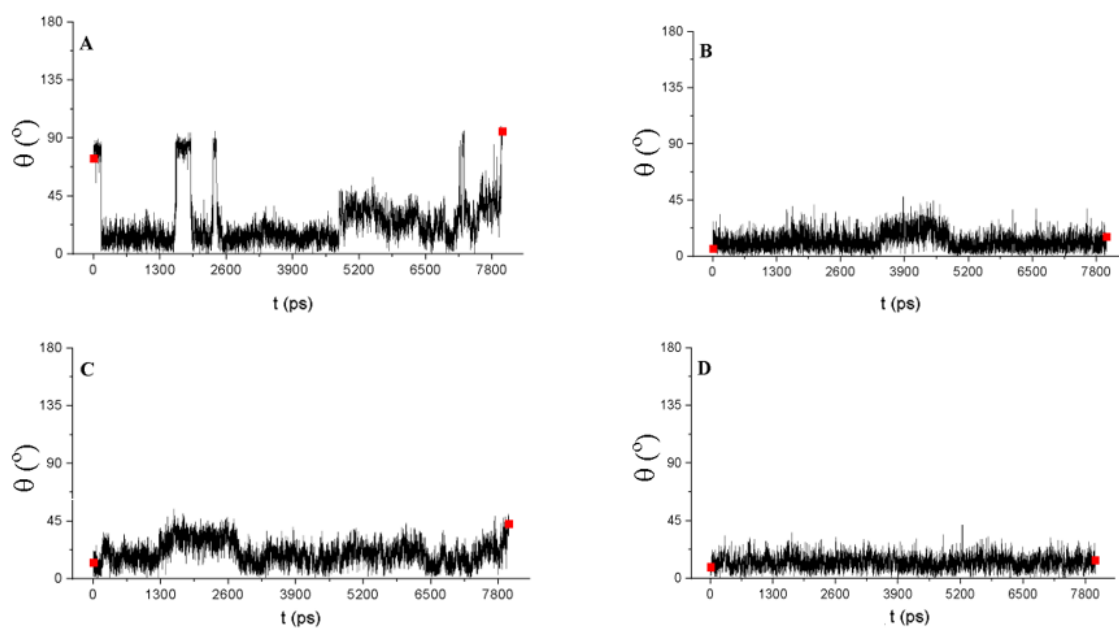




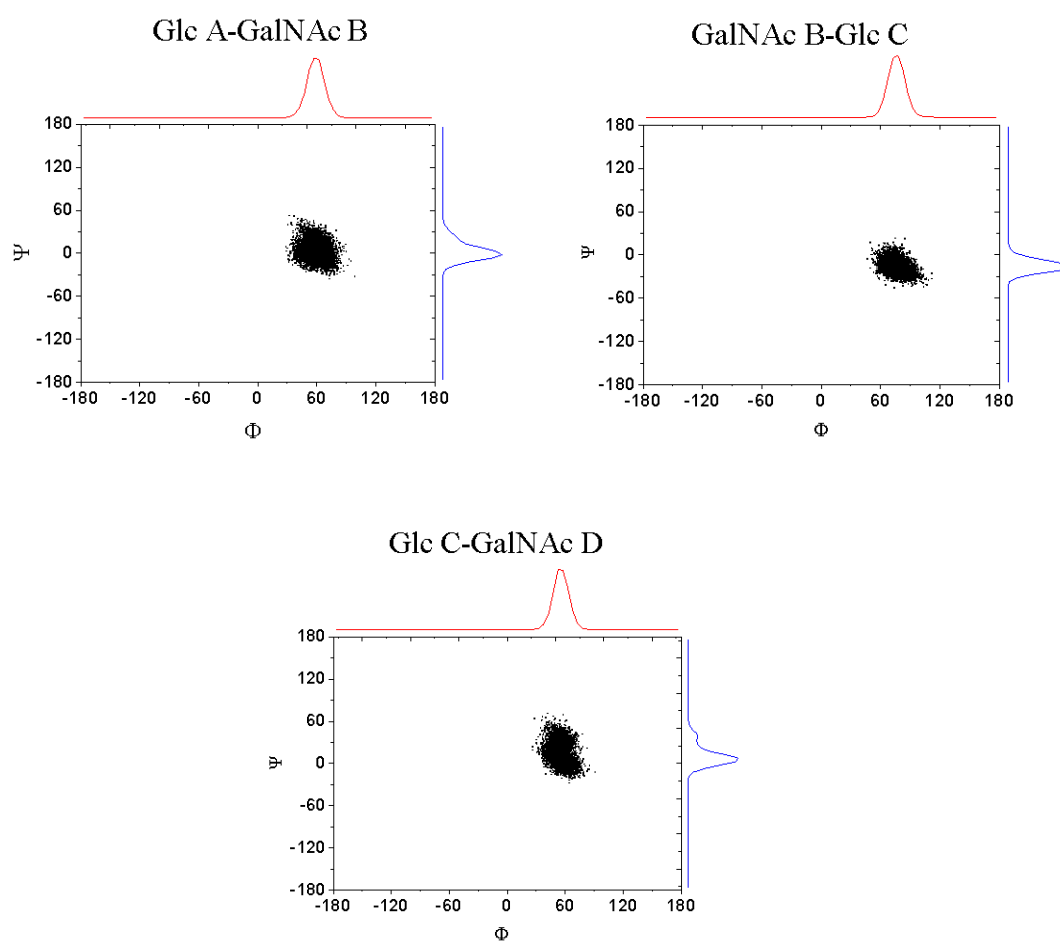
B)



**A.51.** A) Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo 3-PTN8 obtenidas de la dinámica MD-TAR de 40 ns con restricción en los anillos B y D utilizando el conformero 1. B) Repetición de la dinámica con las mismas restricciones utilizando el conformero 2.



A.52. Gráficas de Cremer-Pople para el complejo 6-PTN8 para una dinámica MD-TAR de 40 ns.



A.53. Trayectorias ( $\phi$ ,  $\psi$ ) para la MD-TAR de 40 ns para el complejo 6-PTN8.

1-PTN4	Residues	VDW	Electrost.	PS	Non-PS	Global
SER27	4GB 141	0.15 +/- 0.35	-2.85 +/- 0.47	-0.34 +/- 0.00	-0.68 +/- 0.02	-3.73 +/- 0.14
LYS 61	UVB 141	-1.52 +/- 0.01	-9.05 +/- 0.46	4.73 +/- 0.13	-1.15 +/- 0.02	-6.99 +/- 0.36
LYS 61	4GB 141	-1.62 +/- 0.01	-3.73 +/- 0.53	3.22 +/- 0.33	-1.08 +/- 0.01	-3.21 +/- 0.20
ARG 52	QVB 138	-0.63 +/- 0.15	-12.81 +/- 1.87	7.61 +/- 0.03	-0.97 +/- 0.19	-6.80 +/- 1.50
ARG 52	SO3 143	0.51 +/- 0.08	80.17 +/- 3.86	56.35 +/- 1.83	-0.63 +/- 0.06	-23.94 +/- 3.92
ARG 52	ISO 137	-1.04 +/- 0.23	-1.55 +/- 0.16	1.46 +/- 0.11	-0.93 +/- 0.16	-2.06 +/- 0.44
ASN 96	SO3 143	0.13 +/- 0.06	15.81 +/- 1.61	4.29 +/- 1.46	-0.36 +/- 0.04	-11.74 +/- 1.95
ASN 96	QVB 138	-0.46 +/- 0.16	-1.79 +/- 0.054	0.63 +/- 0.25	-0.46 +/- 0.09	-2.08 +/- 0.53
LYS 122	SO3 147	0.78 +/- 0.89	-95.93 +/- 4.43	72.21 +/- 1.80	-0.80 +/- 0.08	-23.75 +/- 3.57
LYS 122	UVB 142	-0.15 +/- 0.00	-7.08 +/- 0.01	5.47 +/- 0.06	-0.07 +/- 0.00	-2.54 +/- 0.05
LYS 116	SO3 147	0.15 +/- 0.07	-81.71 +/- 3.87	59.85 +/- 2.01	-0.64 +/- 0.07	-22.33 +/- 3.94
LYS 116	SO3 148	0.64 +/- 0.08	-83.79 +/- 5.43	59.42 +/- 1.57	-0.61 +/- 0.08	-24.33 +/- 5.53
LYS 116	UVB 142	-0.68 +/- 0.07	-13.74 +/- 0.39	7.63 +/- 0.15	-0.61 +/- 0.01	-7.41 +/- 0.16
LYS 124	SO3 145	0.58 +/- 0.09	-85.25 +/- 7.40	65.42 +/- 4.20	-0.64 +/- 0.13	-19.88 +/- 5.04
LYS 124	SO3 146	0.40 +/- 0.08	72.37 +/- 20.96	56.03 +/- 10.33	-0.38 +/- 0.26	-16.32 +/- 10.98
LYS 124	QVB 140	-0.30 +/- 0.15	-15.59 +/- 2.61	11.69 +/- 0.01	-0.58 +/- 0.10	-4.78 +/- 2.55
LYS 125	SO3 147	0.94 +/- 0.09	-86.73 +/- 4.36	63.80 +/- 1.91	-0.58 +/- 0.07	22.52 +/- 3.16
LYS 125	UVB 142	-0.55 +/- 0.35	-10.21 +/- 0.77	5.84 +/- 0.11	-0.96 +/- 0.04	-5.91 +/- 0.34
GLN 131	UVB 142	-1.18 +/- 0.08	0.52 +/- 0.06	-0.92 +/- 0.01	-0.76 +/- 0.03	-2.36 +/- 0.01
LYS 130	SO3 145	0.80 +/- 0.08	-89.22 +/- 7.72	70.87 +/- 4.66	0.76 +/- 0.15	-18.30 +/- 4.15
2-PTN4	Residues	VDW	Electrost.	PS	Non-PS	Global
ARG 52	SO3 144	0.85 +/- 0.09	77.96 +/- 23.04	54.27 +/- 15.45	-0.66 +/- 0.22	-23.50 +/- 8.65
ARG 52	QVB 138	-0.75 +/- 0.09	-10.15 +/- 0.44	9.76 +/- 0.20	-0.67 +/- 0.04	-2.21 +/- 0.59
LYS 61	SO3 147	0.91 +/- 0.08	-80.92 +/- 23.71	53.02 +/- 15.13	-0.52 +/- 0.17	27.50 +/- 10.02
LYS 61	QVB 140	-0.59 +/- 0.09	-29.98 +/- 1.47	14.01 +/- 0.25	-0.94 +/- 0.02	-17.51 +/- 1.10
LYS 84	SO3 149	0.38 +/- 0.07	-71.15 +/- 22.07	47.26 +/- 13.43	-0.46 +/- 0.17	23.96 +/- 10.02
LYS 84	SO3 150	0.23 +/- 0.05	-63.37 +/- 21.34	49.68 +/- 14.66	-0.29 +/- 0.15	-13.75 +/- 8.67
ARG 86	SO3 149	0.53 +/- 0.08	-69.71 +/- 20.24	38.94 +/- 10.57	-0.35 +/- 0.12	-30.58 +/- 10.14
ARG 86	SO3 150	1.28 +/- 1.02	-75.14 +/- 22.10	46.42 +/- 13.15	-0.51 +/- 0.18	-27.95 +/- 9.68
ARG 86	UVB 142	-0.09 +/- 0.11	-15.26 +/- 0.62	5.75 +/- 0.05	-0.68 +/- 0.07	-10.28 +/- 0.53
PHE 63	BN1 148	-0.59 +/- 0.02	-0.70 +/- 0.04	0.63 +/- 0.04	0.60 +/- 0.01	-1.27 +/- 0.03
LYS 107	SO3 149	0.93 +/- 0.09	-87.18 +/- 25.55	52.04 +/- 14.91	-0.59 +/- 0.19	-34.80 +/- 11.38
LYS 122	UVB 142	-0.49 +/- 0.02	-6.01 +/- 0.03	3.94 +/- 0.17	-0.40 +/- 0.01	-2.97 +/- 0.23
LYS 122	BN1 148	-0.89 +/- 0.03	4.81 +/- 0.04	-5.46 +/- 0.06	-0.96 +/- 0.04	-2.50 +/- 0.11
LYS 122	SO3 149	1.21 +/- 0.96	-84.42 +/- 24.69	50.09 +/- 14.16	-0.48 +/- 0.16	-33.59 +/- 10.75
LYS 123	SO3 147	0.82 +/- 0.94	-89.34 +/- 26.33	59.84 +/- 17.37	-0.68 +/- 0.23	-29.35 +/- 10.29
LYS 125	QVB 140	-0.24 +/- 0.18	-22.36 +/- 0.45	10.48 +/- 0.80	-0.70 +/- 0.03	-12.81 +/- 1.10
LYS 125	SO3 146	0.29 +/- 0.06	-73.50 +/- 21.74	50.76 +/- 14.38	-0.44 +/- 0.16	-22.88 +/- 8.59
LYS 125	SO3 147	0.59 +/- 0.75	-78.26 +/- 23.19	48.46 +/- 13.80	-0.39 +/- 0.14	-29.60 +/- 11.24
LYS 126	SO3 150	0.15 +/- 0.05	-49.83 +/- 30.58	41.64 +/- 21.02	-0.21 +/- 0.26	-8.24 +/- 10.54
3-PTN4	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 68	SO3 143	0.65 +/- 0.09	-77.47 +/- 4.50	59.78 +/- 1.28	-0.42 +/- 0.01	-17.47 +/- 2.00
LYS 68	SO3 144	0.28 +/- 0.06	-76.47 +/- 2.34	57.79 +/- 0.59	-0.42 +/- 0.01	-18.81 +/- 1.08
LYS 68	QVB 138	0.28 +/- 0.06	-19.38 +/- 0.03	12.32 +/- 0.26	-0.66 +/- 0.04	-7.44 +/- 0.22
LYS 68	PGB 139	-1.01 +/- 0.17	-14.62 +/- 1.54	14.01 +/- 0.87	-0.77 +/- 0.09	-2.39 +/- 0.94
LYS 61	SO3 145	0.60 +/- 0.08	-85.57 +/- 4.73	68.10 +/- 2.71	-0.73 +/- 0.09	-17.59 +/- 3.77
LYS 61	CF1 157	-1.07 +/- 0.03	-2.32 +/- 0.09	1.76 +/- 0.17	-0.67 +/- 0.01	-2.30 +/- 0.05
LYS 61	LV1 158	-0.81 +/- 0.05	-17.48 +/- 2.85	15.64 +/- 1.73	-1.11 +/- 0.24	-3.75 +/- 1.30
PHE 71	BN1 148	-0.22 +/- 0.26	-0.36 +/- 0.01	0.52 +/- 0.01	-1.02 +/- 0.08	-1.08 +/- 0.18
PHE 71	BZ1 147	-1.20 +/- 0.18	0.11 +/- 0.03	-0.17 +/- 0.06	-1.22 +/- 0.18	-2.49 +/- 0.03
ARG 86	QVB 140	-0.34 +/- 0.14	-13.76 +/- 0.21	8.81 +/- 0.21	-0.28 +/- 0.01	-5.57 +/- 0.29
ARG 86	SO3 149	2.08 +/- 0.30	-84.91 +/- 1.37	57.60 +/- 1.37	-0.66 +/- 0.01	-25.88 +/- 0.29
ARG 92	SO3 143	0.44 +/- 0.16	-80.53 +/- 0.51	53.47 +/- 0.50	-0.67 +/- 0.03	-27.28 +/- 0.14
ARG 92	SO3 144	0.06 +/- 0.01	-78.48 +/- 3.66	51.91 +/- 0.12	-0.63 +/- 0.04	-27.14 +/- 3.59
ARG 92	QVB 138	-0.16 +/- 0.04	-15.37 +/- 0.35	9.68 +/- 0.19	-0.50 +/- 0.01	-6.35 +/- 0.60
LYS 107	SO3 149	0.60 +/- 0.08	-95.95 +/- 4.32	73.85 +/- 1.53	-0.81 +/- 0.03	-22.30 +/- 2.00

**A.T1.** Tabla de energías de enlaces efectivas (kcal/mol) mediante la descomposición por residuo a través del método MM-PBSA a partir de los resultados de dinámica molecular libres y MD-TAR para la serie pentasacáridica con la conformación de la pleiotrofina más plegada (contribución energética favorable  $E_{global} < -1.20$  kcal/mol).



1-PTN3	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 3	SO3 143	0.56 +/- 0.90	-89.00 +/- 5.47	68.06 +/- 2.92	-0.70 +/- 0.10	-21.06 +/- 3.82
LYS 3	SO3 144	-0.02 +/- 0.40	-54.94 +/- 12.43	49.28 +/- 5.62	-0.11 +/- 0.12	-5.80 +/- 7.06
LYS 5	SO3 143	0.72 +/- 0.71	-89.84 +/- 4.97	-68.87 +/- 3.67	-0.70 +/- 0.08	-20.94 +/- 3.23
ARG 35	SO3 147	0.80 +/- 0.09	-66.09 +/- 36.16	42.28 +/- 22.32	-0.54 +/- 0.32	-23.55 +/- 13.87
ARG 35	4GB 141	-0.18 +/- 0.02	3.26 +/- 0.16	0.39 +/- 0.66	-0.33 +/- 0.21	3.13 +/- 2.24
ARG 35	UVB 142	-0.13 +/- 0.08	-5.47 +/- 2.95	3.67 +/- 1.91	-0.08 +/- 0.05	-2.01 +/- 1.18
ARG 39	SO3 145	0.84 +/- 0.09	-68.87 +/- 37.81	45.99 +/- 24.57	-0.62 +/- 0.36	-22.66 +/- 13.42
ARG 49	SO3 145	0.70 +/- 0.08	-69.42 +/- 38.23	53.40 +/- 28.79	-0.45 +/- 0.26	-15.76 +/- 9.70
GLN 51	QVB 140	-1.35 +/- 0.85	-0.76 +/- 0.85	0.56 +/- 0.38	-1.01 +/- 0.59	-2.56 +/- 1.63
ARG 52	SO3 143	0.69 +/- 0.08	-59.05 +/- 32.27	43.23 +/- 22.96	-0.42 +/- 0.25	15.54 +/- 9.50
ARG 52	SO3 144	0.18 +/- 0.81	-57.66 +/- 31.60	44.44 +/- 23.72	0.54 +/- 0.33	-13.58 +/- 8.53
LYS 54	QVB 138	-0.01 +/- 0.01	-11.01 +/- 6.04	7.81 +/- 4.11	-0.45 +/- 0.28	-3.67 +/- 2.25
LYS 54	SO3 143	0.42 +/- 0.05	-61.66 +/- 33.78	50.30 +/- 27.01	-0.44 +/- 0.25	-11.37 +/- 6.9
ARG 92	SO3 148	0.64 +/- 0.08	-65.09 +/- 35.69	49.54 +/- 26.61	-0.53 +/- 0.31	-15.43 +/- 9.40
HIS 95	SO3 146	0.62 +/- 0.06	-58.33 +/- 31.77	46.48 +/- 24.89	-0.44 +/- 0.25	-11.66 +/- 6.82
HIS 95	QVB 140	-0.73 +/- 0.62	-14.89 +/- 8.35	11.36 +/- 6.22	-0.60 +/- 0.36	-4.85 +/- 2.93
LYS 101	UVB 142	-0.14 +/- 0.02	-8.36 +/- 4.69	4.09 +/- 2.21	-0.31 +/- 0.18	-4.72 +/- 2.80
LYS 101	SO3 147	0.47 +/- 0.08	-64.46 +/- 35.33	49.53 +/- 26.61	-0.51 +/- 0.30	-14.96 +/- 8.89
2-PTN3	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 2	SO3 144	0.78 +/- 0.08	-97.77 +/- 3.94	72.69 +/- 2.37	-0.79 +/- 0.09	-25.09 +/- 3.78
LYS 3	SO3 143	0.56 +/- 0.09	-89.02 +/- 5.47	68.06 +/- 2.92	-0.69 +/- 0.10	-21.06 +/- 3.81
LYS 3	SO3 144	-0.03 +/- 0.01	-54.94 +/- 12.43	49.28 +/- 5.62	-0.11 +/- 0.12	-5.80 +/- 2.06
LYS 5	SO3 143	0.72 +/- 0.07	-0.89 +/- 4.96	68.87 +/- 3.67	-0.70 +/- 0.08	-20.94 +/- 3.23
LYS 5	QVB 138	-0.17 +/- 0.17	-11.98 +/- 1.85	9.66 +/- 0.71	-0.18 +/- 0.13	-2.68 +/- 1.50
LYS 8	SO3 143	0.04 +/- 0.02	-33.08 +/- 18.42	30.95 +/- 12.77	-0.06 +/- 0.15	-2.15 +/- 6.18
SER 27	QVB 140	-1.19 +/- 0.02	-2.20 +/- 0.07	1.20 +/- 0.01	-0.64 +/- 0.02	-2.84 +/- 0.06
THR 26	WGB 141	0.13 +/- 0.30	-4.40 +/- 1.25	0.93 +/- 0.26	-0.41 +/- 0.00	-3.74 +/- 0.70
THR 26	BN1 148	-0.98 +/- 0.05	-0.16 +/- 0.02	-0.07 +/- 0.08	-1.13 +/- 0.05	-2.35 +/- 0.17
ARG 52	SO3 149	1.18 +/- 0.94	-90.90 +/- 4.23	68.40 +/- 1.54	-1.00 +/- 0.10	-22.31 +/- 3.83
ARG 92	SO3 144	0.94 +/- 0.09	-83.74 +/- 2.97	56.22 +/- 2.04	-0.60 +/- 0.05	-27.17 +/- 2.84
ARG 92	QVB 138	-2.70 +/- 0.75	-27.01 +/- 1.22	17.17 +/- 1.05	-2.26 +/- 0.01	-14.80 +/- 0.91
LYS 91	SO3 146	0.85 +/- 0.87	-88.89 +/- 4.12	71.39 +/- 2.72	-0.73 +/- 0.09	-17.38 +/- 3.09
LYS 91	SO3 147	-0.12 +/- 0.07	-51.21 +/- 6.68	48.93 +/- 5.35	-0.10 +/- 0.08	-2.50 +/- 1.61
LYS 91	WGB 139	-0.69 +/- 0.02	-9.20 +/- 0.01	7.76 +/- 0.07	-0.25 +/- 0.00	-2.37 +/- 0.11
ALA 93	QVB 138	-1.40 +/- 0.17	-2.01 +/- 0.01	0.25 +/- 0.01	-0.65 +/- 0.05	-3.81 +/- 0.24
ALA 93	WGB 139	-0.25 +/- 0.21	-2.17 +/- 0.30	0.60 +/- 0.13	-0.48 +/- 0.02	-2.31 +/- 0.02
HIS 95	ISO 137	-1.14 +/- 0.12	-0.45 +/- 0.11	0.72 +/- 0.09	-1.04 +/- 0.11	-1.90 +/- 0.25
HIS 95	SO3 143	0.48 +/- 0.07	-74.15 +/- 3.41	59.47 +/- 1.58	-0.61 +/- 0.07	-14.81 +/- 2.38
HIS 95	QVB 138	-1.05 +/- 0.03	-12.27 +/- 1.28	8.40 +/- 0.07	-0.58 +/- 0.04	-5.50 +/- 1.27
LYS 101	QVB 140	-0.52 +/- 0.02	-15.56 +/- 2.64	13.46 +/- 1.37	-0.31 +/- 0.19	-2.95 +/- 1.75
LYS 101	BN1 145	-1.46 +/- 0.08	5.25 +/- 0.13	-5.20 +/- 0.15	-1.10 +/- 0.02	-2.47 +/- 0.04
LYS 101	SO3 147	0.98 +/- 0.83	-89.07 +/- 3.56	71.38 +/- 2.37	-0.87 +/- 0.08	-17.57 +/- 1.92
LYS 130	SO3 146	0.38 +/- 0.78	-58.30 +/- 29.78	50.25 +/- 20.60	-0.36 +/- 0.41	-8.03 +/- 5.45
3-PTN3	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 8	SO3 143	1.04 +/- 0.29	-90.36 +/- 1.03	69.58 +/- 0.07	-0.79 +/- 0.02	-20.52 +/- 0.78
LYS 9	SO3 143	1.31 +/- 0.01	86.20 +/- 2.22	61.41 +/- 0.66	-0.57 +/- 0.06	-24.05 +/- 2.94
LYS 9	SO3 144	0.08 +/- 0.17	-88.09 +/- 0.08	65.99 +/- 0.38	-0.67 +/- 0.02	-22.69 +/- 0.45
LYS 68	SO3 150	2.38 +/- 0.64	-92.37 +/- 0.42	63.58 +/- 0.03	-0.72 +/- 0.03	-24.12 +/- 0.29
LYS 68	QVB 140	-0.23 +/- 0.00	-13.04 +/- 0.40	10.35 +/- 0.06	-0.09 +/- 0.00	-3.01 +/- 0.47
SER 89	SO3 155	0.13 +/- 0.58	-15.82 +/- 0.25	8.10 +/- 1.13	-0.47 +/- 0.03	-8.06 +/- 0.77
LYS 91	PGB 141	-0.98 +/- 0.08	-24.45 +/- 0.12	14.26 +/- 0.68	-0.68 +/- 0.05	-8.85 +/- 0.42
LYS 91	QVB 142	-0.51 +/- 0.05	-16.86 +/- 0.07	10.19 +/- 0.19	-0.46 +/- 0.00	-7.65 +/- 0.31
LYS 91	BZ1 153	-1.11 +/- 0.09	-8.24 +/- 0.25	6.42 +/- 0.17	-0.60 +/- 0.07	-3.52 +/- 0.24
ARG 92	SO3 150	-0.10 +/- 0.09	-65.94 +/- 0.32	53.56 +/- 0.54	-0.50 +/- 0.02	-12.98 +/- 0.15
ARG 92	PGB 139	-1.20 +/- 0.13	-16.86 +/- 0.06	15.22 +/- 0.40	-0.71 +/- 0.06	-3.55 +/- 0.64
ARG 92	QVB 140	-2.54 +/- 0.31	-17.93 +/- 1.21	12.90 +/- 0.13	-1.45 +/- 0.01	-9.02 +/- 1.02
ARG 92	PV1 146	-0.13 +/- 0.54	-1.43 +/- 1.13	-1.57 +/- 0.22	-0.59 +/- 0.02	-3.73 +/- 0.39
ARG 92	BZ1 153	-0.87 +/- 0.09	-5.75 +/- 0.10	4.35 +/- 0.19	-0.49 +/- 0.03	-2.76 +/- 0.03
LYS 101	QVB 142	-0.34 +/- 0.13	-12.26 +/- 0.24	10.60 +/- 0.41	-0.48 +/- 0.05	-2.47 +/- 0.57
LYS 101	BN1 154	-0.17 +/- 0.02	16.09 +/- 0.69	-12.74 +/- 0.02	-0.13 +/- 0.01	3.04 +/- 0.70
LYS 101	SO3 155	0.93 +/- 0.98	-0.79.6 +/- 2.41	55.40 +/- 1.28	-0.72 +/- 0.09	-23.98 +/- 2.80
LYS 101	SO3 156	0.82 +/- 0.29	-91.15 +/- 0.01	63.71 +/- 1.67	-0.68 +/- 0.01	27.31 +/- 1.97

**A.T2.** Tabla de energías de enlaces efectivas (kcal/mol) mediante la descomposición por residuo a través del método MM-PBSA a partir de los resultados de dinámica molecular libres y MD-TAR para la serie pentasacáridica con la conformación de la pleiotrofina más abierta (contribución energética favorable  $E_{global} < -1.20$  kcal/mol).

1-PTN8	Residues	VDW	Electrost.	PS	Non-PS	Global
ARG 52	SO3 147	1.04 +/- 0.52	-91.47 +/- 1.09	57.49 +/- 2.16	-0.77 +/- 0.02	-33.71 +/- 2.76
ARG 52	SO3 148	-0.04 +/- 0.01	-37.09 +/- 0.72	35.65 +/- 0.16	0.18 +/- 0.12	-2.28 +/- 0.57
ARG 52	UVB 142	-0.16 +/- 0.01	-6.75 +/- 0.38	4.32 +/- 0.13	-0.08 +/- 0.01	-2.67 +/- 0.27
LYS 54	SO3 147	0.47 +/- 0.26	-91.77 +/- 0.33	60.64 +/- 0.33	-0.53 +/- 0.02	-31.20 +/- 0.37
LYS 54	SO3 148	-0.35 +/- 0.02	-86.20 +/- 1.22	59.17 +/- 0.21	-0.60 +/- 0.02	-27.98 +/- 1.06
LYS 54	UVB 142	-0.43 +/- 0.01	-6.82 +/- 0.61	4.57 +/- 0.44	-0.49 +/- 0.01	-3.18 +/- 0.17
LYS 58	SO3 147	-0.28 +/- 0.03	-4.03 +/- 0.13	2.11 +/- 0.12	-0.15 +/- 0.01	-2.36 +/- 0.29
LYS 60	4GB 141	-1.80 +/- 0.03	-3.32 +/- 0.47	2.61 +/- 0.31	-1.35 +/- 0.05	-3.85 +/- 0.15
LYS 60	UVB 142	-0.70 +/- 0.14	-12.44 +/- 0.47	5.34 +/- 0.31	-1.34 +/- 0.02	-9.14 +/- 0.67
LYS 60	SO3 147	-0.21 +/- 0.14	-77.35 +/- 2.51	63.47 +/- 0.53	-0.53 +/- 0.02	-14.63 +/- 1.87
LYS 61	SO3 145	0.45 +/- 0.89	-82.12 +/- 4.85	59.21 +/- 0.38	-0.60 +/- 0.09	-23.06 +/- 4.42
LYS 61	SO3 146	2.03 +/- 1.52	-93.18 +/- 1.82	64.43 +/- 2.03	-0.92 +/- 0.03	-27.63 +/- 1.70
LYS 61	4GB 141	0.17 +/- 0.44	-0.02 +/- 0.01	-1.99 +/- 0.28	-0.37 +/- 0.00	-2.21 +/- 0.26
LYS 61	QVB 140	-1.50 +/- 0.08	-19.13 +/- 0.62	11.82 +/- 0.66	-1.13 +/- 0.03	-9.94 +/- 0.16
LYS 68	SO3 145	-0.03 +/- 0.01	-85.24 +/- 4.24	65.27 +/- 0.69	-0.64 +/- 0.06	-20.64 +/- 2.88
LYS 68	4GB 139	-1.02 +/- 0.10	-5.16 +/- 0.56	2.86 +/- 0.26	-1.15 +/- 0.02	-4.48 +/- 0.18
LYS 68	QVB 140	0.08 +/- 0.01	-20.81 +/- 1.23	12.15 +/- 0.19	-0.87 +/- 0.02	-9.44 +/- 0.43
GLY 64	4GB 139	-0.40 +/- 0.18	-2.64 +/- 0.96	0.52 +/- 0.22	-0.48 +/- 0.00	-3.00 +/- 0.56
ARG 86	SO3 145	1.99 +/- 0.10	-85.74 +/- 1.62	59.70 +/- 0.04	-0.77 +/- 0.02	-24.81 +/- 1.78
ARG 86	QVB 140	-0.14 +/- 0.00	-12.76 +/- 0.40	9.93 +/- 0.59	-0.06 +/- 0.00	-3.03 +/- 0.20
ARG 92	QVB 138	-1.80 +/- 0.60	-20.17 +/- 0.73	13.33 +/- 1.00	-1.43 +/- 0.04	-10.07 +/- 1.17
ARG 92	4GB 139	-0.12 +/- 0.38	0.25 +/- 0.43	1.53 +/- 0.16	-0.67 +/- 0.09	-2.07 +/- 0.55
ARG 92	SO3 144	0.52 +/- 0.13	-80.57 +/- 0.92	60.84 +/- 1.45	-0.74 +/- 0.03	-19.93 +/- 2.52
LYS 124	SO3 148	0.65 +/- 0.01	-85.15 +/- 2.61	62.72 +/- 1.28	-0.61 +/- 0.01	-22.38 +/- 1.31
LYS 130	SO3 148	0.21 +/- 0.25	-87.36 +/- 0.89	70.46 +/- 0.92	-0.66 +/- 0.03	-17.35 +/- 0.26
2-PTN8	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 61	SO3 143	-0.23 +/- 0.07	-80.86 +/- 1.84	65.64 +/- 0.66	-0.63 +/- 0.01	-16.09 +/- 2.57
LYS 61	SO3 144	0.54 +/- 0.37	-93.51 +/- 1.67	62.56 +/- 1.67	-0.59 +/- 0.01	-30.98 +/- 2.96
LYS 62	SO3 144	-0.27 +/- 0.15	-4.04 +/- 0.18	-2.10 +/- 0.82	-0.31 +/- 0.00	-6.71 +/- 0.85
GLU 98	BN1 148	-1.45 +/- 0.08	-4.02 +/- 0.31	3.93 +/- 0.31	-1.15 +/- 0.04	-2.69 +/- 0.12
GLN 100	QVB 140	-1.04 +/- 0.15	-0.43 +/- 0.15	-0.18 +/- 0.19	-0.70 +/- 0.15	-2.35 +/- 0.35
GLN 100	WGB 141	-1.40 +/- 0.36	-3.35 +/- 0.14	1.17 +/- 0.19	-0.99 +/- 0.04	-4.57 +/- 0.35
GLN 100	BN1 148	-0.75 +/- 0.06	0.14 +/- 0.04	-0.10 +/- 0.00	-0.57 +/- 0.00	-1.27 +/- 0.02
GLN 100	UVB 142	-1.43 +/- 0.26	-2.25 +/- 0.11	1.27 +/- 0.02	-0.79 +/- 0.15	-3.19 +/- 0.28
LYS 101	SO3 150	-0.08 +/- 0.26	-86.33 +/- 3.51	69.04 +/- 0.15	-0.53 +/- 0.01	-17.90 +/- 3.11
LYS 101	UVB 142	-1.46 +/- 0.44	-11.57 +/- 1.84	1.42 +/- 1.17	-1.62 +/- 0.13	-3.24 +/- 0.09
VAL 103	BN1 145	-0.77 +/- 0.07	0.42 +/- 0.07	-0.52 +/- 0.02	-0.75 +/- 0.05	-1.63 +/- 0.18
LYS 107	QVB 138	-0.41 +/- 0.04	-17.41 +/- 0.19	13.68 +/- 0.43	-0.34 +/- 0.04	-4.48 +/- 0.16
LYS 107	SO3 144	1.88 +/- 1.21	-90.54 +/- 3.46	66.04 +/- 1.14	-0.68 +/- 0.01	-23.29 +/- 1.11
3-PTN8	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 61	SO3 143	0.45 +/- 0.29	-79.03 +/- 0.74	62.54 +/- 0.60	-0.56 +/- 0.04	-16.59 +/- 1.68
LYS 61	SO3 144	0.77 +/- 0.54	-85.55 +/- 0.01	61.44 +/- 1.17	-0.68 +/- 0.02	-24.01 +/- 0.65
LYS 61	QVB 138	-0.43 +/- 0.09	-13.55 +/- 2.07	11.60 +/- 0.38	-0.49 +/- 0.02	-2.86 +/- 1.62
LYS 68	SO3 143	-0.06 +/- 0.01	-44.58 +/- 0.67	42.25 +/- 1.05	-0.01 +/- 0.01	-2.41 +/- 0.37
LYS 68	SO3 144	0.85 +/- 0.67	-88.27 +/- 2.61	63.43 +/- 1.58	-0.65 +/- 0.03	-24.64 +/- 3.55
LYS 68	QVB 138	-0.58 +/- 0.04	-17.91 +/- 1.15	12.98 +/- 1.25	-0.55 +/- 0.11	-6.06 +/- 0.16
LYS 68	BZ1 147	-0.04 +/- 0.12	-10.49 +/- 0.07	7.45 +/- 0.08	-0.39 +/- 0.01	-3.47 +/- 0.02
GLN 70	SO3 143	-0.71 +/- 0.08	-18.09 +/- 0.12	9.92 +/- 0.71	-0.68 +/- 0.03	-9.56 +/- 0.69
ARG 92	BN1 148	-1.27 +/- 0.04	8.84 +/- 0.07	-9.00 +/- 0.07	-1.23 +/- 0.02	-2.65 +/- 0.02
LEU 94	CF1 157	-0.62 +/- 0.01	-0.32 +/- 0.029	-0.19 +/- 0.07	-0.37 +/- 0.09	-1.50 +/- 0.32
HIP 95	CF1 157	-1.15 +/- 0.01	-2.45 +/- 0.39	2.90 +/- 0.19	-1.04 +/- 0.01	-1.74 +/- 0.20
HIP 95	LV1 158	0.08 +/- 0.09	-39.19 +/- 1.54	25.48 +/- 0.00	-1.48 +/- 0.11	-15.11 +/- 1.57
LYS 101	QVB 142	-0.44 +/- 0.01	-15.68 +/- 0.05	14.10 +/- 0.19	-0.28 +/- 0.00	-2.30 +/- 0.25
LYS 101	SO3 156	1.10 +/- 0.72	-76.78 +/- 1.18	65.28 +/- 0.04	-0.46 +/- 0.01	-10.85 +/- 0.40

**A.T3.** Tabla de energías de enlaces efectivas (kcal/mol) mediante la descomposición por residuo a través del método MM-PBSA a partir de los resultados de dinámica molecular libres y MD-TAR para la serie pentasacáridica con la conformación de la pleiotrofina en forma de horquilla (contribución energética favorable  $E_{global} < -1.20$  kcal/mol).

4-PTN4	Residues	VDW	Electrost.	PS	Non-PS	Global
SER 27	4GB 138	-1.33 +/- 0.31	-0.20 +/- 0.83	0.25 +/- 0.41	-0.82 +/- 0.08	-2.10 +/- 0.03
SER 27	QVB 139	-1.14 +/- 0.10	0.36 +/- 0.27	-0.41 +/- 0.17	-0.81 +/- 0.02	-2.01 +/- 0.21
CYS 30	4GB 138	-0.07 +/- 0.64	-3.04 +/- 0.95	0.99 +/- 0.12	-0.41 +/- 0.03	-2.53 +/- 0.46
LYS 49	SO3 145	0.50 +/- 0.61	-94.50 +/- 0.34	74.59 +/- 1.29	-0.91 +/- 0.07	-20.31 +/- 1.09
ARG 52	UVB 141	-0.92 +/- 0.06	-9.94 +/- 0.73	5.51 +/- 0.06	-0.85 +/- 0.12	-6.20 +/- 0.73
ARG 52	SO3 144	-0.15 +/- 0.03	-44.69 +/- 2.51	42.07 +/- 2.14	0.07 +/- 0.03	-2.85 +/- 0.43
ARG 52	SO3 145	0.12 +/- 0.59	-79.11 +/- 1.28	56.91 +/- 0.94	-0.61 +/- 0.01	-22.69 +/- 0.25
TRP 59	ISO 137	-1.22 +/- 0.36	0.07 +/- 0.14	-0.06 +/- 0.01	-0.99 +/- 0.17	-2.19 +/- 0.68
TRP 59	4GB 138	-1.55 +/- 0.07	-0.96 +/- 0.07	-0.17 +/- 0.01	-1.30 +/- 0.12	-4.00 +/- 0.28
LYS 61	SO3 143	1.62 +/- 1.28	-87.30 +/- 1.29	59.26 +/- 0.41	-0.69 +/- 0.02	-27.10 +/- 0.61
LYS 61	QVB 139	-0.61 +/- 0.73	-25.44 +/- 0.99	13.60 +/- 0.13	-1.23 +/- 0.00	-13.67 +/- 0.39
LYS 68	SO3 144	0.65 +/- 0.49	-86.48 +/- 0.16	59.16 +/- 1.20	-0.62 +/- 0.03	-27.28 +/- 0.91
LYS 68	4GB 140	-0.04 +/- 0.41	-0.99 +/- 0.74	-1.42 +/- 0.43	-0.62 +/- 0.07	-3.07 +/- 0.83
LYS 68	UVB 141	-0.11 +/- 0.45	-11.67 +/- 2.58	4.47 +/- 0.20	-0.46 +/- 0.01	-7.77 +/- 1.94
ARG 86	SO3 143	0.81 +/- 0.50	-92.43 +/- 1.53	53.69 +/- 0.47	-0.83 +/- 0.03	-38.75 +/- 0.58
ARG 86	QVB 139	-0.21 +/- 0.01	-11.27 +/- 0.14	8.60 +/- 0.07	-0.10 +/- 0.01	-2.97 +/- 0.23
LYS 91	SO3 144	1.19 +/- 0.66	-83.26 +/- 5.82	59.65 +/- 1.31	-0.47 +/- 0.10	-22.88 +/- 6.57
LYS 91	UVB 141	-0.09 +/- 0.13	-8.50 +/- 3.62	3.85 +/- 0.40	-0.36 +/- 0.12	-5.11 +/- 3.21
ARG 92	UVB 141	-0.17 +/- 0.02	-7.48 +/- 0.40	3.86 +/- 0.05	-0.08 +/- 0.01	-3.87 +/- 0.38
ARG 92	SO3 144	2.20 +/- 1.20	-92.85 +/- 2.18	52.62 +/- 0.67	-0.77 +/- 0.02	-38.81 +/- 1.68
LYS 107	QVB 139	-0.49 +/- 0.01	-11.72 +/- 0.05	10.39 +/- 0.03	-0.57 +/- 0.04	-2.34 +/- 0.02
LYS 107	SO3 142	-0.43 +/- 0.19	-81.86 +/- 0.84	64.81 +/- 0.81	-0.58 +/- 0.02	-18.07 +/- 1.48
LYS 107	SO3 143	0.16 +/- 0.47	-76.38 +/- 2.49	56.95 +/- 0.27	-0.39 +/- 0.03	-19.65 +/- 1.78
LYS 114	SO3 142	2.00 +/- 1.26	100.28 +/- 3.49	78.27 +/- 0.68	1.01 +/- 0.06	21.03 +/- 1.49
5-PTN4	Residues	VDW	Electrost.	PS	Non-PS	Global
TRP 59	UVB 141	-2.00 +/- 0.06	-0.99 +/- 0.50	-0.06 +/- 0.22	-1.42 +/- 0.04	-4.48 +/- 0.29
TRP 59	BN1 145	-1.83 +/- 0.21	-0.71 +/- 0.22	0.57 +/- 0.06	-1.47 +/- 0.14	-3.44 +/- 0.06
LYS 61	QVB 139	-0.49 +/- 0.25	-12.77 +/- 0.96	10.71 +/- 0.24	-0.84 +/- 0.11	-3.40 +/- 0.86
LYS 61	SO3 143	0.06 +/- 0.29	-85.86 +/- 2.93	70.92 +/- 1.82	-0.76 +/- 0.02	-15.64 +/- 0.84
LYS 61	SO3 144	-0.32 +/- 0.05	-51.26 +/- 3.05	48.33 +/- 2.23	-0.22 +/- 0.03	-3.48 +/- 0.91
GLN 62	SO3 143	-0.14 +/- 0.34	-9.06 +/- 5.22	4.26 +/- 1.68	-0.16 +/- 0.14	-5.11 +/- 6.17
PHE 63	SO3 143	-0.45 +/- 0.05	-7.48 +/- 0.40	3.83 +/- 0.86	-0.25 +/- 0.02	-4.36 +/- 0.95
GLY 64	SO3 143	0.09 +/- 0.01	-5.84 +/- 2.50	3.61 +/- 0.98	-0.09 +/- 0.01	-2.23 +/- 0.20
ARG 86	QVB 139	-0.55 +/- 0.02	-12.48 +/- 0.50	9.88 +/- 0.21	-0.33 +/- 0.01	-3.47 +/- 0.74
ARG 86	SO3 143	-0.16 +/- 0.01	-46.93 +/- 0.66	44.34 +/- 0.71	-0.16 +/- 0.01	-2.91 +/- 0.08
ARG 86	SO3 144	1.95 +/- 0.36	-84.21 +/- 0.64	51.76 +/- 1.95	-0.64 +/- 0.00	-31.13 +/- 1.67
LYS 107	SO3 144	0.52 +/- 0.80	-82.83 +/- 4.25	61.74 +/- 0.46	-0.51 +/- 0.05	-21.07 +/- 3.96
LYS 114	SO3 146	1.15 +/- 0.50	-94.16 +/- 1.62	77.42 +/- 0.07	-0.88 +/- 0.01	16.47 +/- 1.06
6-PTN4	Residues	VDW	Electrost.	PS	Non-PS	Global
THR 50	BZ1 143	-0.65 +/- 0.00	-0.47 +/- 0.02	0.29 +/- 0.00	-0.65 +/- 0.04	-1.48 +/- 0.01
GLN 51	BZ1 143	-0.83 +/- 0.1	-0.87 +/- 0.12	0.37 +/- 0.01	-0.52 +/- 0.01	-1.85 +/- 0.01
ARG 52	PGB 138	-0.945 +/- 0.15	-18.23 +/- 3.28	15.23 +/- 0.35	-0.66 +/- 0.06	-4.61 +/- 2.83
ARG 52	BZ1 143	-1.47 +/- 0.07	-5.25 +/- 0.45	5.51 +/- 0.34	-1.06 +/- 0.04	-2.27 +/- 0.23
ARG 52	QVB 139	-0.71 +/- 0.04	-14.05 +/- 1.94	9.13 +/- 0.19	-0.50 +/- 0.02	-6.13 +/- 2.11
ARG 52	SO3 145	0.84 +/- 0.39	-83.64 +/- 0.22	54.65 +/- 0.63	-0.56 +/- 0.04	-28.71 +/- 0.86
LYS 54	QVB 139	-0.13 +/- 0.00	-10.39 +/- 0.19	8.15 +/- 0.18	-0.06 +/- 0.00	-2.44 +/- 0.37
LYS 54	SO3 145	0.73 +/- 0.22	-98.34 +/- 1.71	67.08 +/- 1.28	-0.78 +/- 0.07	-31.31 +/- 0.29
LYS 61	QVB 139	-0.29 +/- 0.06	-14.04 +/- 0.42	8.56 +/- 0.74	-0.48 +/- 0.11	-6.25 +/- 0.37
PHE 63	BZ1 148	-0.89 +/- 0.10	0.16 +/- 0.02	0.19 +/- 0.01	-0.69 +/- 0.01	-1.23 +/- 0.05
LYS 68	QVB 141	-0.69 +/- 0.05	-19.07 +/- 0.58	15.64 +/- 0.19	-0.40 +/- 0.08	-4.52 +/- 0.89
LYS 61	SO3 145	1.22 +/- 0.37	-87.31 +/- 3.29	61.77 +/- 0.11	-0.70 +/- 0.02	-25.02 +/- 2.82

**A.T4.** Tabla de energías de enlaces efectivas (kcal/mol) mediante la descomposición por residuo a través del método MM-PBSA a partir de los resultados de dinámica molecular libres y MD-TAR para la serie tetrasacáridica con la conformación de la pleiotrofina más plegada (contribución energética favorable  $E_{global} < -1.20$  kcal/mol).

4-PTN3	Residues	VDW	Electrost.	PS	Non-PS	Global
ASP 29	4GB 138	-1.03 +/- 0.05	-6.64 +/- 1.01	2.89 +/- 0.11	-0.97 +/- 0.10	-5.75 +/- 0.74
ARG 52	UVB 141	-0.84 +/- 0.16	-10.75 +/- 0.12	6.43 +/- 0.72	-0.96 +/- 0.02	-6.12 +/- 0.99
ARG 52	SO3 145	0.48 +/- 0.59	-74.83 +/- 7.35	58.24 +/- 1.16	-0.66 +/- 0.12	-16.76 +/- 5.72
LYS 54	4GB 140	-0.85 +/- 0.20	-5.74 +/- 0.42	2.15 +/- 0.81	-0.98 +/- 0.04	-5.43 +/- 0.23
LYS 54	SO3 144	0.63 +/- 0.28	-81.73 +/- 1.66	64.15 +/- 0.74	-0.76 +/- 0.07	-17.71 +/- 1.28
LYS 54	UVB 141	0.33 +/- 0.32	-14.74 +/- 0.26	5.75 +/- 0.63	-0.56 +/- 0.02	-9.23 +/- 0.06
LYS 91	4GB 138	-1.30 +/- 0.09	-2.89 +/- 0.74	-1.26 +/- 1.02	-0.88 +/- 0.01	-6.33 +/- 0.38
LYS 91	QVB 139	-0.55 +/- 0.05	-13.19 +/- 0.80	10.67 +/- 0.28	-0.52 +/- 0.01	-3.58 +/- 0.48
LYS 91	SO3 142	1.29 +/- 0.46	-91.21 +/- 0.62	64.00 +/- 0.61	-0.77 +/- 0.01	-26.67 +/- 0.46
LYS 91	SO3 143	0.35 +/- 0.78	-73.72 +/- 3.14	50.54 +/- 0.36	-0.31 +/- 0.03	-23.14 +/- 2.75
ARG 92	4GB 138	-1.80 +/- 0.20	-10.64 +/- 0.25	1.03 +/- 0.84	-1.39 +/- 0.02	-12.80 +/- 0.92
ARG 92	QVB 139	-1.75 +/- 0.03	-15.86 +/- 1.18	11.03 +/- 0.34	-1.05 +/- 0.05	-7.63 +/- 0.87
ARG 92	SO3 142	0.09 +/- 0.01	-43.08 +/- 0.54	39.09 +/- 0.34	-0.01 +/- 0.00	-4.10 +/- 0.21
ARG 92	SO3 143	0.78 +/- 0.91	-80.98 +/- 1.00	46.26 +/- 0.21	-0.52 +/- 0.01	-34.46 +/- 0.11
LYS 122	SO3 142	0.47 +/- 0.42	-86.38 +/- 3.10	70.67 +/- 0.48	-0.71 +/- 0.11	-15.94 +/- 3.14
LYS 122	SO3 143	-0.06 +/- 0.08	-41.67 +/- 2.78	39.73 +/- 2.72	-0.01 +/- 0.01	-2.01 +/- 0.07
LYS 124	QVB 139	-0.24 +/- 0.01	-12.66 +/- 0.46	10.01 +/- 0.58	-0.11 +/- 0.01	-3.00 +/- 0.14
LYS 124	SO3 143	1.63 +/- 0.32	-100.00 +/- 2.32	64.31 +/- 0.12	-0.75 +/- 0.01	-34.81 +/- 1.87
LYS 126	QVB 139	-0.16 +/- 0.42	-21.59 +/- 1.25	11.31 +/- 1.48	-0.70 +/- 0.04	-11.14 +/- 0.15
LYS 126	SO3 143	2.63 +/- 0.25	-93.00 +/- 0.72	54.62 +/- 1.86	-0.51 +/- 0.03	-36.25 +/- 1.37
LYS 126	UVB 141	-1.49 +/- 0.26	-2.34 +/- 0.77	1.53 +/- 0.44	-1.05 +/- 0.06	-3.36 +/- 0.64
LYS 129	UVB 141	-0.97 +/- 0.34	-6.94 +/- 2.63	6.53 +/- 1.57	-0.98 +/- 0.36	-2.35 +/- 1.78
LYS 129	SO3 145	0.84 +/- 0.14	-86.42 +/- 10.15	69.03 +/- 3.97	-0.67 +/- 0.24	-17.21 +/- 6.55
LYS 130	UVB 141	-0.86 +/- 0.12	-8.47 +/- 0.58	4.56 +/- 0.24	-0.78 +/- 0.15	-5.55 +/- 0.62
LYS 130	SO3 144	0.61 +/- 0.59	-82.86 +/- 2.79	67.32 +/- 0.54	-0.64 +/- 0.03	-15.58 +/- 1.69
5-PTN3	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 8	QVB 139	-0.12 +/- 0.45	-18.35 +/- 0.57	12.81 +/- 0.35	-0.36 +/- 0.04	-6.31 +/- 0.51
LYS 8	SO3 143	0.96 +/- 0.29	-85.12 +/- 3.17	63.78 +/- 0.52	-0.83 +/- 0.07	-21.21 +/- 2.43
LYS 8	SO3 144	0.02 +/- 0.02	-70.12 +/- 0.29	58.32 +/- 0.24	-0.39 +/- 0.00	-12.17 +/- 0.49
ARG 35	SO3 146	1.46 +/- 0.27	-89.51 +/- 1.72	60.41 +/- 0.77	-0.99 +/- 0.03	-28.63 +/- 0.71
ARG 35	UVB 141	-0.16 +/- 0.02	-6.82 +/- 0.16	4.75 +/- 0.18	-0.12 +/- 0.01	-2.36 +/- 0.37
LYS 54	SO3 146	0.11 +/- 0.09	-82.16 +/- 0.63	59.33 +/- 0.40	-0.78 +/- 0.03	-23.50 +/- 0.16
LYS 54	SO3 147	0.21 +/- 0.39	-83.34 +/- 1.15	65.08 +/- 0.31	-0.72 +/- 0.00	-18.78 +/- 1.07
LYS 54	UVB 141	-0.41 +/- 0.31	-14.76 +/- 2.30	7.57 +/- 0.15	-0.64 +/- 0.06	-8.24 +/- 2.20
PRO 56	BN1 145	-0.95 +/- 0.29	0.38 +/- 0.12	-0.42 +/- 0.08	-0.98 +/- 0.24	-2.01 +/- 0.48
TRP 59	BN1 145	-0.58 +/- 0.18	-0.24 +/- 0.10	0.21 +/- 0.04	-0.73 +/- 0.16	-1.34 +/- 0.40
GLN 62	WGB 138	-0.54 +/- 0.03	-1.39 +/- 0.08	0.34 +/- 0.03	-0.56 +/- 0.25	2.17 +/- 0.95
HIP 95	SO3 143	0.81 +/- 1.15	-79.38 +/- 1.59	66.00 +/- 0.12	-0.64 +/- 0.00	-13.21 +/- 0.32
HIP 95	SO3 144	-0.21 +/- 0.13	-51.93 +/- 6.74	50.25 +/- 5.75	-0.15 +/- 0.11	-2.04 +/- 1.23
ASN 96	WGB 138	-1.27 +/- 0.10	-2.70 +/- 1.04	-0.44 +/- 0.66	-1.19 +/- 0.08	-5.61 +/- 0.56
GLU 98	WGB 138	-0.00 +/- 0.11	-0.24 +/- 0.84	-3.19 +/- 0.48	-0.88 +/- 0.08	-4.31 +/- 0.55
6-PTN3	Residues	VDW	Electrost.	PS	Non-PS	Global
VAL 24	BZ1 143	-0.60 +/- 0.25	-0.93 +/- 0.21	0.47 +/- 0.07	-0.50 +/- 0.23	-1.55 +/- 0.65
PRO 25	BZ1 143	-0.99 +/- 0.31	-0.22 +/- 0.14	0.26 +/- 0.11	-0.86 +/- 0.14	-1.82 +/- 0.37
SER 27	SO3 146	-0.28 +/- 0.19	-8.03 +/- 2.40	5.83 +/- 1.65	-0.20 +/- 0.09	-2.68 +/- 1.41
SER 27	QVB 139	-1.02 +/- 0.33	-1.79 +/- 0.46	0.76 +/- 0.34	-0.48 +/- 0.16	-2.53 +/- 0.66
GLY 28	SO3 146	-0.40 +/- 0.25	-7.25 +/- 2.81	5.32 +/- 1.77	-0.31 +/- 0.08	-2.64 +/- 1.59
GLY 28	BN1 144	-0.83 +/- 0.15	-1.12 +/- 0.54	1.02 +/- 1.07	-0.57 +/- 0.01	-1.50 +/- 0.33
GLY 28	QVB 139	-1.24 +/- 0.22	-1.31 +/- 0.56	0.93 +/- 0.29	-0.82 +/- 0.09	-2.44 +/- 0.65
LYS 60	BN1 144	-0.81 +/- 0.47	11.89 +/- 1.95	-12.15 +/- 1.98	-0.88 +/- 0.52	-2.05 +/- 0.81
ARG 92	QVB 139	-0.61 +/- 0.09	-13.97 +/- 0.15	8.70 +/- 0.10	-0.50 +/- 0.05	-6.40 +/- 0.30
ARG 92	PV1 142	-0.39 +/- 0.25	-0.59 +/- 1.09	-1.65 +/- 0.32	-0.57 +/- 0.16	3.20 +/- 1.32
ARG 92	SO3 145	0.62 +/- 0.08	83.23 +/- 3.45	57.84 +/- 1.53	-0.65 +/- 0.06	-25.42 +/- 3.67
HIP 95	CF1 154	-0.98 +/- 0.01	-2.35 +/- 0.01	2.68 +/- 0.12	-0.67 +/- 0.06	-1.33 +/- 0.05
HIP 95	PGB 138	-1.37 +/- 0.31	-12.49 +/- 0.91	12.23 +/- 0.69	-0.59 +/- 0.16	-2.22 +/- 0.70
ASN 96	ISO 137	-1.01 +/- 0.06	0.24 +/- 0.07	-0.08 +/- 0.01	-0.74 +/- 0.08	-1.51 +/- 0.06
LYS 101	QVB 139	-0.19 +/- 0.01	-13.28 +/- 0.83	10.74 +/- 0.49	-0.14 +/- 0.00	2.88 +/- 0.35
LYS 101	SO3 145	0.71 +/- 0.85	-91.65 +/- 4.85	72.25 +/- 2.56	-0.84 +/- 0.09	-19.53 +/- 3.02

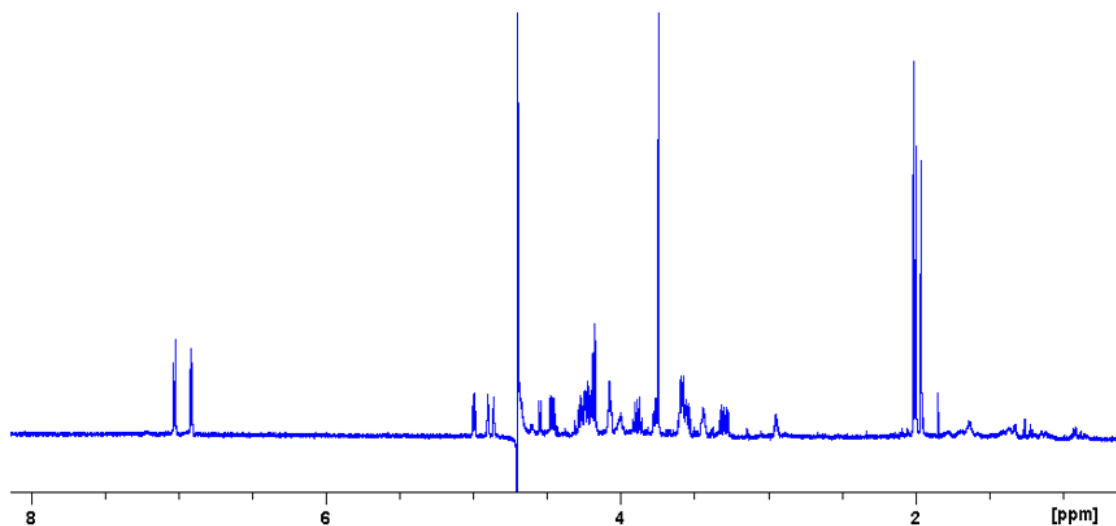
**A.T5.** Tabla de energías de enlaces efectivas (kcal/mol) mediante la descomposición por residuo a través del método MM-PBSA a partir de los resultados de dinámica molecular libres y MD-TAR para la serie tetrasacáridica con la conformación de la pleiotrofina más abierta (contribución energética favorable  $E_{global} < -1.20$  kcal/mol).

4-PTN8	Residues	VDW	Electrost.	PS	Non-PS	Global
GLN 70	UVB 141	-1.25 +/- 0.14	-0.98 +/- 1.29	0.27 +/- 0.15	-0.81 +/- 0.01	-2.77 +/- 1.27
SER 89	SO3 144	0.12 +/- 0.62	-6.50 +/- 2.04	4.45 +/- 2.79	-0.25 +/- 0.02	-2.18 +/- 1.30
LEU 90	UVB 141	-0.90 +/- 0.50	-0.88 +/- 0.87	0.38 +/- 0.32	-0.61 +/- 0.38	-2.01 +/- 1.33
LYS 91	SO3 145	0.43 +/- 0.01	-73.84 +/- 2.74	62.19 +/- 0.97	-0.47 +/- 0.02	-11.70 +/- 0.77
LYS 91	UVB 141	-1.74 +/- 0.62	-5.36 +/- 3.14	-5.58 +/- 1.20	-1.77 +/- 0.15	-3.29 +/- 1.16
LYS 101	QVB 139	-0.50 +/- 0.03	-25.68 +/- 0.71	15.02 +/- 0.17	-1.04 +/- 0.04	-12.20 +/- 0.95
LYS 101	SO3 143	0.50 +/- 0.13	-87.87 +/- 1.30	65.68 +/- 0.52	-0.81 +/- 0.07	-22.49 +/- 1.62
5-PTN8	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 68	QVB 139	-0.60 +/- 0.08	-12.10 +/- 0.95	10.81 +/- 0.63	-0.45 +/- 0.07	-2.33 +/- 0.48
LYS 68	SO3 143	1.05 +/- 0.13	-88.20 +/- 0.34	70.31 +/- 0.69	-0.70 +/- 0.02	-17.53 +/- 1.18
LYS 68	SO3 144	-0.15 +/- 0.07	-51.39 +/- 4.83	48.82 +/- 3.52	-0.10 +/- 0.06	-2.83 +/- 1.45
LEU 90	BN1 142	-1.58 +/- 0.03	-0.86 +/- 0.29	0.61 +/- 0.14	-1.23 +/- 0.00	-3.07 +/- 0.11
LYS 91	QVB 139	-1.23 +/- 0.08	-15.68 +/- 0.41	11.52 +/- 0.29	-0.74 +/- 0.03	-6.14 +/- 0.17
LYS 91	BN1 142	-1.64 +/- 0.19	6.21 +/- 0.61	-5.96 +/- 0.30	-1.14 +/- 0.05	-2.54 +/- 0.17
LYS 91	SO3 143	0.65 +/- 0.09	-86.60 +/- 0.95	68.10 +/- 1.18	-0.81 +/- 0.02	-18.65 +/- 1.18
ARG 92	QVB 139	-1.81 +/- 0.03	-13.79 +/- 0.11	12.03 +/- 0.27	-0.99 +/- 0.07	-4.57 +/- 0.05
ARG 92	WGB 140	-1.87 +/- 0.10	-5.79 +/- 0.39	5.10 +/- 0.28	-1.71 +/- 0.04	-4.28 +/- 0.16
ARG 92	SO3 144	0.12 +/- 0.19	-80.84 +/- 1.68	62.86 +/- 0.08	-0.76 +/- 0.01	-18.62 +/- 1.56
ALA 93	WGB 140	-0.03 +/- 0.47	-0.97 +/- 0.11	-0.57 +/- 0.07	-0.57 +/- 0.01	-2.14 +/- 0.28
ALA 93	UVB 141	-0.83 +/- 0.11	-2.91 +/- 0.16	-0.58 +/- 0.02	-0.70 +/- 0.09	-3.86 +/- 0.12
LEU 94	UVB 141	-1.54 +/- 0.16	-1.81 +/- 0.33	1.18 +/- 0.17	-1.20 +/- 0.11	-3.36 +/- 0.11
HIP 95	UVB 141	-1.30 +/- 0.30	-8.06 +/- 0.06	8.50 +/- 0.06	-1.22 +/- 0.01	-2.10 +/- 0.22
HIP 95	SO3 147	0.51 +/- 0.06	-86.46 +/- 2.37	68.68 +/- 0.55	-0.81 +/- 0.03	-18.07 +/- 2.27
6-PTN8	Residues	VDW	Electrost.	PS	Non-PS	Global
ARG 39	QVB 141	0.21 +/- 0.38	-18.05 +/- 1.79	10.95 +/- 0.01	-0.75 +/- 0.02	-7.63 +/- 1.4
LYS 54	SO3 145	-0.16 +/- 0.18	-87.09 +/- 0.35	67.53 +/- 0.99	-0.73 +/- 0.02	-20.46 +/- 1.55
LYS 60	PV1 142	-1.00 +/- 0.03	3.50 +/- 0.09	-4.06 +/- 0.23	-0.62 +/- 0.08	-2.20 +/- 0.26
LYS 60	PGB 138	-1.57 +/- 0.12	-13.10 +/- 0.11	13.37 +/- 0.52	-1.14 +/- 0.11	-2.44 +/- 0.18
LYS 60	SO3 145	0.08 +/- 0.05	-60.98 +/- 15.57	52.73 +/- 7.88	-0.22 +/- 0.14	-8.40 +/- 1.56
LYS 60	ISO 137	-0.71 +/- 0.10	-5.19 +/- 0.38	3.96 +/- 0.20	-0.66 +/- 0.06	-2.61 +/- 0.35
LYS 61	PV1 142	-0.88 +/- 0.06	0.25 +/- 0.24	-1.91 +/- 0.30	-0.95 +/- 0.14	-3.50 +/- 0.15
PHE 63	BZ1 148	-0.43 +/- 0.06	-0.97 +/- 0.28	0.71 +/- 0.10	-0.76 +/- 0.42	1.43 +/- 0.66
PHE 63	CF 147	-0.90 +/- 0.26	-0.35 +/- 0.09	0.17 +/- 0.05	-0.85 +/- 0.23	-1.94 +/- 0.45
LYS 68	QVB 141	-0.47 +/- 0.00	-17.82 +/- 0.34	13.51 +/- 0.44	-0.23 +/- 0.00	-5.02 +/- 0.10
TYR 69	BN1 149	-0.81 +/- 0.07	-0.92 +/- 0.07	0.86 +/- 0.05	-0.66 +/- 0.03	-1.52 +/- 0.11
LYS 91	QVB 141	-0.12 +/- 0.01	-12.51 +/- 0.28	10.67 +/- 0.18	-0.05 +/- 0.01	-2.00 +/- 0.09
LYS 116	SO3 145	0.91 +/- 0.01	-88.24 +/- 0.98	61.22 +/- 0.63	-0.74 +/- 0.01	-26.84 +/- 0.37
LYS 116	SO3 146	-0.07 +/- 0.01	-45.92 +/- 1.02	41.89 +/- 0.70	-0.02 +/- 0.01	-4.12 +/- 0.03
LYS 116	QVB 139	-0.47 +/- 0.04	-16.97 +/- 0.49	11.02 +/- 0.28	-0.41 +/- 0.02	-6.83 +/- 0.20
LYS 116	PGB 138	-0.54 +/- 0.17	-21.53 +/- 0.28	16.00 +/- 0.27	-0.70 +/- 0.10	-6.78 +/- 0.48
ILE 105	CF 147	-0.84 +/- 0.14	-0.10 +/- 0.01	-0.01 +/- 0.00	-0.71 +/- 0.07	-1.46 +/- 0.18
LYS 107	QVB 139	-0.24 +/- 0.02	-13.94 +/- 0.27	12.22 +/- 0.02	-0.08 +/- 0.01	-2.04 +/- 0.22
LYS 107	BN1 144	1.42 +/- 0.02	18.05 +/- 0.70	-16.43 +/- 0.68	-1.53 +/- 0.06	-1.34 +/- 0.11
LYS 107	SO3 146	0.72 +/- 0.35	-91.71 +/- 1.43	69.60 +/- 0.18	-0.66 +/- 0.02	-22.05 +/- 0.93
PRO 108	BZ1 143	-0.70 +/- 0.05	-0.41 +/- 0.08	0.35 +/- 0.07	-0.71 +/- 0.02	-1.46 +/- 0.06
GLU 120	SO3 145	-0.47 +/- 0.04	65.64 +/- 3.86	-60.28 +/- 3.01	-0.16 +/- 0.01	4.73 +/- 0.82
LYS 124	SO3 145	0.24 +/- 0.31	-83.96 +/- 3.13	61.13 +/- 0.16	-0.60 +/- 0.05	-23.19 +/- 3.03
LYS 124	SO3 146	0.59 +/- 0.26	-85.57 +/- 0.13	62.71 +/- 0.80	-0.64 +/- 0.03	-22.91 +/- 1.22

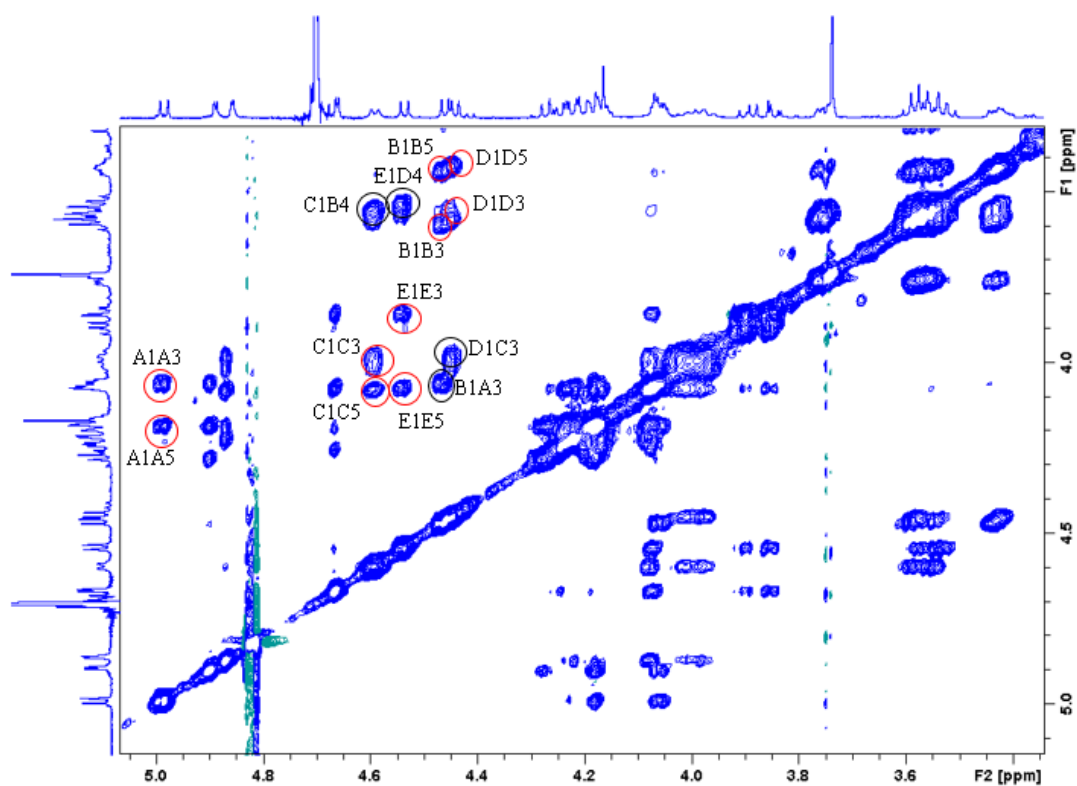
**A.T6.** Tabla de energías de enlaces efectivas (kcal/mol) mediante la descomposición por residuo a través del método MM-PBSA a partir de los resultados de dinámica molecular libres y MD-TAR para la serie tetrasacáridica con la conformación de la pleiotrofina en forma de horquilla (contribución energética favorable  $E_{global}$ )

**Capítulo 5:**➤ Análisis del ligando **1** con Midkina

A)

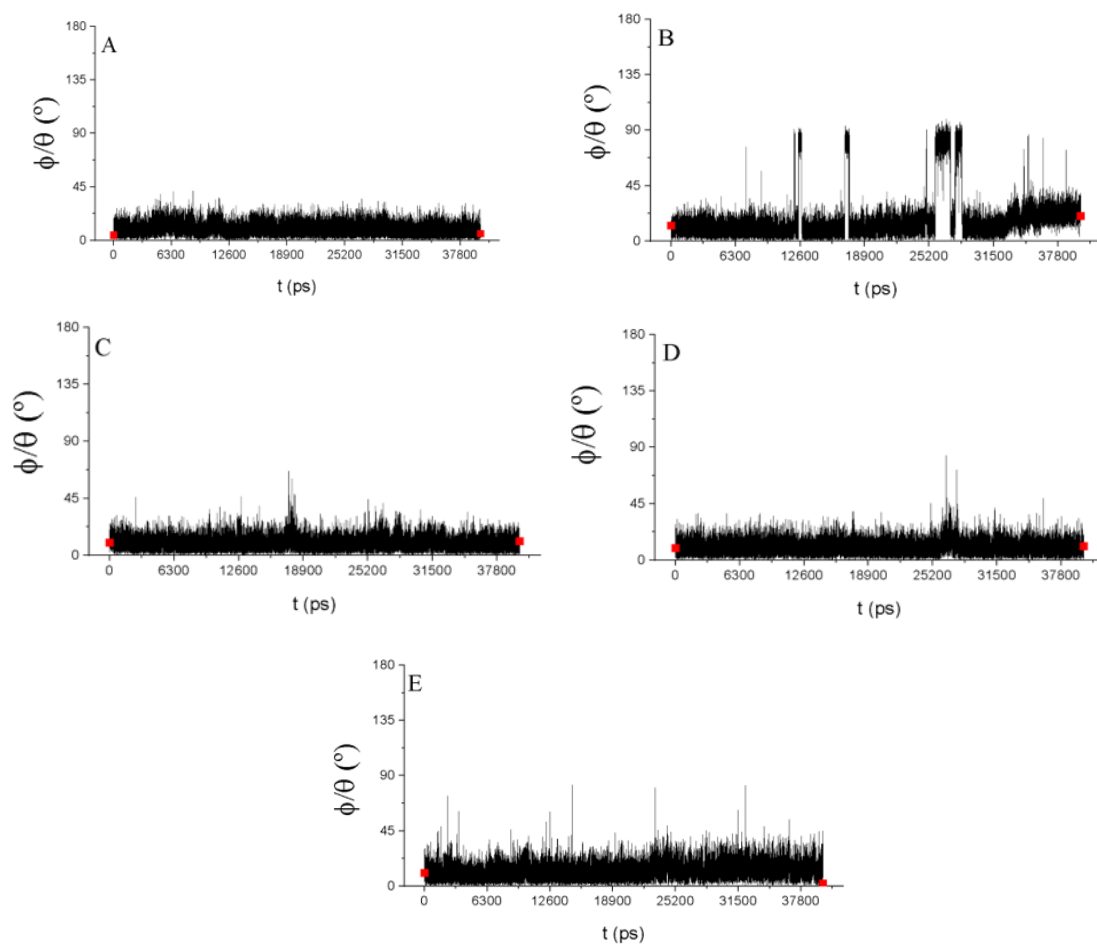


B)

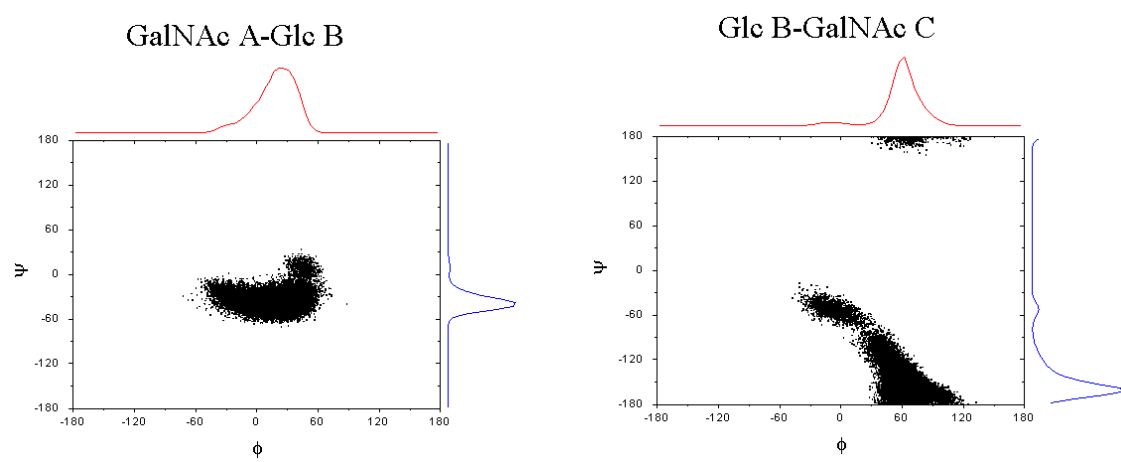


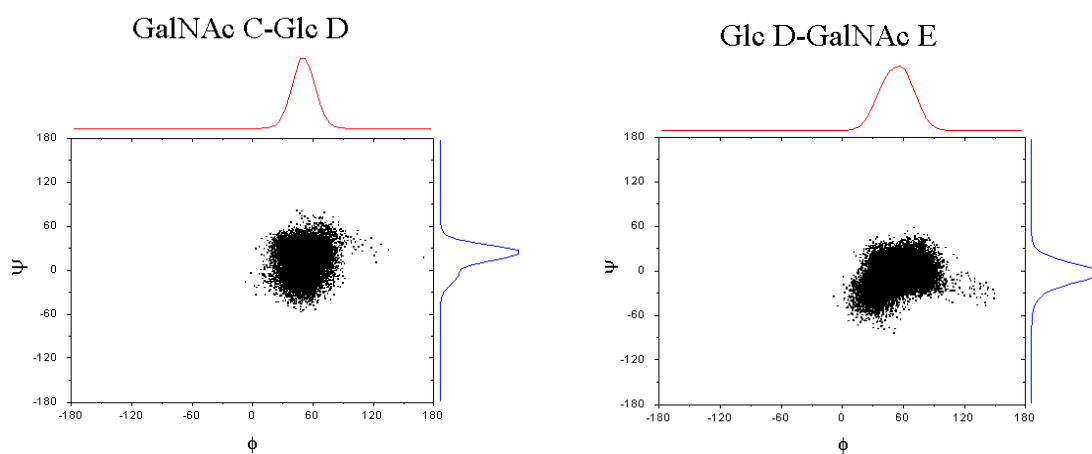
**A.54.** Espectro monodimensional (A) y NOESY transfer (B) del complejo **1-MDK** a 1.5 mM y 300 K a 700 MHz y 600 MHz respectivamente.

A)

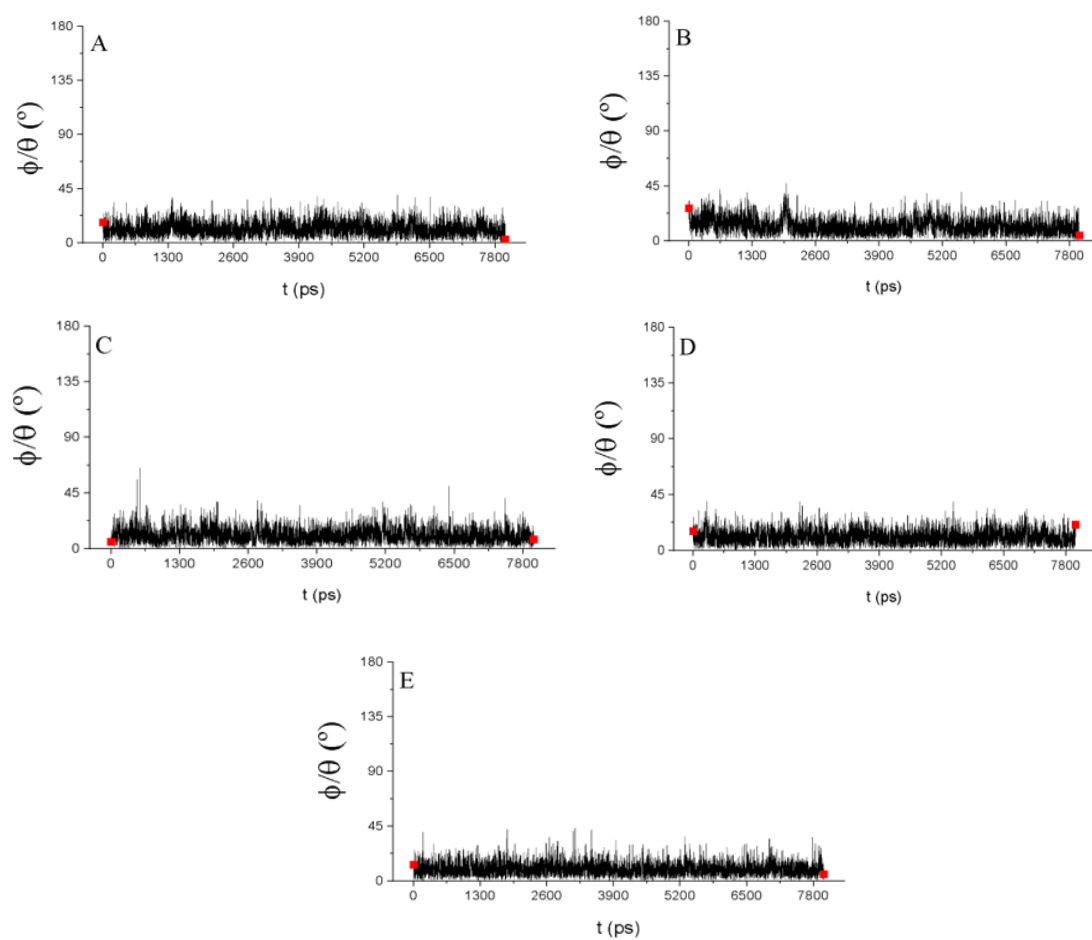


B)

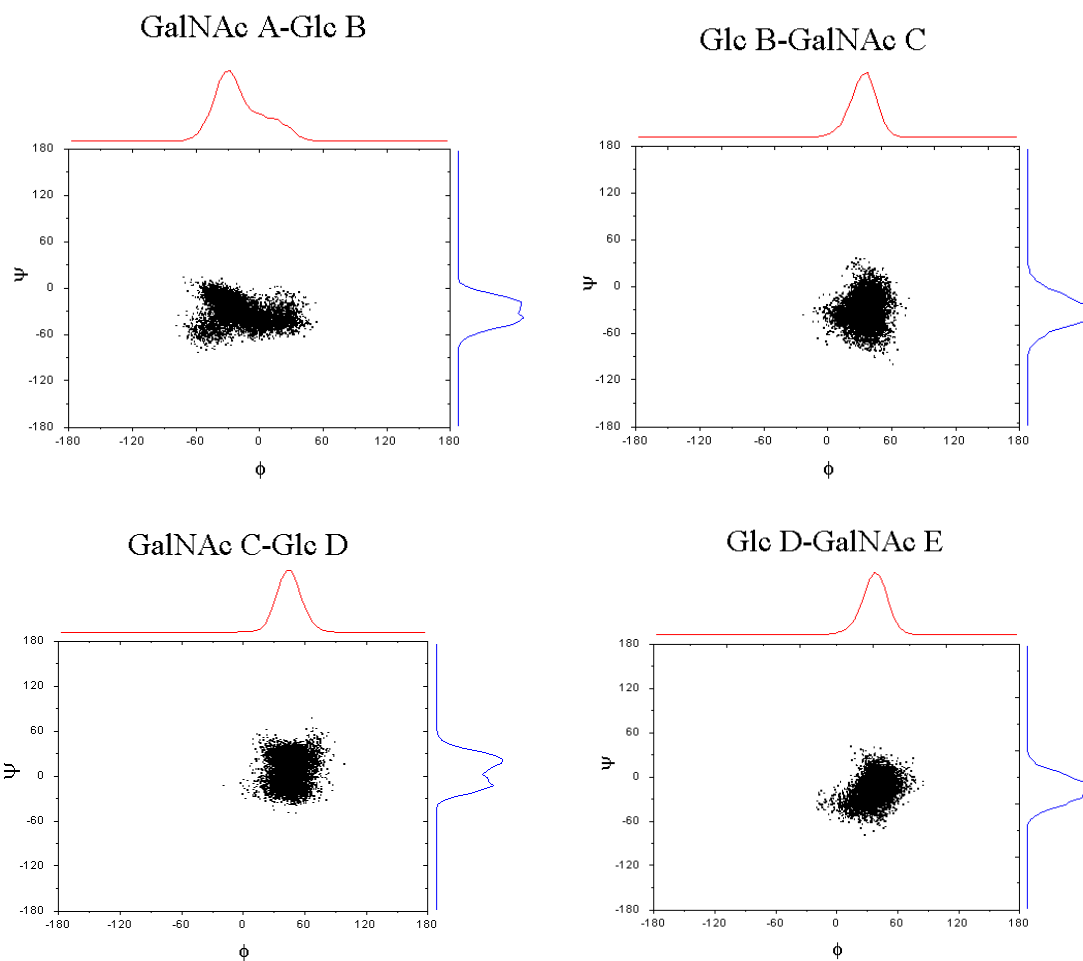




**A.55.** A) Gráficas de Cremer-Pople para el complejo **1-MDK4** para una dinámica de 200 ns. B) Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **1-MDK4** obtenidas de la dinámica de 200 ns.

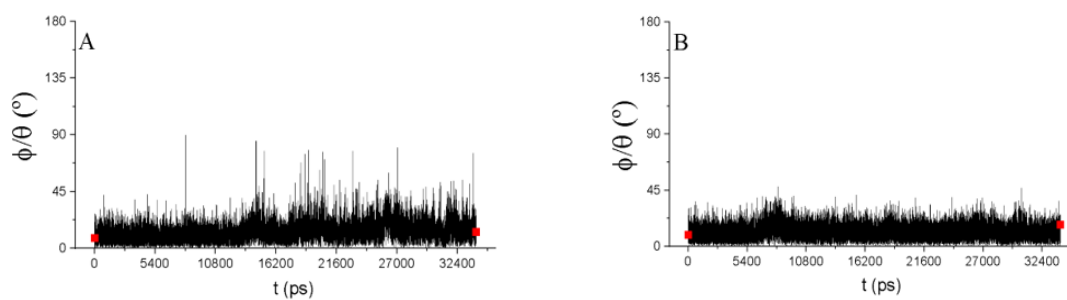


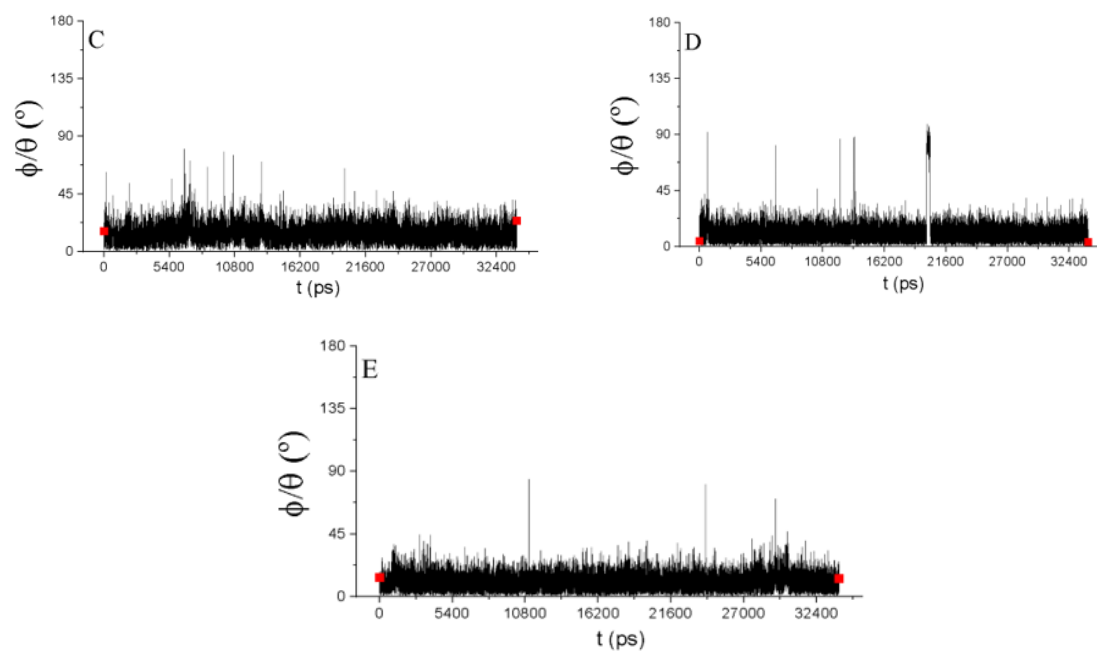




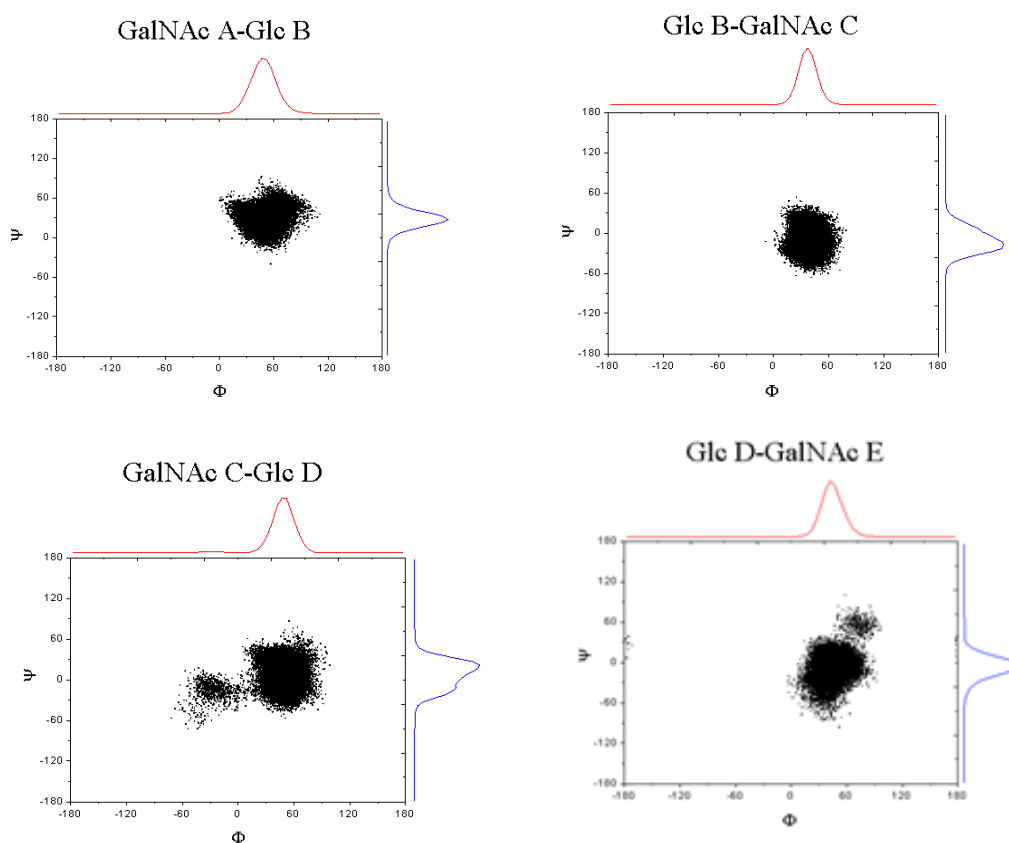
**A.56.** A) Gráficas de Cremer-Pople para el complejo **1-MDK4** para una MD-TAR de 40 ns. B) Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **1-MDK4** obtenidas de la dinámica de 40 ns.

A)



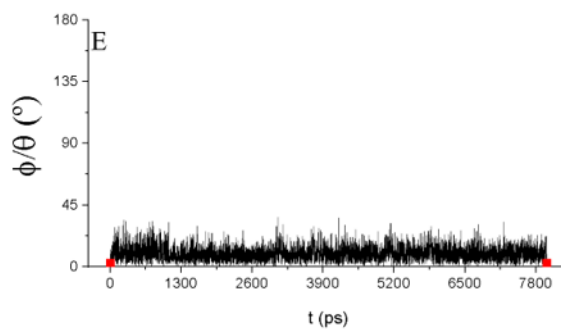
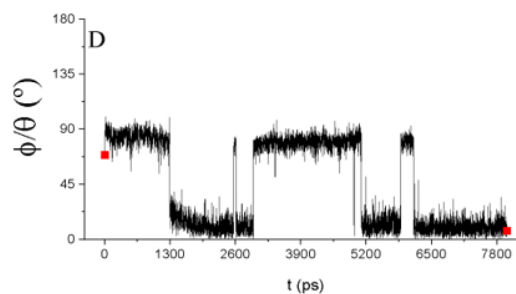
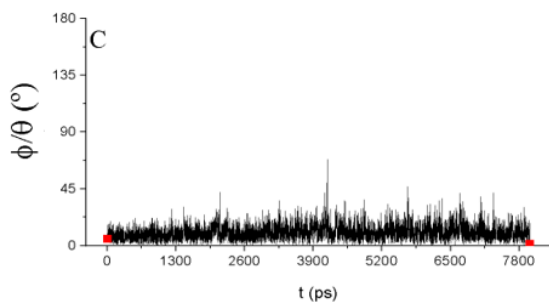
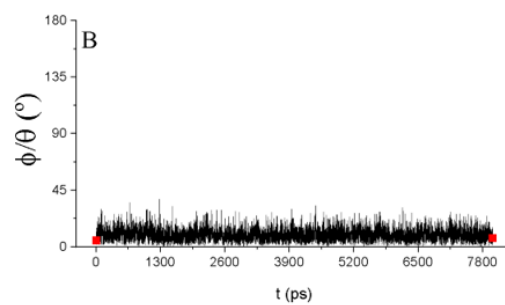
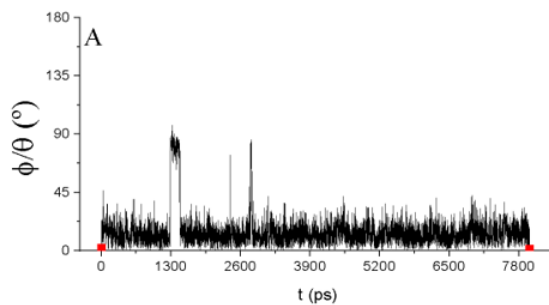


B)

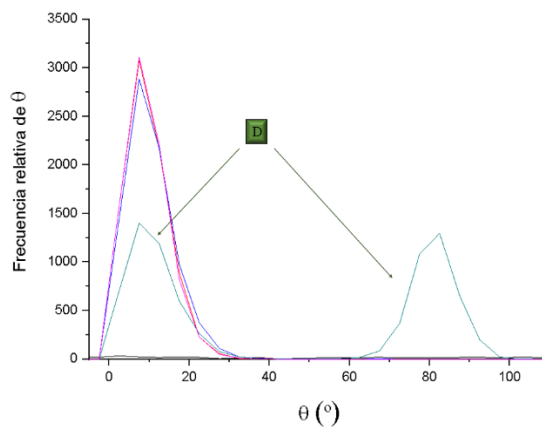
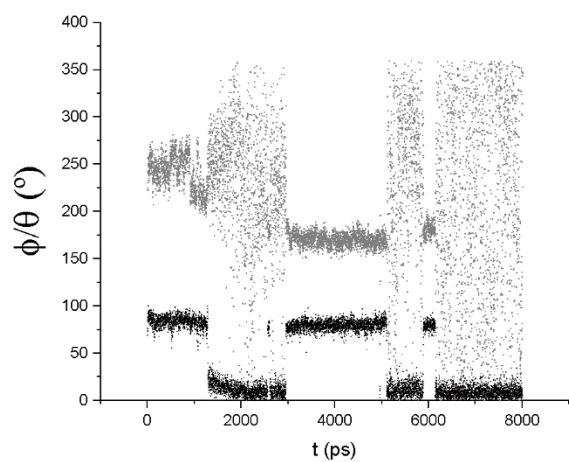


**A.57.** Gráficas de Cremer-Pople para el complejo *I-MDK0* (A) y trayectorias  $(\phi, \psi)$  (B) para una dinámica molecular de 200 ns.

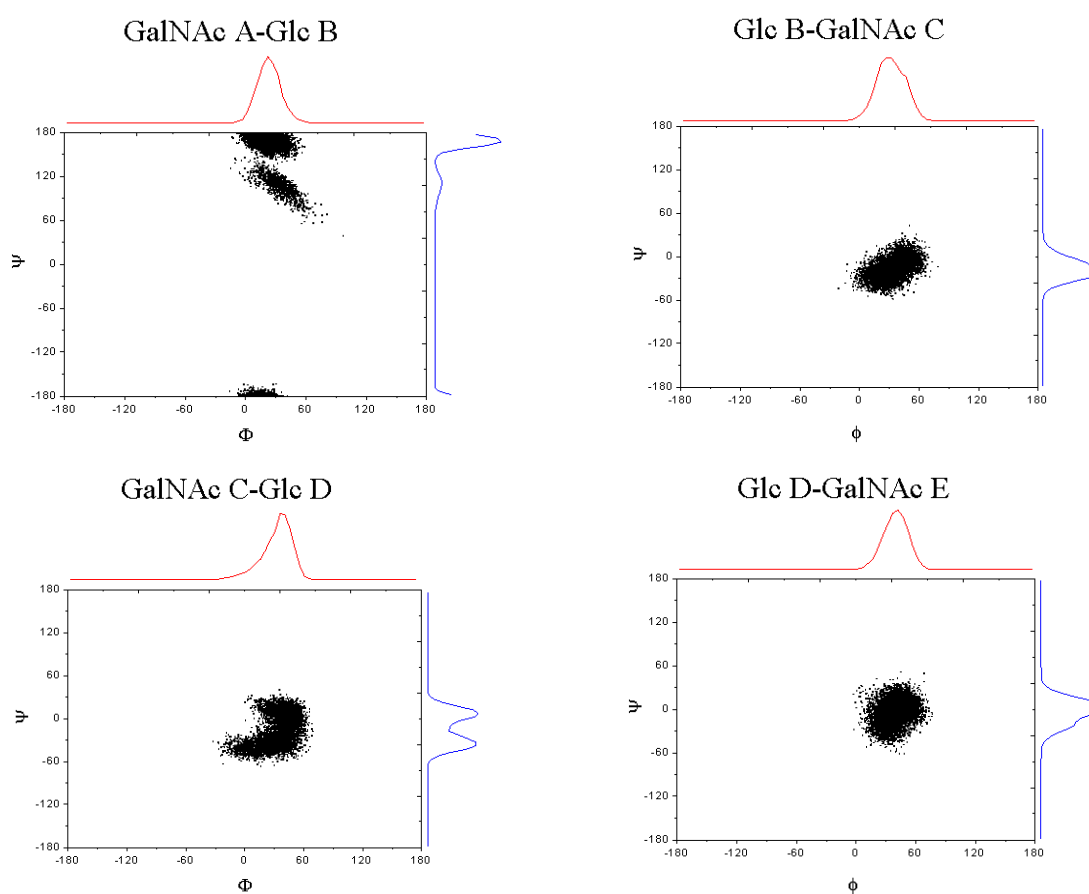
A)



B)

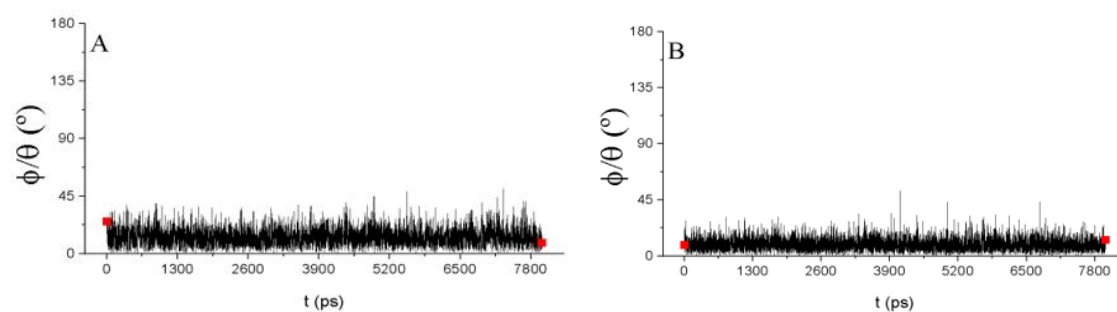


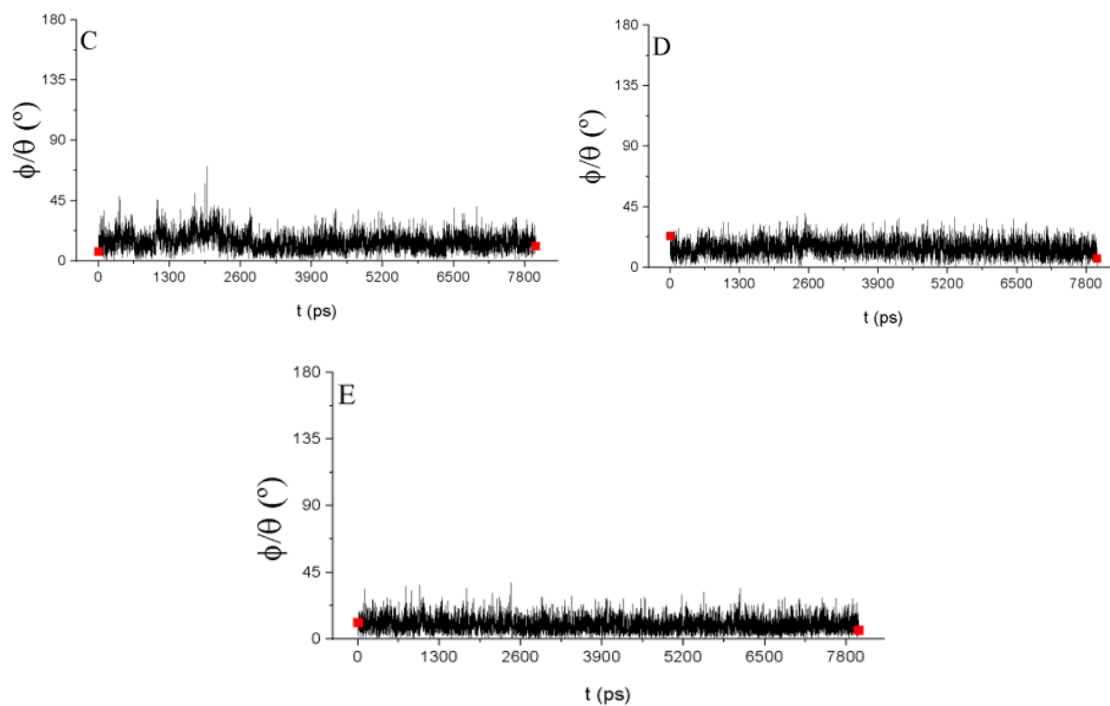
C)



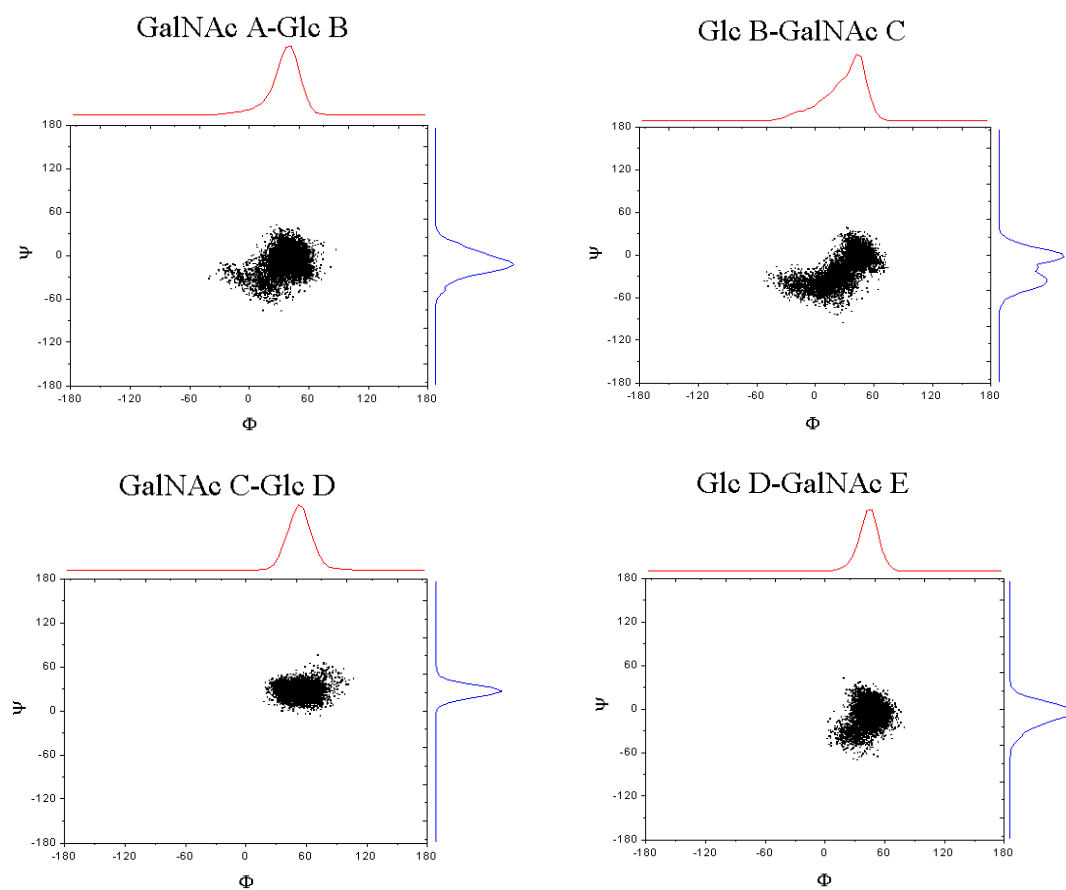
**A.58.** A) Gráficas de Cremer-Pople para el complejo **1-MDK2** para la MD-TAR de 40 ns con distorsión en el anillo D para el conformero 1. B) A la izquierda, superposición de la representación de los ángulos  $\phi$  y  $\theta$ , a la derecha representación de la frecuencia relativa de  $\theta$  de todos los anillos. C) Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **1-MDK2** obtenidas de la MD-TAR.

A)





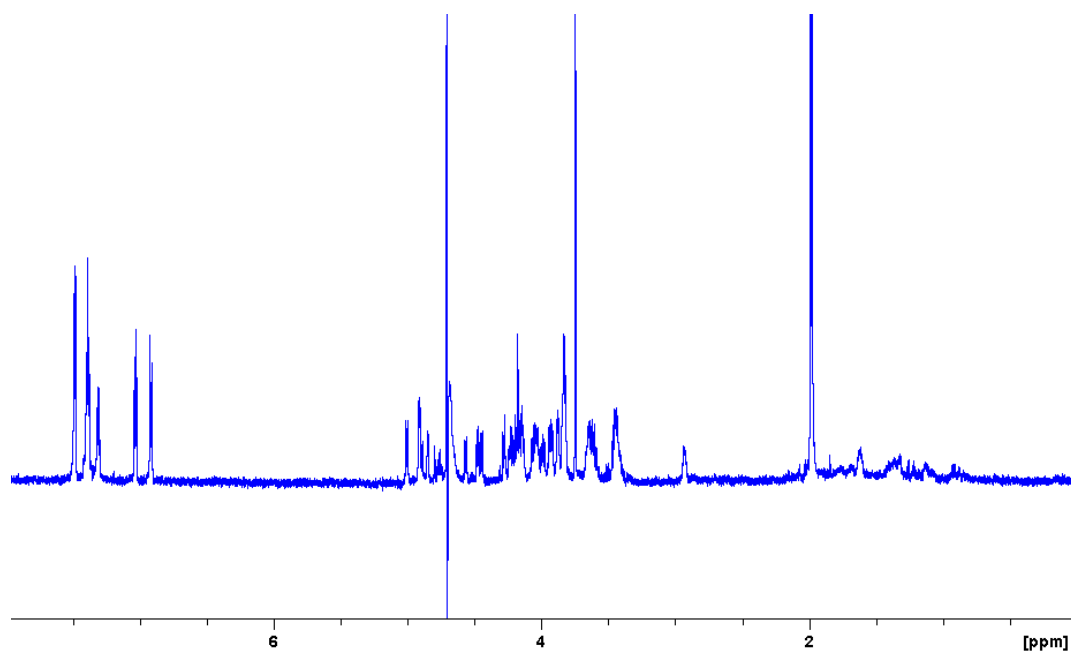
B)



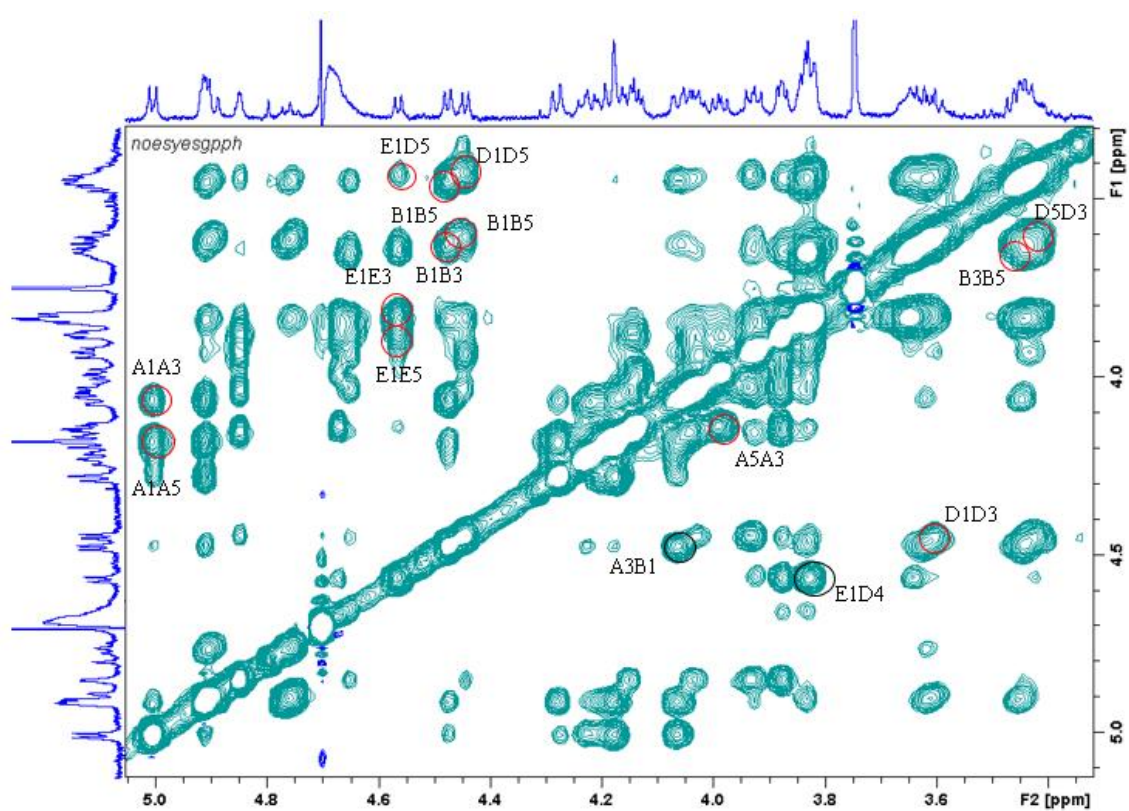
**A.59.** Gráficas de Cremer-Pople para el complejo **1-MDK2** (A) y trayectorias  $(\phi, \psi)$  (B) para una MD-TAR de 40 ns utilizando el segundo conformero con mayor afinidad.

➤ Análisis del ligando **2** con Midkina

A)

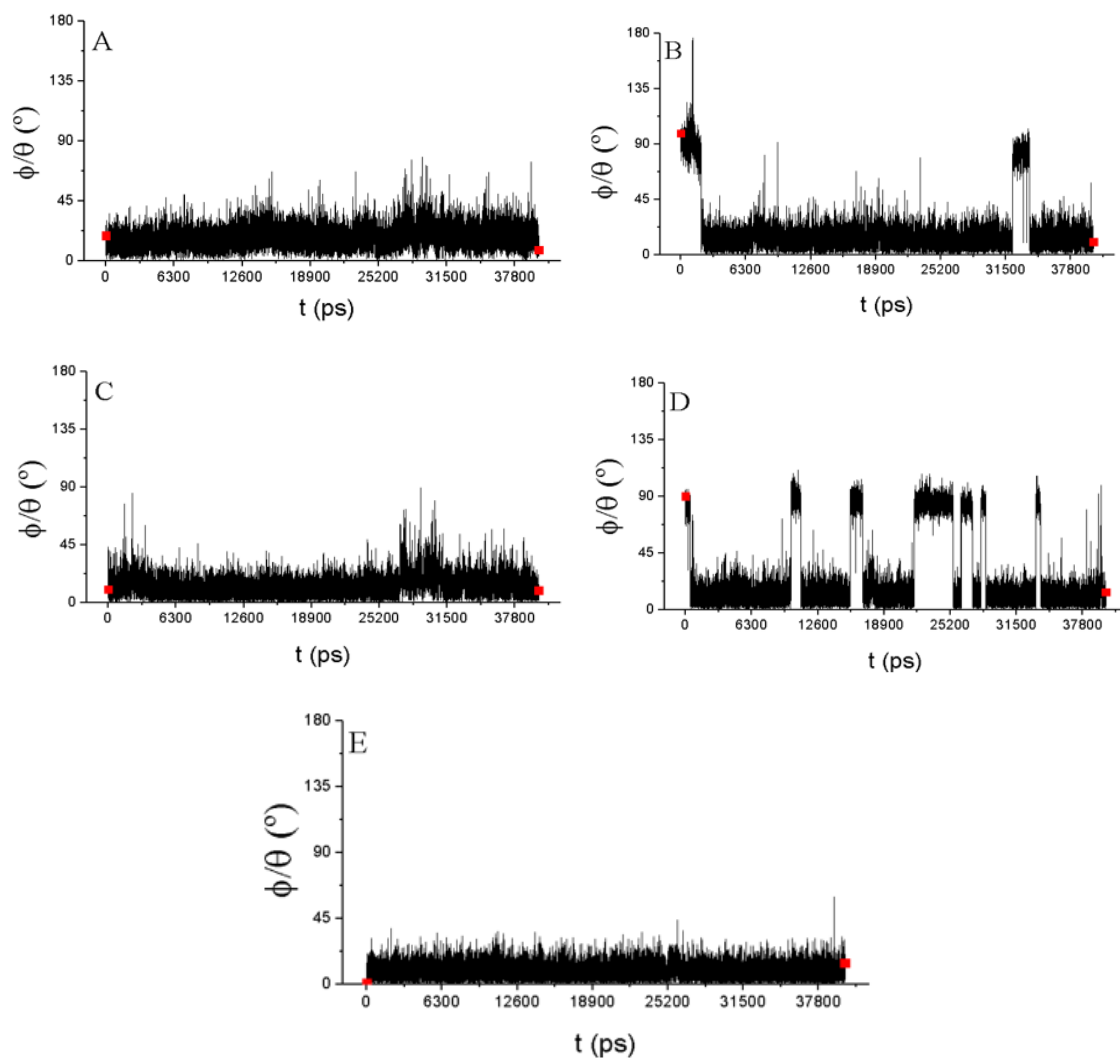


B)

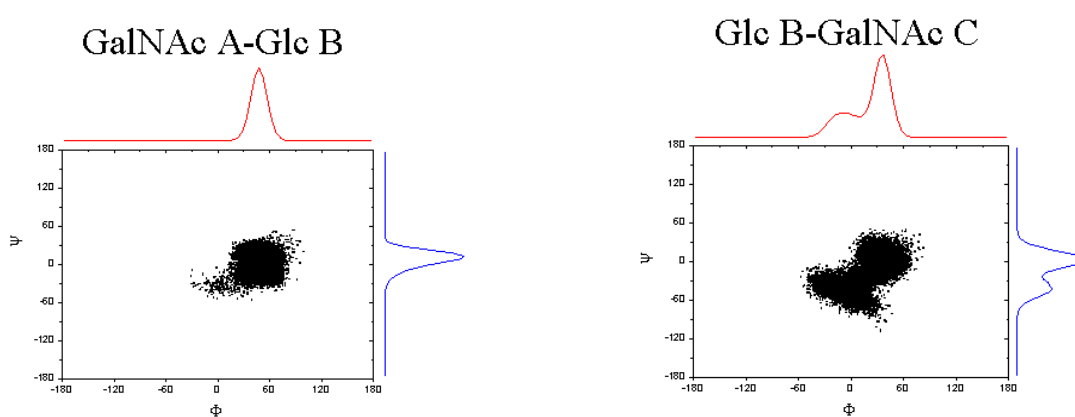


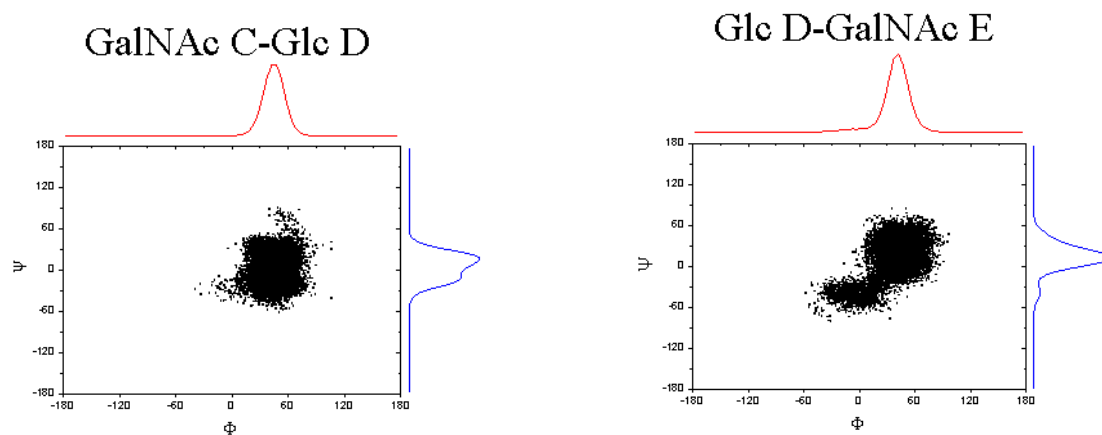
**A.60.** Espectro monodimensional (A) y NOESY-transfer (B) del complejo **2-MDK** a 1.5 mM y 300 K a 700 MHz y 600 MHz respectivamente.

A)



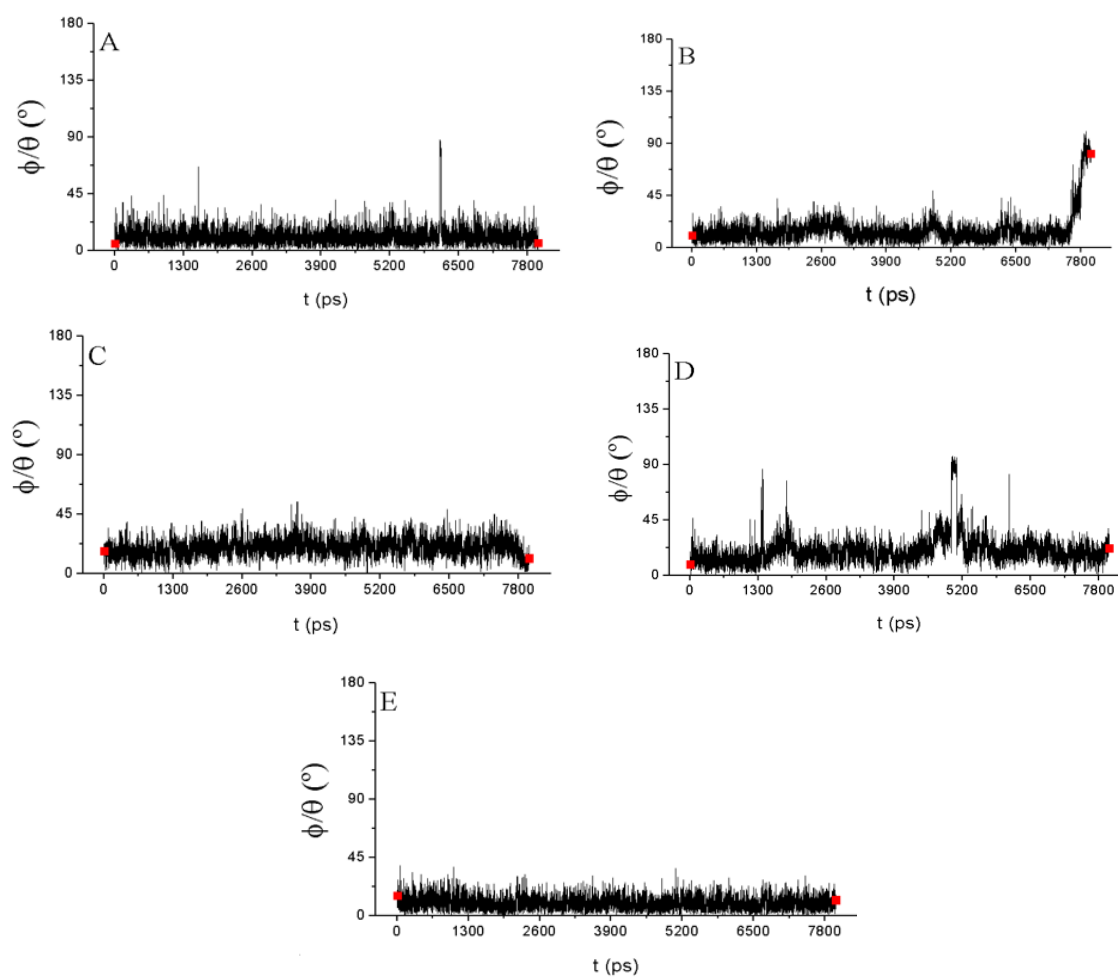
B)





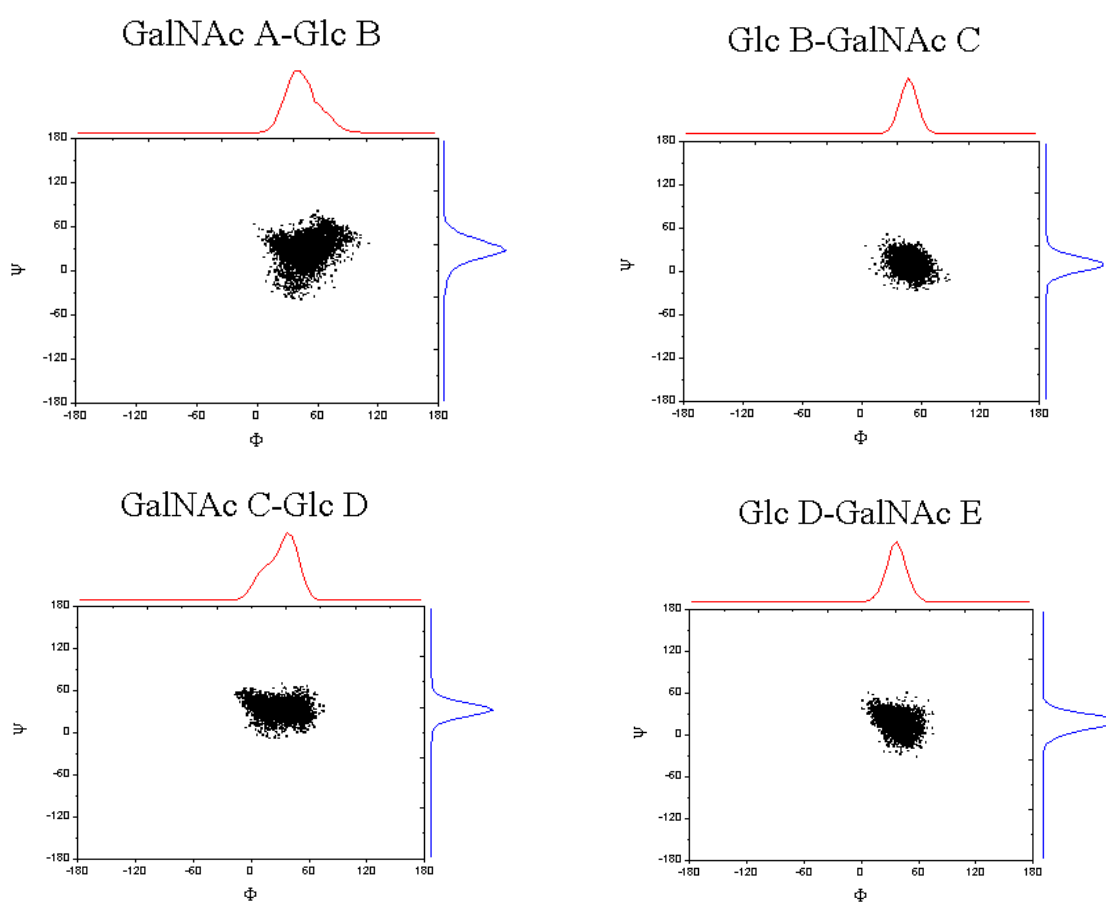
**A.61.** Gráficas de Cremer-Pople para el complejo **2-MDK4** (A) y trayectorias  $(\phi, \psi)$  (B) para una dinámica molecular de 200 ns.

A)



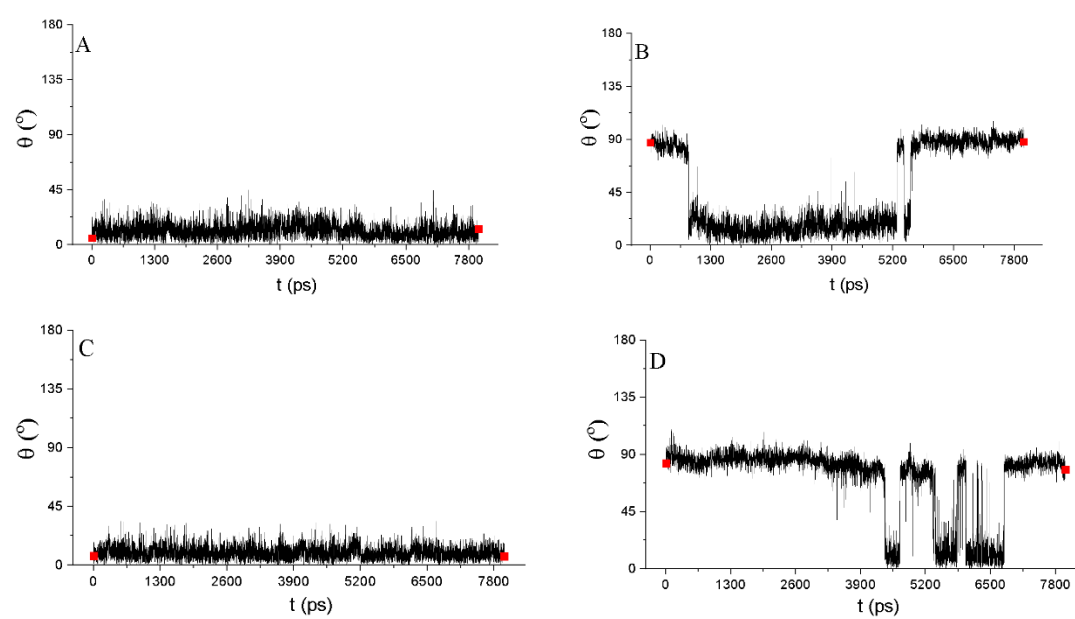


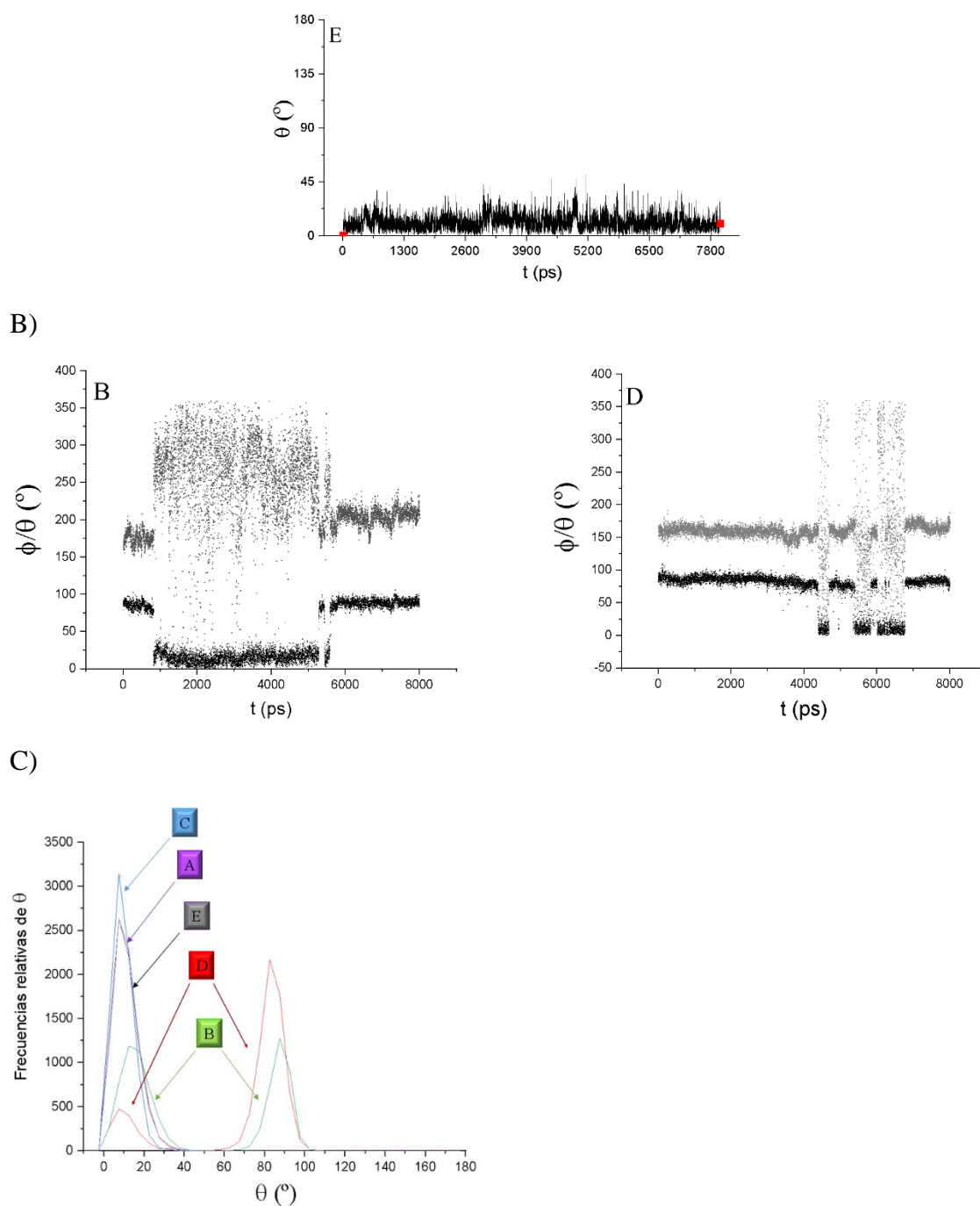
B)



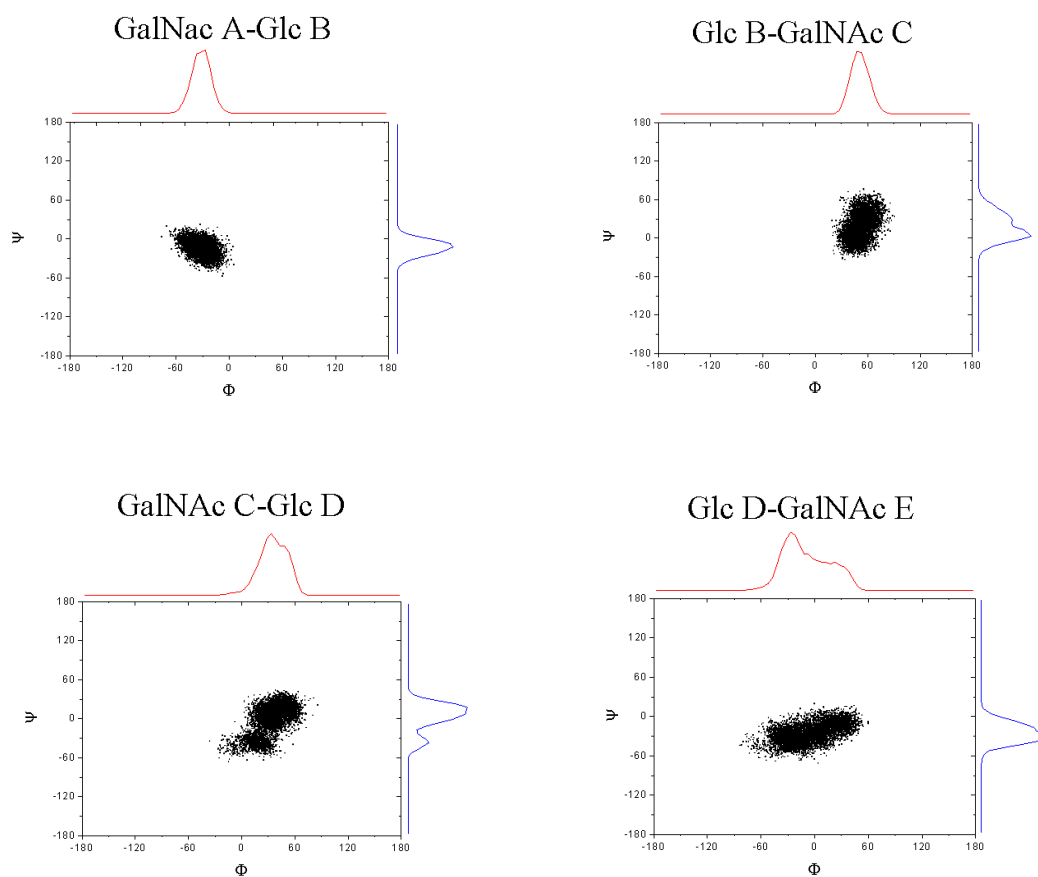
**A.62.** Gráficas de Cremer-Pople para el complejo 2-MDK0 (A) y trayectorias ( $\phi$ ,  $\psi$ ) (B) para una MD-TAR de 40 ns.

A)

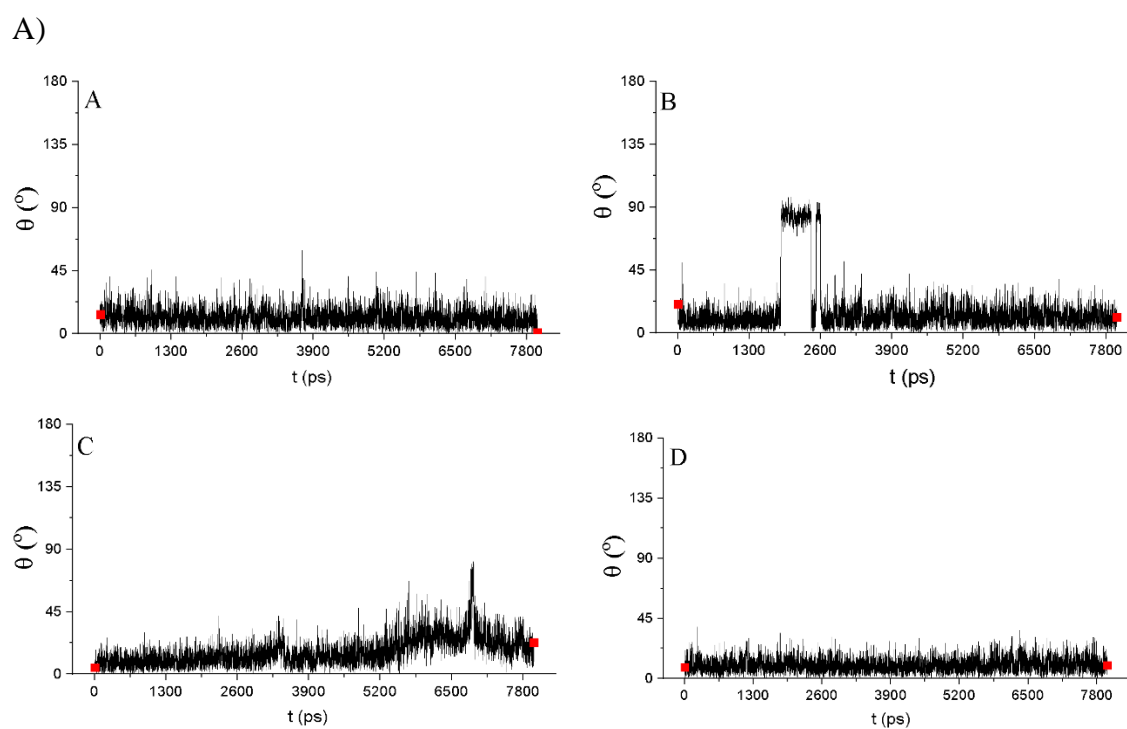


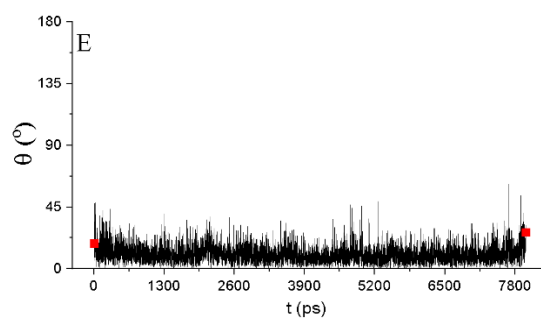


**A.63.** A) Gráficas de Cremer-Pople para el complejo 2-MDK2 para una MD-TAR de 40 ns con una  $K=50$  Kcal·mol<sup>-1</sup>·Å<sup>-2</sup>. B) Superposición de la representación de los ángulos  $\phi$  y  $\theta$  para la distorsión del anillo B (izquierda) y D (derecha). C) Representación de la frecuencia relativa de  $\theta$  de todos los anillos.

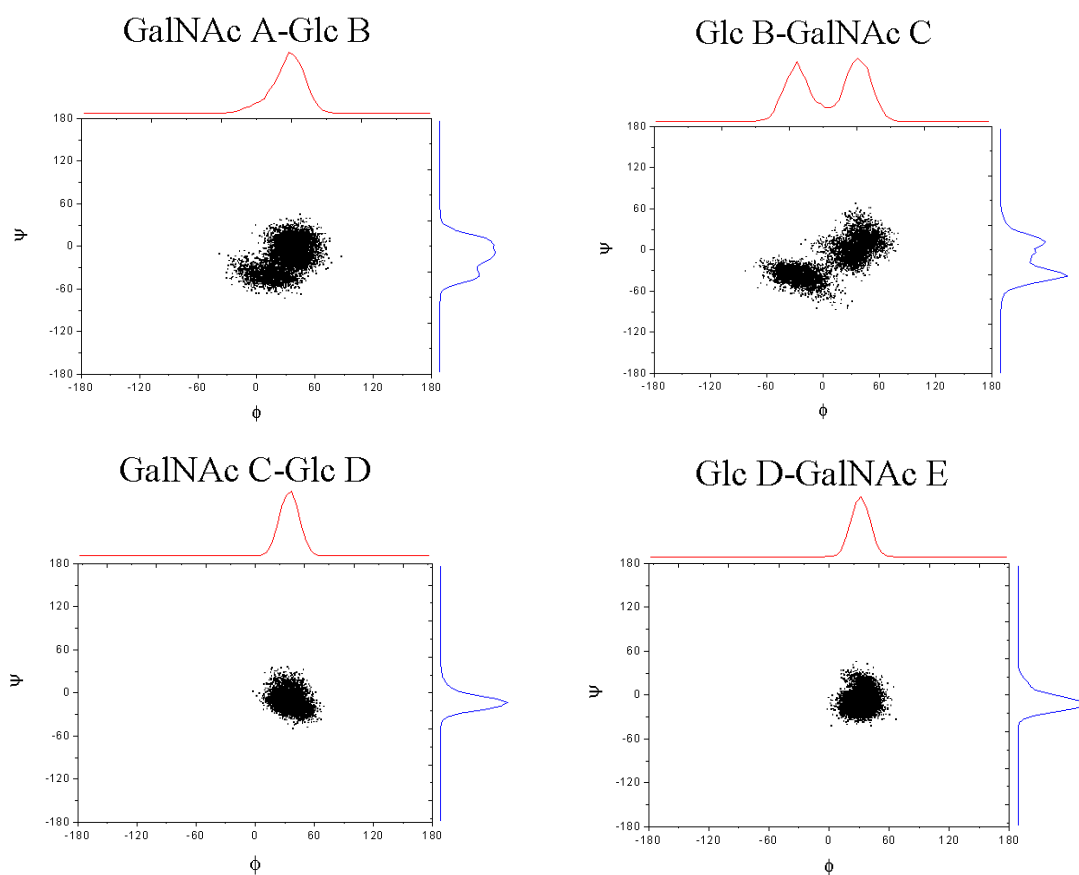


**A.64.** Trayectorias ( $\phi$ ,  $\psi$ ) para una MD-TAR de 40 ns para el complejo 2-MK2 con una  $K=50$  Kcal·mol<sup>-1</sup>·Å<sup>-2</sup>.





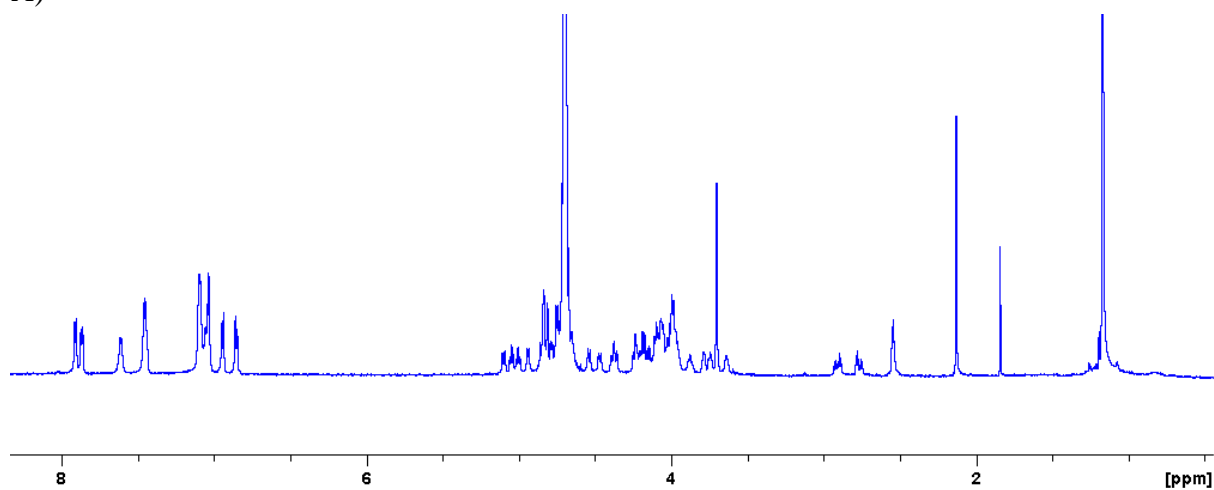
B)



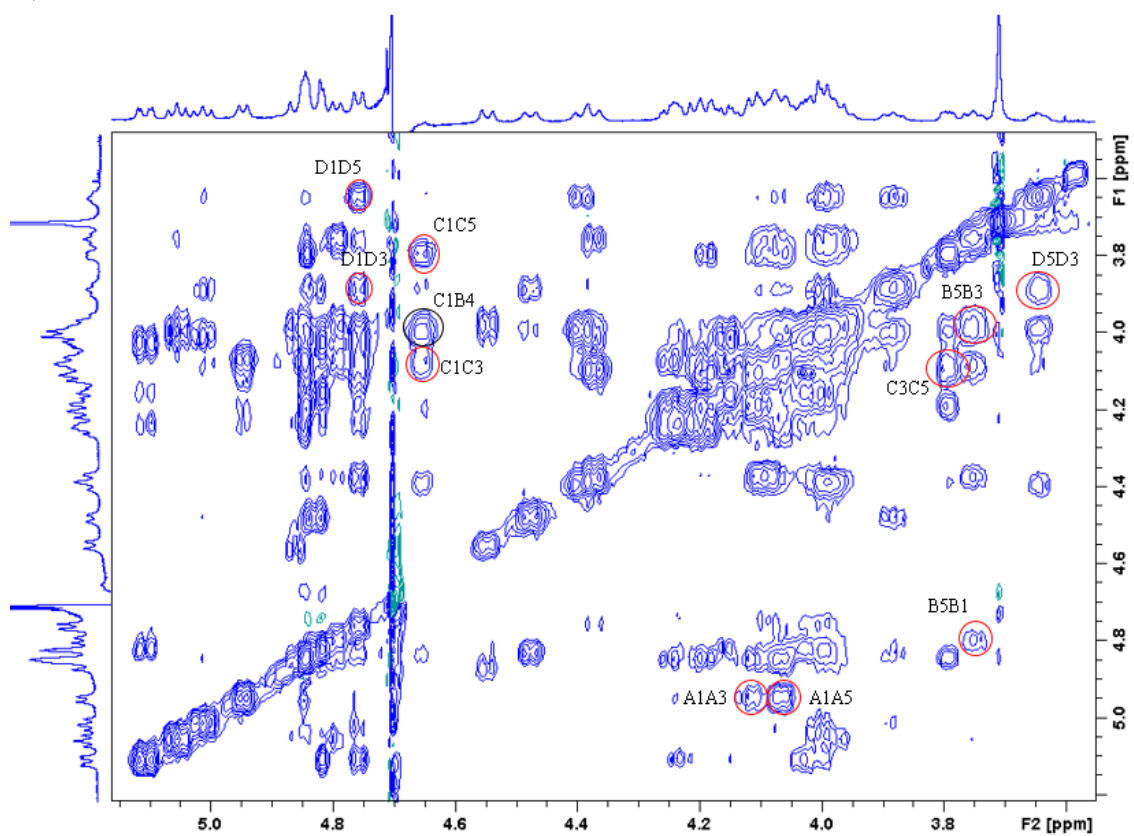
**A.65.** Gráficas de Cremer-Pople para el complejo 2-MDK0 (A) y trayectorias ( $\phi$ ,  $\psi$ ) (B) para una MD-TAR de 40 ns empleando el conformero 3 del ligando azúcar.

➤ Análisis del ligando **3** con Midkina

A)

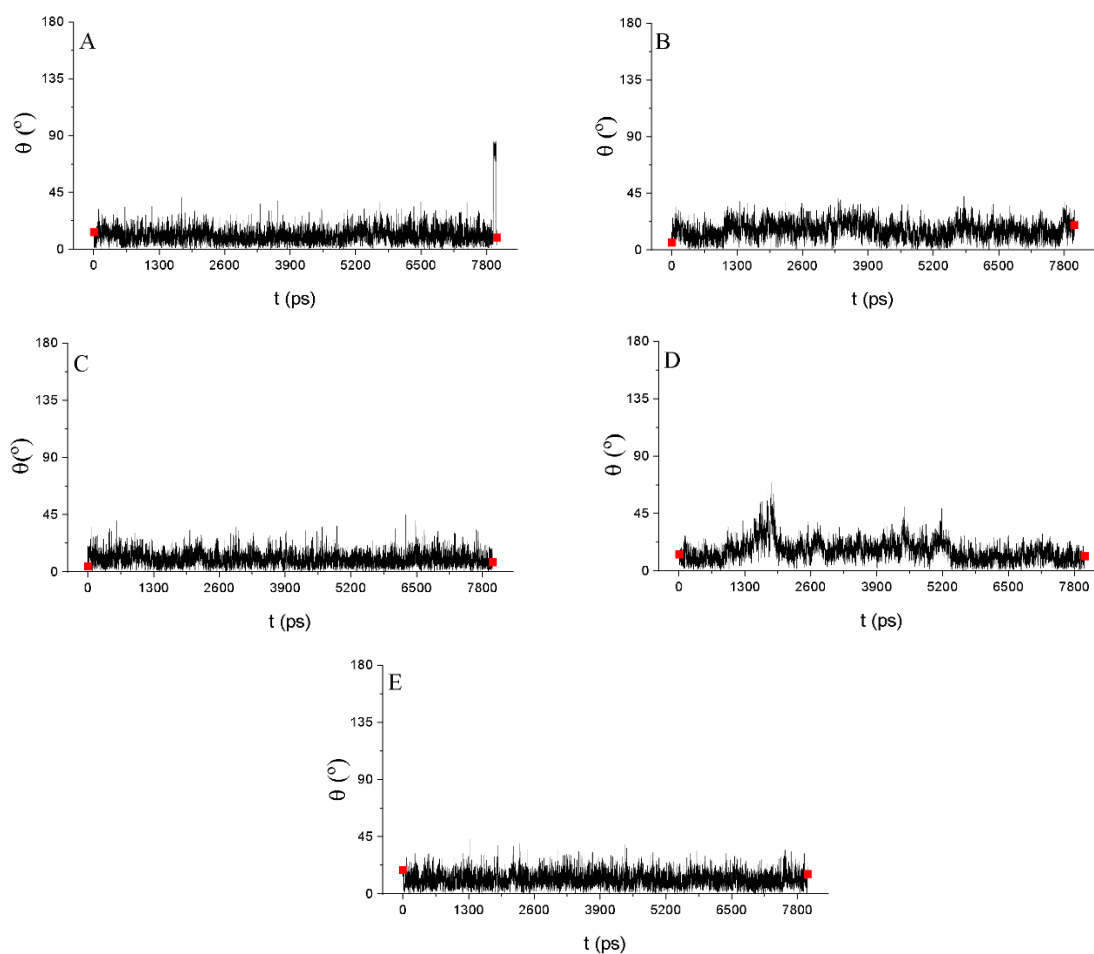


B)

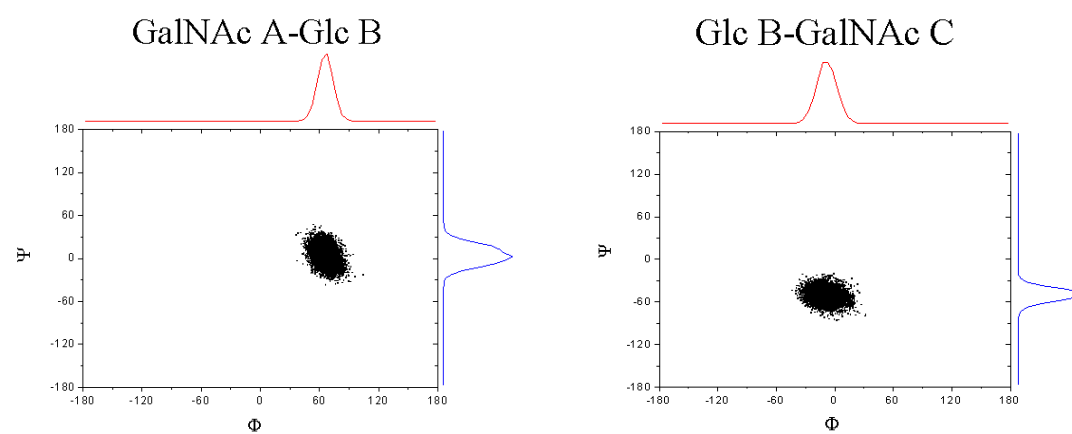


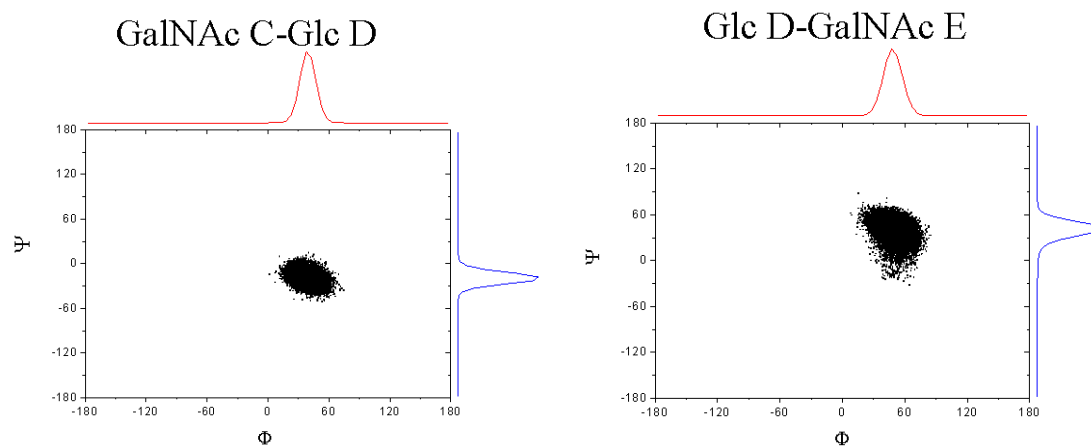
**A.66.** Espectro monodimensional (A) y NOESY-transfer (B) del complejo **3-MDK** a 1.5 mM y 300 K a 700 MHz y 600 MHz respectivamente.

A)



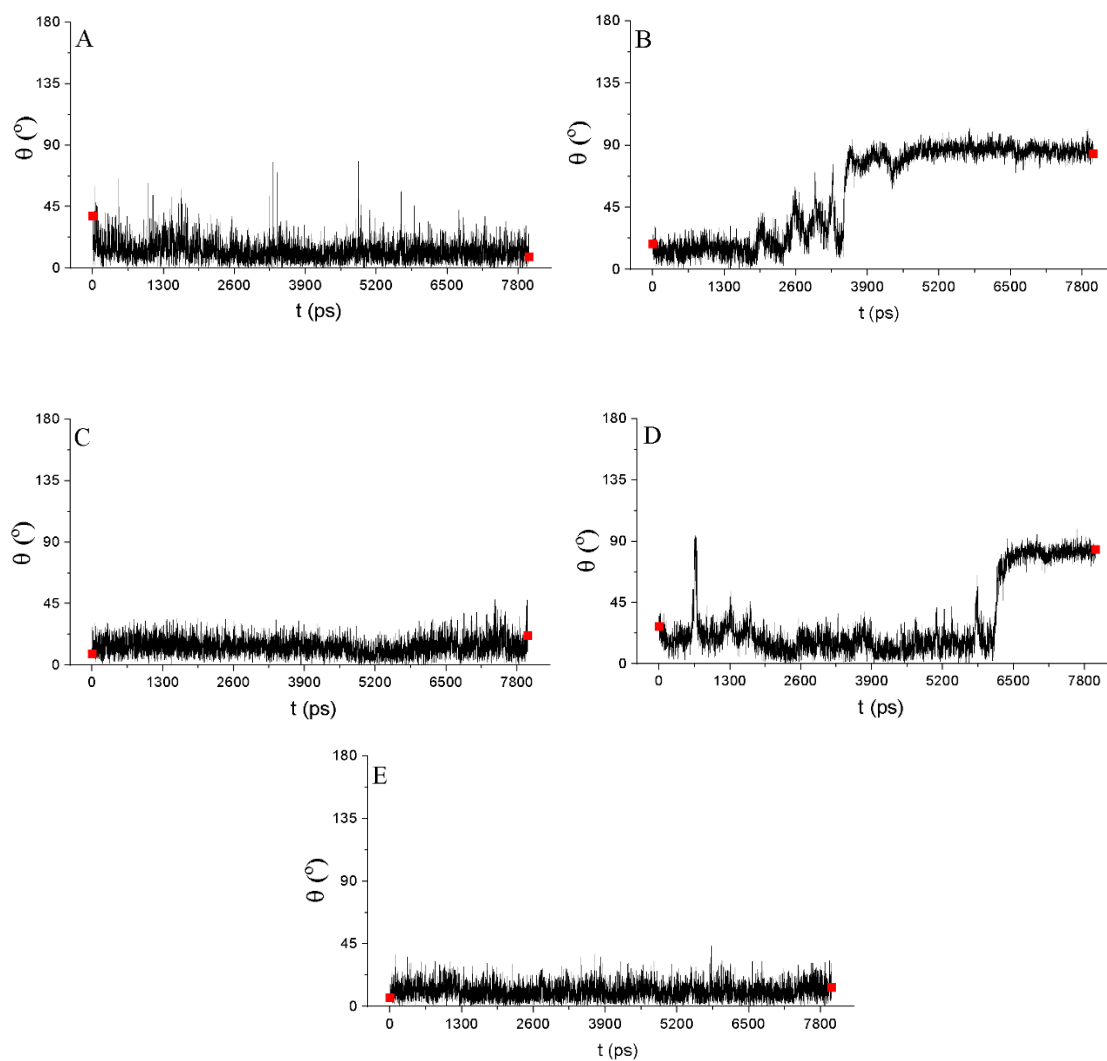
B)



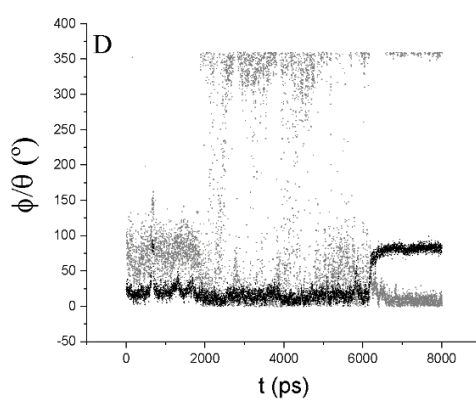
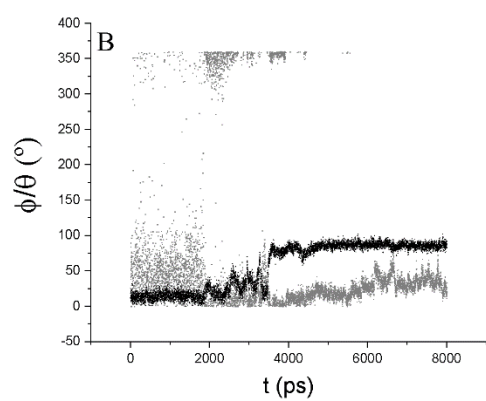


**A.67.** Gráficas de Cremer-Pople para el complejo 3-MK4 (A) y trayectorias ( $\phi$ ,  $\psi$ ) (B) para una MD-TAR de 40 ns.

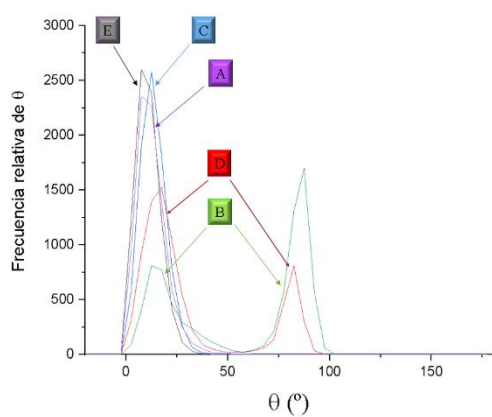
A)



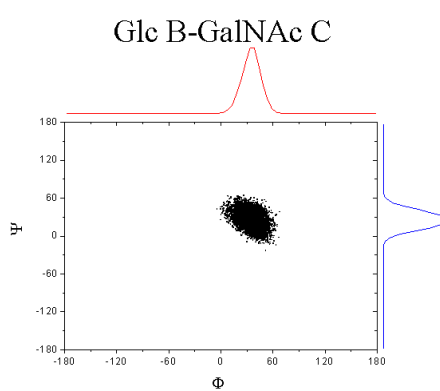
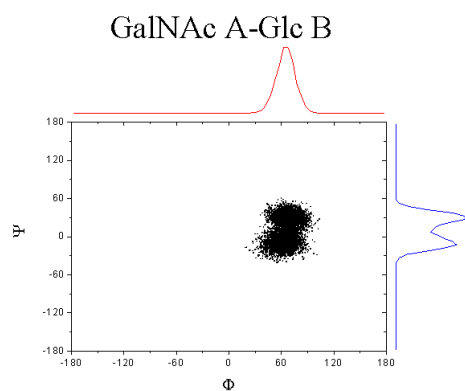
B)



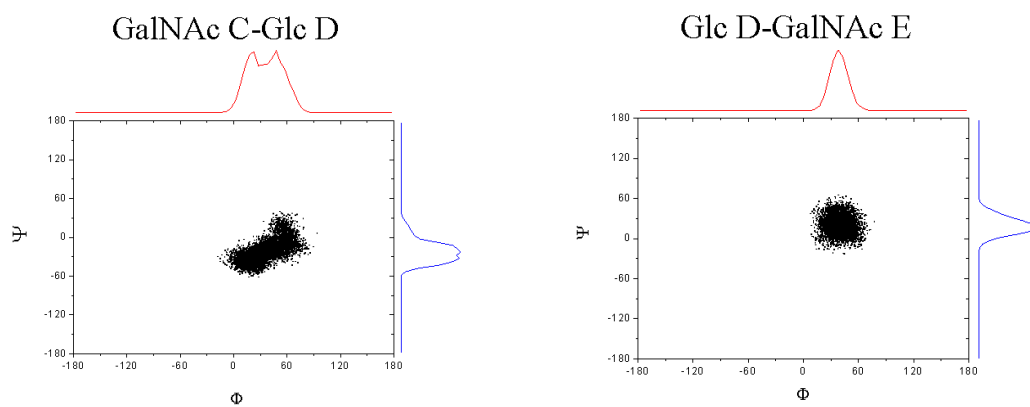
C)



**A.68.** A) Gráficas de Cremer-Pople para el complejo **3-MK0** para una MD-TAR de 40 ns. B) Representación del ángulo  $\phi$  para determinar las distorsiones de los anillos B y D. C) Frecuencias relativas de todos ellos.

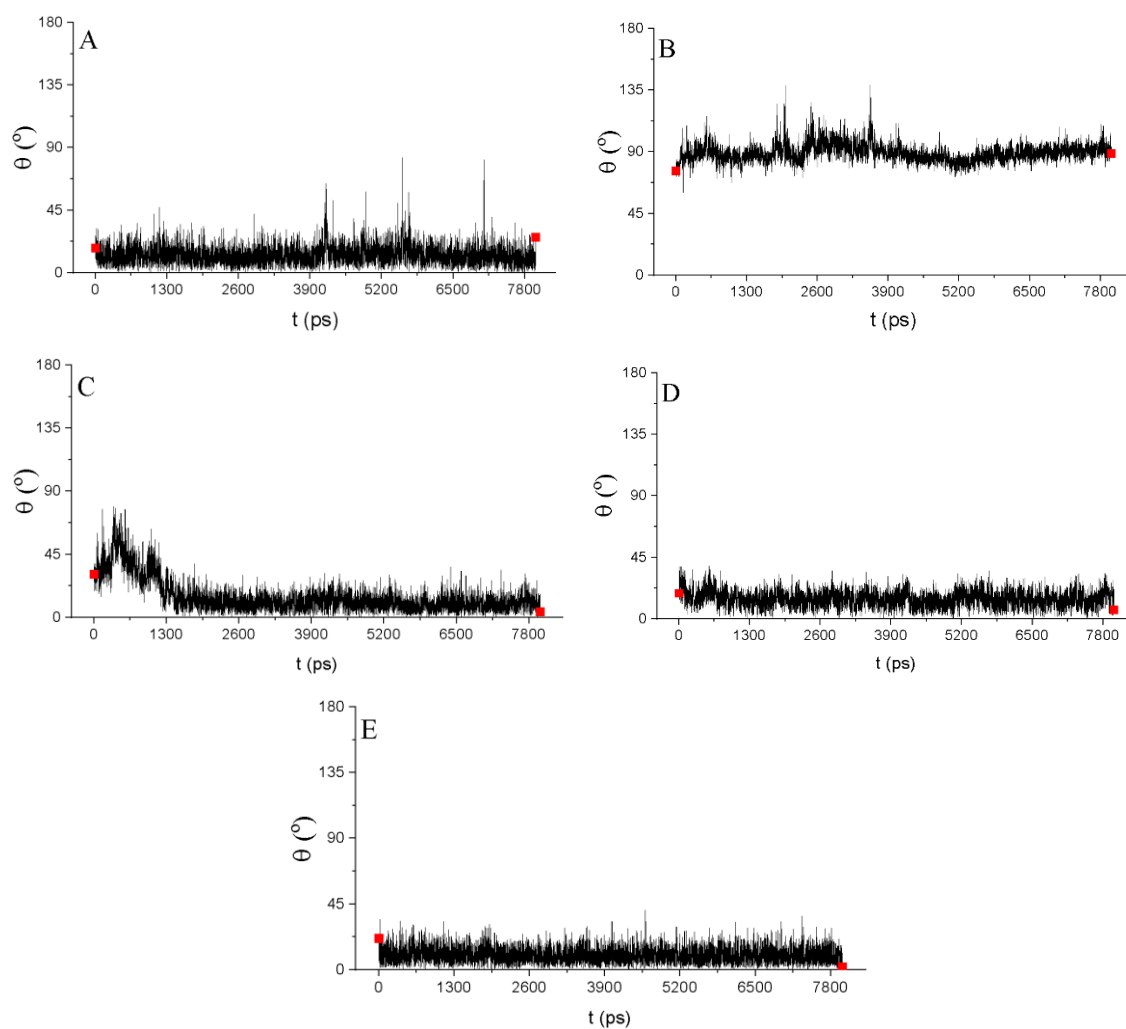




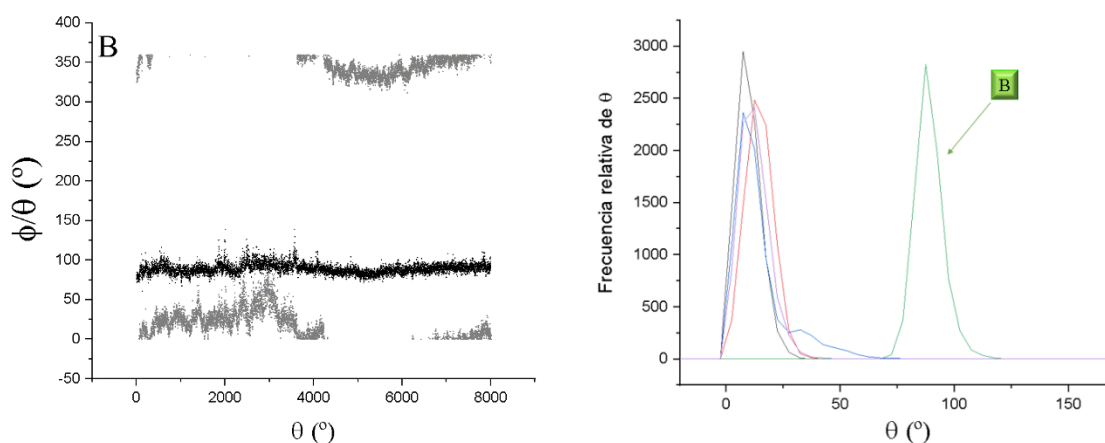


A.69. Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo 3-MK0 obtenidas de la MD-TAR de 40 ns.

A)

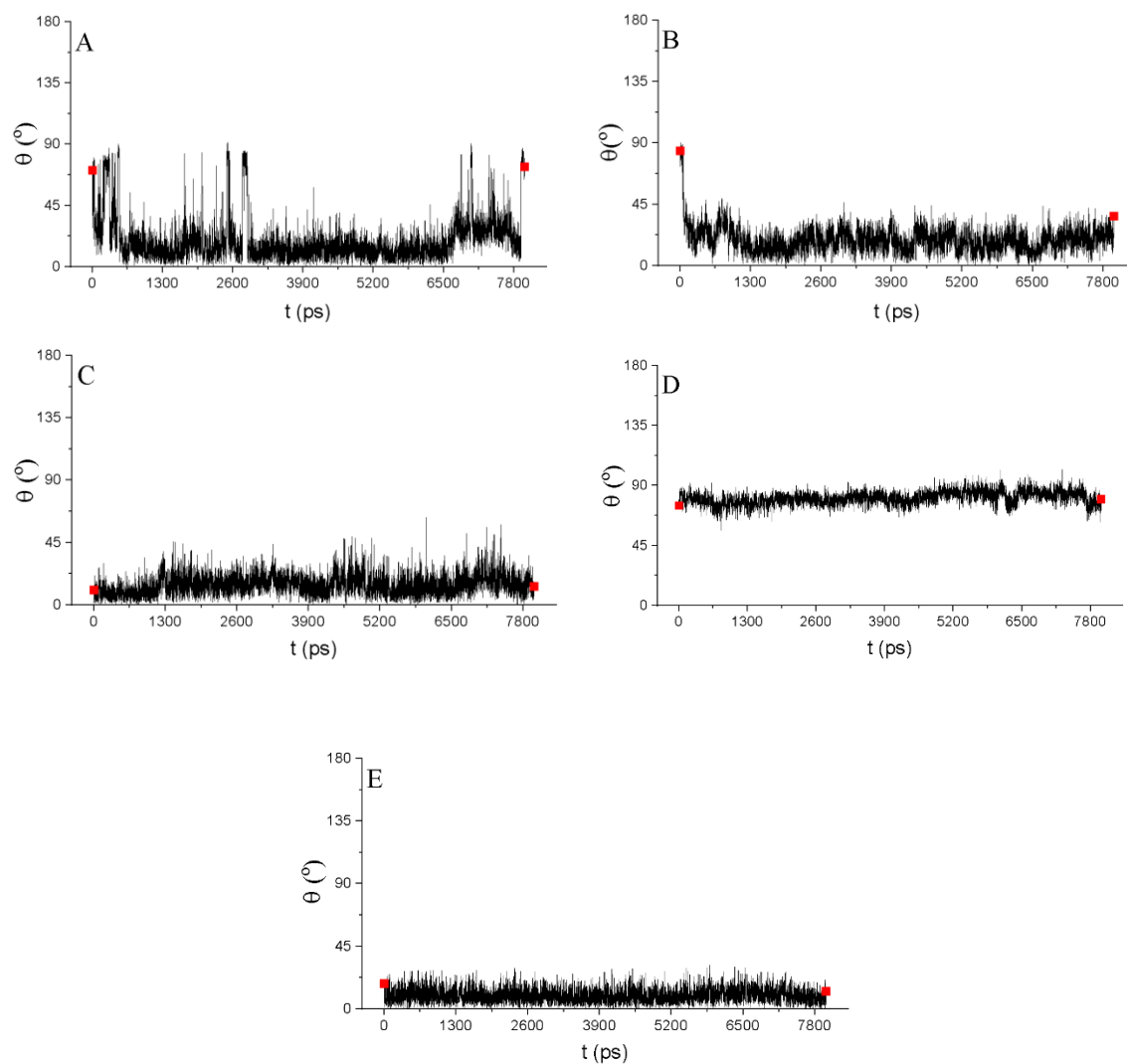


B)

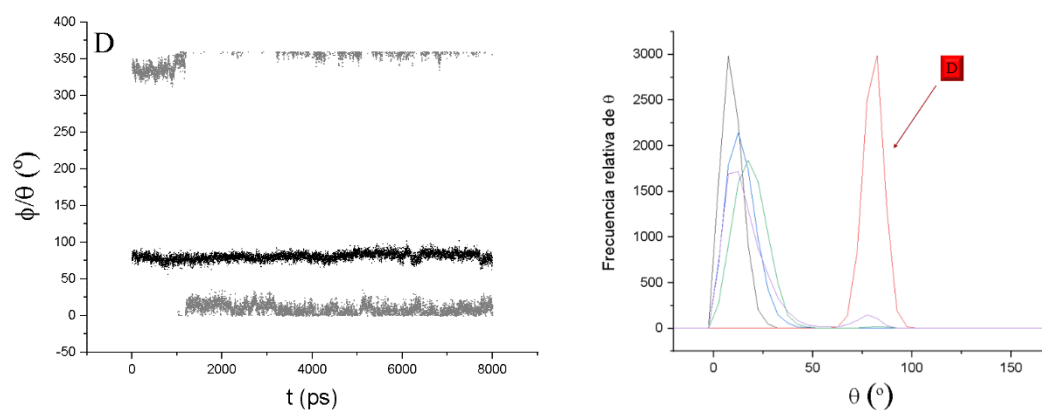


**A.70.** A) Gráficas de Cremer-Pople para el complejo **3-MK0** para una MD-TAR de 40 ns para el conformero 2. B) A la izquierda, representación del ángulo  $\phi$  para determinar la distorsión del anillo B; a la derecha, frecuencias relativas de todos ellos.

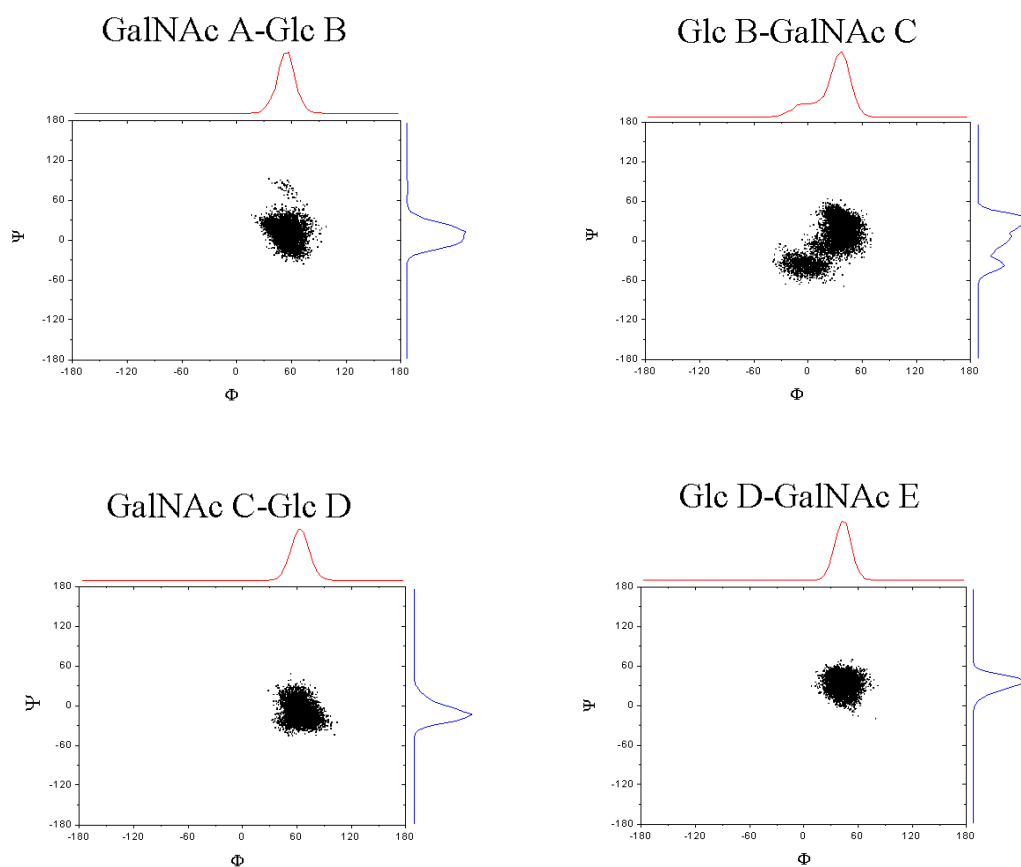
A)



B)

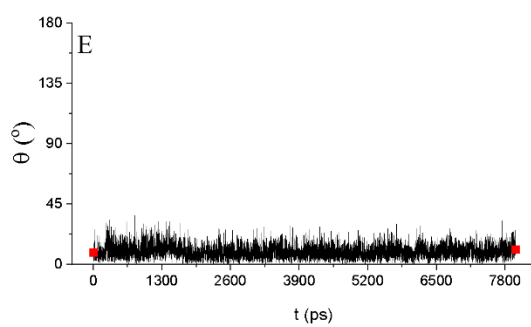
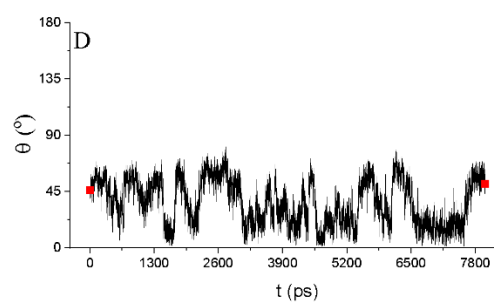
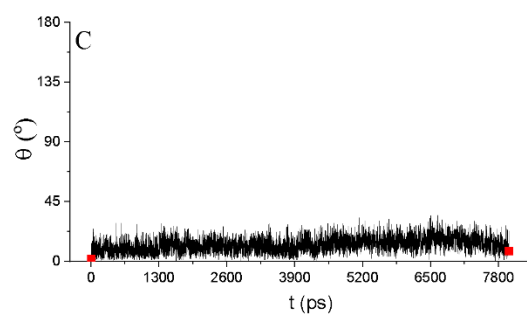
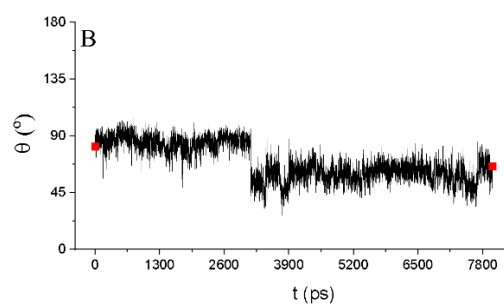
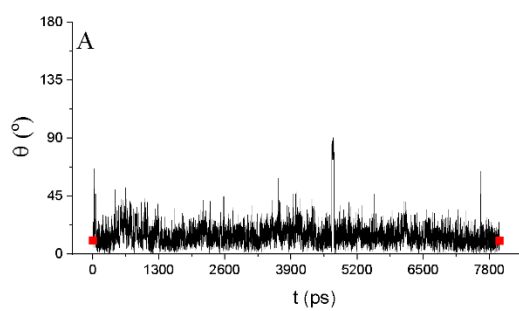


**A.71.** A) Gráficas de Cremer-Pople para el complejo **3-MK0** para una MD-TAR de 40 ns para el conformero 5. B) A la izquierda, representación del ángulo  $\phi$  para determinar la distorsión del anillo D; a la derecha, frecuencias relativas de todos ellos.

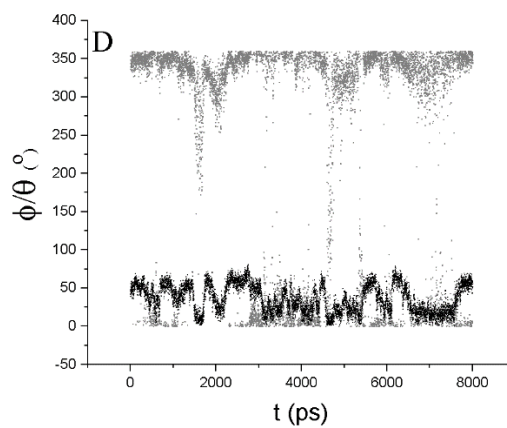
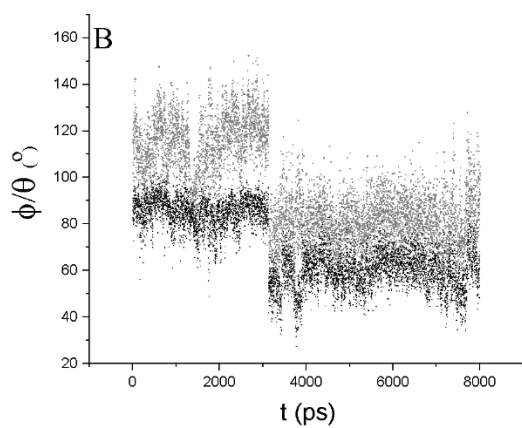


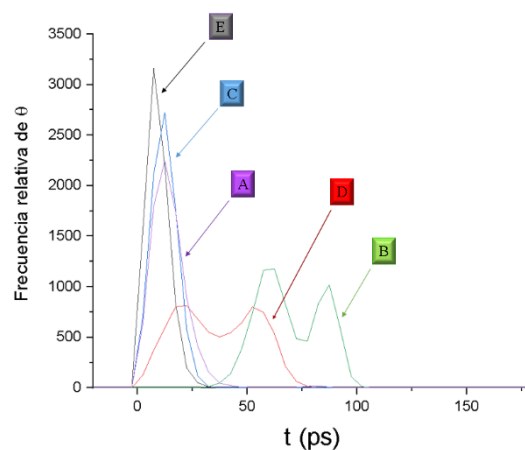
**A.72.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **3-MK0** obtenidas de la MD-TAR de 40 ns para el conformero 5.

A)

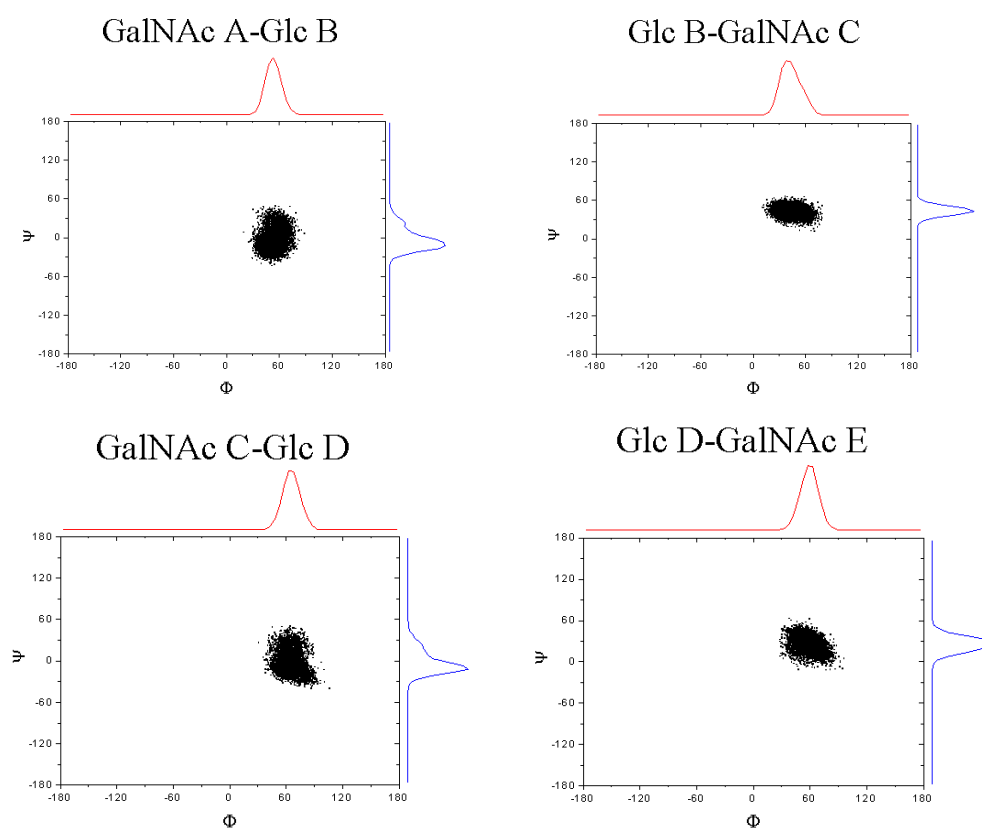


B)



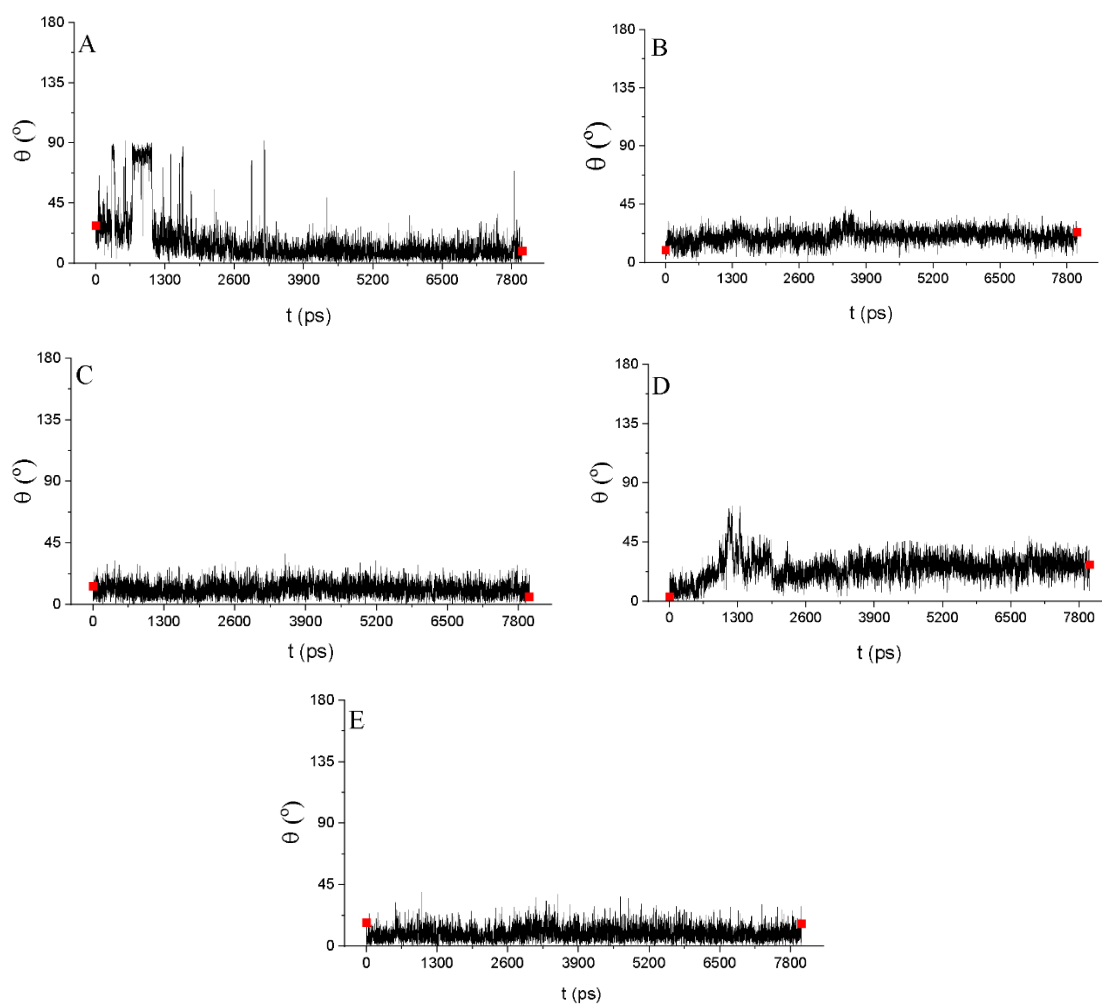


**A.73.** A) Gráficas de Cremer-Pople para el complejo **3-MK2** para una MD-TAR de 40 ns. B) Representación del ángulo  $\phi$  para determinar las distorsiones de los anillos B y D. C) Frecuencias relativas de todos ellos.

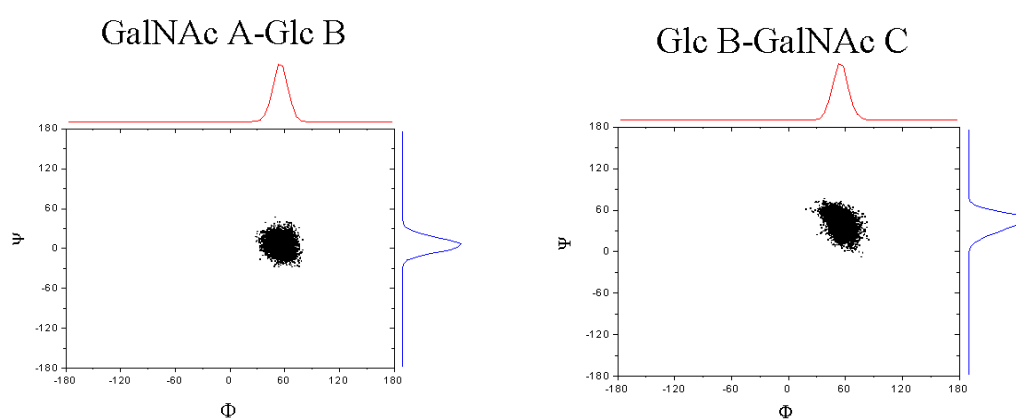


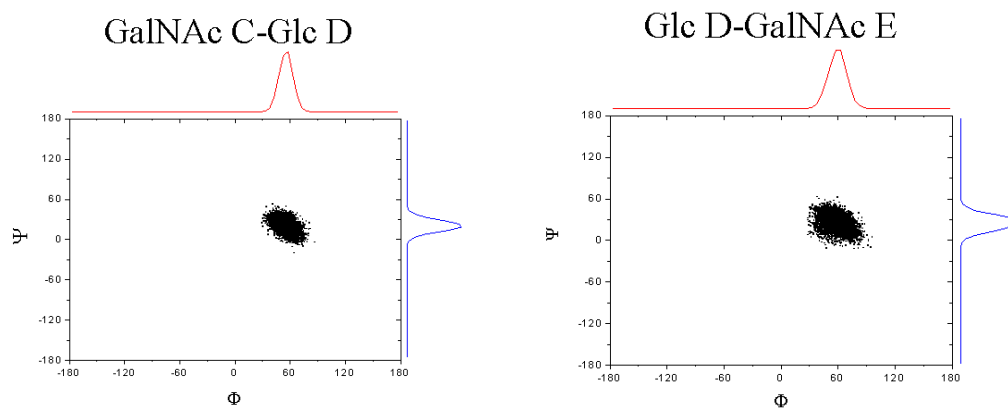
**A.74.** Trayectorias ( $\phi$ ,  $\psi$ ) para el complejo **3-MK2** obtenidas de la MD-TAR de 40 ns.

A)



B)





**A.75.** Gráficas de Cremer-Pople (A) y trayectorias ( $\phi$ ,  $\psi$ ) (B) para el complejo 3-MK2 para una MD-TAR de 40 ns empleando el tercer conformero más estable en energía.

1-MK4	Residues	VDW	Electrost.	PS	Non-PS	Global
SER 25	SO3 133	-0.57 +/- 0.07	-11.67 +/- 1.59	-2.73 +/- 1.24	-0.51 +/- 0.02	-14.97 +/- 2.05
LYS 66	QVB 127	-1.65 +/- 0.29	-24.73 +/- 1.29	13.04 +/- 0.50	-1.41 +/- 0.19	-14.75 +/- 1.20
LYS 66	SO3 132	-0.02 +/- 0.00	-37.14 +/- 1.25	33.96 +/- 0.66	-0.00 +/- 0.00	-3.19 +/- 0.76
LYS 66	SO3 133	1.40 +/- 0.86	-89.17 +/- 3.28	54.10 +/- 2.08	-0.51 +/- 0.03	-34.16 +/- 3.58
LYS 82	SO3 132	0.36 +/- 0.04	-82.44 +/- 3.18	53.70 +/- 1.99	-0.48 +/- 0.03	-28.86 +/- 3.88
LYS 82	SO3 133	-0.06 +/- 0.01	-42.04 +/- 1.51	37.58 +/- 0.83	-0.08 +/- 0.01	-4.53 +/- 1.13
LYS 82	QVB 127	-0.35 +/- 0.06	-13.56 +/- 0.57	8.04 +/- 0.38	-0.15 +/- 0.03	-6.03 +/- 1.04
ARG 84	SO3 132	-0.76 +/- 0.01	-40.92 +/- 1.07	35.16 +/- 1.04	-0.00 +/- 0.00	-5.84 +/- 0.96
ARG 84	SO3 133	1.67 +/- 0.92	-83.75 +/- 2.10	44.49 +/- 1.73	-0.49 +/- 0.01	-38.07 +/- 2.67
ARG 84	QVB 127	-0.89 +/- 0.07	-14.40 +/- 1.03	9.40 +/- 0.56	-0.80 +/- 0.05	-6.70 +/- 1.47
LYS 105	QVB 127	-0.47 +/- 0.06	-14.28 +/- 0.45	7.41 +/- 0.78	-0.94 +/- 0.05	-8.28 +/- 0.32
LYS 105	SO3 132	0.52 +/- 0.08	-84.31 +/- 1.82	51.46 +/- 2.46	-0.48 +/- 0.02	-32.82 +/- 4.09
LYS 105	SO3 133	-0.04 +/- 0.00	-38.91 +/- 0.79	34.73 +/- 0.51	0.00 +/- 0.00	-4.22 +/- 0.65
LYS 105	SO3 134	0.23 +/- 0.04	-81.31 +/- 3.37	61.78 +/- 0.88	-0.57 +/- 0.07	-19.86 +/- 3.15
LYS 105	SO3 135	-0.09 +/- 0.02	-50.05 +/- 2.75	43.09 +/- 1.40	-0.04 +/- 0.01	-7.10 +/- 1.96
LYS 105	QVB 129	-0.13 +/- 0.03	-12.03 +/- 0.88	-9.56 +/- 0.32	-0.09 +/- 0.02	-2.70 +/- 0.61
LYS 110	QVB 127	-0.17 +/- 0.02	-10.31 +/- 0.36	6.64 +/- 0.33	-0.07 +/- 0.01	-3.91 +/- 0.62
LYS 110	QVB 129	-0.26 +/- 0.05	-14.33 +/- 0.91	9.95 +/- 0.57	-0.18 +/- 0.04	-4.82 +/- 1.30
LYS 110	SO3 132	0.90 +/- 1.13	-98.86 +/- 3.25	53.65 +/- 2.16	-0.68 +/- 0.06	-44.98 +/- 3.52
LYS 110	SO3 133	-0.03 +/- 0.00	-39.45 +/- 1.23	34.32 +/- 0.58	0.00 +/- 0.00	-5.16 +/- 0.91
LYS 110	SO3 135	1.02 +/- 0.61	-94.10 +/- 2.49	59.72 +/- 1.36	-0.66 +/- 0.04	-34.02 +/- 2.75
LYS 110	SO3 134	-0.04 +/- 0.01	-42.66 +/- 1.71	39.91 +/- 1.16	-0.00 +/- 0.00	-2.79 +/- 0.68
LYS 112	QVB 127	-0.38 +/- 0.23	-11.52 +/- 0.61	7.86 +/- 0.43	-0.52 +/- 0.03	-4.58 +/- 0.86
LYS 112	SO3 132	0.25 +/- 0.08	-80.56 +/- 5.50	49.19 +/- 2.51	-0.47 +/- 0.05	-31.58 +/- 7.13
LYS 112	SO3 133	0.59 +/- 0.05	-86.47 +/- 2.93	48.28 +/- 2.47	-0.43 +/- 0.04	-38.03 +/- 4.16
LYS 112	SO3 135	-0.25 +/- 0.08	-49.29 +/- 2.74	44.01 +/- 2.27	-0.14 +/- 0.06	-5.67 +/- 1.20
LYS 118	QVB 129	-0.61 +/- 0.36	-27.69 +/- 1.91	14.15 +/- 0.72	-1.16 +/- 0.07	-15.32 +/- 1.63
LYS 118	SO3 132	-0.02 +/- 0.00	-37.84 +/- 1.09	34.69 +/- 0.85	0.00 +/- 0.00	-3.17 +/- 0.51
LYS 118	SO3 135	0.49 +/- 0.64	-84.00 +/- 3.52	58.20 +/- 1.03	-0.62 +/- 0.03	-25.93 +/- 2.81
LYS 119	4GB 130	-0.41 +/- 0.33	-4.21 +/- 2.13	1.34 +/- 0.95	-0.85 +/- 0.09	-4.13 +/- 1.75
LYS 119	UVB 131	0.18 +/- 0.05	-23.75 +/- 0.95	6.50 +/- 0.78	-0.63 +/- 0.06	-17.69 +/- 1.11
LYS 119	SO3 136	0.54 +/- 0.62	-82.92 +/- 61.20	61.20 +/- 1.45	-0.58 +/- 0.07	-21.76 +/- 2.70
LYS 119	SO3 137	-0.00 +/- 0.00	-77.25 +/- 2.46	56.52 +/- 0.89	-0.38 +/- 0.03	-21.11 +/- 2.29
LYS 121	UVB 131	-0.48 +/- 0.28	-17.57 +/- 1.86	5.78 +/- 0.95	-0.48 +/- 0.13	-12.74 +/- 2.41
LYS 121	SO3 136	0.87 +/- 0.08	-87.09 +/- 4.53	63.31 +/- 1.87	-0.66 +/- 0.10	-23.57 +/- 4.15
LYS 121	SO3 137	0.99 +/- 0.07	-90.62 +/- 2.70	61.40 +/- 2.21	-0.62 +/- 0.04	-28.84 +/- 2.61
LYS 123	SO3 137	0.56 +/- 0.05	-95.62 +/- 3.02	72.34 +/- 1.19	-0.77 +/- 0.04	-23.49 +/- 2.91



2-MK4	Residues	VDW	Electrost.	PS	Non-PS	Global
TYR 23	ISO 126	-0.94 +/- 0.26	-0.04 +/- 0.12	0.03 +/- 0.07	-0.74 +/- 0.17	-2.23 +/- 0.58
ARG 38	QVB 127	-0.57 +/- 0.58	-12.84 +/- 3.85	8.09 +/- 0.80	-0.71 +/- 0.22	-6.03 +/- 3.00
ARG 38	SO3 133	-0.041 +/- 0.00	-37.63 +/- 1.02	35.44 +/- 0.75	0.00 +/- 0.00	-2.23 +/- 0.54
ARG 38	SO3 132	1.37 +/- 1.26	-84.88 +/- 4.46	59.47 +/- 2.34	-0.73 +/- 0.06	-24.76 +/- 4.41
GLY 40	QVB 127	-0.82 +/- 0.21	-1.70 +/- 0.26	0.63 +/- 0.15	-0.53 +/- 0.07	-2.42 +/- 0.34
GLY 40	SO3 133	-0.52 +/- 0.06	-8.38 +/- 0.64	3.20 +/- 0.41	-0.23 +/- 0.03	-5.92 +/- 0.80
THR 41	QVB 127	-1.87 +/- 0.22	-1.56 +/- 0.71	-0.28 +/- 0.49	-1.04 +/- 0.13	-4.76 +/- 0.66
THR 41	SO3 133	0.82 +/- 0.78	-14.08 +/- 1.41	-0.30 +/- 0.99	-0.36 +/- 0.02	-13.92 +/- 1.64
LYS 66	SO3 132	0.63 +/- 0.80	-85.84 +/- 20.02	69.04 +/- 11.89	-0.71 +/- 0.31	-16.88 +/- 8.55
TYR67	UVB 131	-1.08 +/- 0.78	-0.34 +/- 0.06	0.26 +/- 0.02	-0.78 +/- 0.54	-1.94 +/- 0.82
TRP 72	SO3 133	-0.58 +/- 0.34	-7.80 +/- 2.63	6.63 +/- 0.63	-0.28 +/- 0.07	-2.03 +/- 0.53
LYS 82	SO3 133	-0.08 +/- 0.02	-46.47 +/- 1.62	41.22 +/- 1.14	-0.02 +/- 0.01	-5.35 +/- 1.00
ARG 84	QVB 127	-0.23 +/- 0.02	-11.64 +/- 0.45	8.92 +/- 0.40	-0.13 +/- 0.02	-3.08 +/- 0.53
ARG 84	SO3 133	1.24 +/- 1.17	-86.08 +/- 6.16	53.60 +/- 2.62	-0.68 +/- 0.06	-31.91 +/- 7.18
LYS 105	QVB 127	-0.1 +/- 0.07	-28.40 +/- 2.65	13.5 +/- 1.18	-0.81 +/- 0.13	-15.81 +/- 2.32
LYS 105	SO3 133	1.48 +/- 1.05	-90.79 +/- 3.31	51.32 +/- 2.56	-0.43 +/- 0.03	-38.41 +/- 4.01
3-MK4	Residues	VDW	Electrost.	PS	Non-PS	Global
ARG 52	ISO 126	-1.29 +/- 0.37	-3.00 +/- 0.23	2.81 +/- 0.16	-1.43 +/- 0.20	-2.91 +/- 0.45
ARG 52	QVB 127	-0.34 +/- 0.48	-14.87 +/- 0.81	7.95 +/- 0.53	-0.58 +/- 0.11	-7.84 +/- 1.22
ARG 52	SO3 132	0.50 +/- 0.81	-80.33 +/- 4.37	56.03 +/- 1.27	-0.67 +/- 0.06	-24.46 +/- 4.30
LYS 58	QVB 127	-0.14 +/- 0.02	-11.10 +/- 0.42	9.19 +/- 0.19	-0.08 +/- 0.02	-2.14 +/- 0.32
LYS 58	SO3 132	-1.37 +/- 0.98	-95.02 +/- 3.88	72.20 +/- 1.56	-0.81 +/- 0.07	-22.24 +/- 2.65
LYS 59	QVB 127	-0.16 +/- 0.22	-11.20 +/- 1.54	9.69 +/- 0.83	-0.45 +/- 0.20	-2.13 +/- 0.97
LYS 59	SO3 132	0.45 +/- 0.61	-72.78 +/- 16.37	56.43 +/- 8.49	-0.43 +/- 0.18	-16.33 +/- 7.96
LYS 59	SO3 133	0.29 +/- 0.49	-78.13 +/- 14.10	59.28 +/- 5.13	-0.51 +/- 0.16	-19.07 +/- 9.42
LYS 66	QVB 127	-0.17 +/- 0.03	-14.52 +/- 0.48	11.48 +/- 0.35	-0.06 +/- 0.02	-3.28 +/- 0.38
LYS 66	SO3 133	0.67 +/- 1.26	-90.77 +/- 5.25	65.78 +/- 1.73	-0.64 +/- 0.06	-24.96 +/- 4.56
TYR 67	BZ1 142	-0.72 +/- 0.12	-0.10 +/- 0.06	0.15 +/- 0.04	-0.57 +/- 0.09	-1.24 +/- 0.22
TYR 67	CF1 146	-0.68 +/- 0.23	-0.13 +/- 0.05	-0.19 +/- 0.06	-0.42 +/- 0.16	-1.43 +/- 0.46
PHE 69	BN1 137	-0.98 +/- 0.40	-0.25 +/- 0.11	0.58 +/- 0.08	-1.10 +/- 0.01	-1.75 +/- 0.34
PHE 69	BZ1 136	-0.60 +/- 0.45	-0.11 +/- 0.09	0.16 +/- 0.09	-0.90 +/- 0.11	-1.44 +/- 0.46
LYS 68	QVB 127	-0.30 +/- 0.79	-30.56 +/- 1.68	13.84 +/- 1.28	-0.98 +/- 0.07	-18.01 +/- 2.05
LYS 68	SO3 133	0.68 +/- 0.66	-80.71 +/- 5.36	56.39 +/- 1.26	-0.43 +/- 0.03	-24.06 +/- 5.87
LYS 68	BZ1 136	-0.71 +/- 0.51	-7.01 +/- 1.56	4.53 +/- 0.38	-0.84 +/- 0.18	-4.04 +/- 1.26
TRP 72	SO3 138	-0.19 +/- 0.11	-8.75 +/- 4.12	7.18 +/- 1.73	-0.28 +/- 0.19	-2.04 +/- 2.76
ARG 84	SO3 138	-0.11 +/- 0.13	-45.43 +/- 11.77	42.85 +/- 7.56	-0.10 +/- 0.15	-2.78 +/- 4.73
ARG 84	BZ1 136	-0.73 +/- 0.16	-2.80 +/- 0.83	2.20 +/- 0.79	-0.71 +/- 0.14	-2.05 +/- 0.45
GLN 98	CF1 146	-0.74 +/- 0.13	0.15 +/- 0.02	-0.10 +/- 0.02	-0.70 +/- 0.09	-1.39 +/- 0.18
THR 104	PV1 141	-0.83 +/- 0.27	-0.49 +/- 0.36	0.09 +/- 0.02	-0.65 +/- 0.18	-1.89 +/- 0.70
LYS 110	SO3 138	0.30 +/- 0.50	-82.98 +/- 3.45	65.27 +/- 1.37	-0.66 +/- 0.05	-18.07 +/- 3.56
LYS 110	SO3 139	0.21 +/- 0.60	-88.69 +/- 2.64	65.31 +/- 1.46	-0.62 +/- 0.03	-23.78 +/- 2.16
LYS 112	QVB 129	-0.60 +/- 0.09	-16.11 +/- 1.16	12.31 +/- 0.68	-0.38 +/- 0.06	-4.78 +/- 1.21
LYS 112	PGB 130	-1.03 +/- 0.28	-21.32 +/- 1.52	16.17 +/- 0.61	-1.09 +/- 0.11	-7.27 +/- 1.19
LYS 112	SO3 139	1.42 +/- 0.78	-92.35 +/- 2.39	64.22 +/- 1.66	-0.61 +/- 0.05	-27.31 +/- 2.01

3-MK4	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 116	SO3 144	0.87 +/- 0.74	-95.57 +/- 3.01	68.93 +/- 1.73	-0.70 +/- 0.06	-26.46 +/- 2.65
LYS 118	SO3 144	0.10 +/- 0.04	-79.87 +/- 3.39	60.10 +/- 0.98	-0.41 +/- 0.04	-20.07 +/- 3.01
LYS 118	SO3 145	0.85 +/- 0.98	-88.17 +/- 3.46	65.28 +/- 1.17	-0.65 +/- 0.05	-22.68 +/- 3.35
LYS 119	BN1 143	-0.70 +/- 0.15	-6.03 +/- 0.32	5.17 +/- 0.21	-0.74 +/- 0.08	-2.31 +/- 0.26
LYS 119	SO3 144	1.54 +/- 1.26	-87.46 +/- 4.55	60.54 +/- 0.86	-0.52 +/- 0.03	-25.89 +/- 3.50
LYS 119	SO3 145	-0.09 +/- 0.03	-45.90 +/- 2.73	43.09 +/- 1.99	-0.02 +/- 0.02	-2.91 +/- 0.85
LYS 121	BN1 143	-1.11 +/- 0.17	-3.05 +/- 0.41	2.47 +/- 0.29	-0.66 +/- 0.09	-2.35 +/- 0.42
LYS 123	PGB 130	-0.95 +/- 0.22	-15.59 +/- 1.36	14.68 +/- 0.84	-0.52 +/- 0.14	-2.39 +/- 0.89
LYS 123	QVB 131	-1.44 +/- 0.22	-17.85 +/- 1.35	14.56 +/- 0.56	-0.97 +/- 0.17	-5.71 +/- 1.29

**A.T7.** Tabla de energías de enlaces efectivas (kcal/mol) mediante la descomposición por residuo a través del método MM-PBSA a partir de los resultados de dinámica molecular libres y MD-TAR para la serie pentasacáridica con la conformación de la MK más plegada (contribución energética favorable  $E_{global} < -1.20$  kcal/mol).

1-MK0	Residues	VDW	Electrost.	PS	Non-PS	Global
ARG 38	QVB 129	-0.21 +/- 0.02	-12.32 +/- 0.69	8.61 +/- 0.38	-0.51 +/- 0.04	-4.42 +/- 0.75
ARG 38	SO3 134	1.01 +/- 0.75	-83.04 +/- 1.61	56.18 +/- 1.38	-0.66 +/- 0.04	-26.51 +/- 2.13
ARG 38	SO3 135	-0.21 +/- 0.06	-49.20 +/- 2.82	43.92 +/- 1.57	-0.11 +/- 0.03	-5.61 +/- 1.58
ARG 47	QVB 129	-0.23 +/- 0.02	-11.51 +/- 0.38	9.23 +/- 0.25	-0.13 +/- 0.02	-2.63 +/- 0.47
ARG 47	SO3 135	1.22 +/- 0.79	-93.03 +/- 2.40	56.07 +/- 2.01	-0.80 +/- 0.02	-36.52 +/- 3.72
ARG 52	4GB 128	-0.93 +/- 0.55	-4.28 +/- 1.52	1.37 +/- 0.59	-1.35 +/- 0.09	-5.20 +/- 0.99
ARG 52	QVB 129	-0.56 +/- 0.23	-15.09 +/- 1.37	8.55 +/- 0.49	-0.55 +/- 0.08	-7.65 +/- 1.35
ARG 52	SO3 134	0.27 +/- 0.65	-81.17 +/- 2.95	57.71 +/- 1.48	-0.76 +/- 0.05	-23.94 +/- 3.16
LYS 59	SO3 133	1.11 +/- 0.81	-95.16 +/- 3.01	71.16 +/- 1.94	-0.84 +/- 0.04	-23.73 +/- 2.09
LYS 66	SO3 133	0.49 +/- 0.05	-86.53 +/- 1.73	63.36 +/- 1.99	-0.54 +/- 0.06	-23.22 +/- 2.45
LYS 82	UVB 131	-0.12 +/- 0.02	-8.28 +/- 0.56	3.99 +/- 0.48	-0.07 +/- 0.02	-4.48 +/- 0.60
LYS 82	SO3 136	0.59 +/- 0.07	-92.37 +/- 3.40	64.94 +/- 0.76	-0.75 +/- 0.03	-27.58 +/- 2.79
LYS 105	QVB 129	-0.86 +/- 0.27	-25.32 +/- 1.51	15.14 +/- 0.92	-1.06 +/- 0.20	-12.09 +/- 1.63
LYS 105	SO3 135	1.09 +/- 0.76	-86.58 +/- 4.77	62.32 +/- 1.49	-0.56 +/- 0.04	-23.74 +/- 4.14
LYS 112	UVB 131	0.09 +/- 0.06	-17.67 +/- 1.76	3.77 +/- 0.71	-0.64 +/- 0.12	-14.44 +/- 1.35
LYS 112	SO3 136	0.21 +/- 0.07	-78.88 +/- 5.04	57.31 +/- 2.85	-0.58 +/- 0.07	-21.94 +/- 3.03
LYS 112	SO3 137	0.54 +/- 0.45	-86.67 +/- 3.77	60.26 +/- 2.17	-0.52 +/- 0.04	-26.39 +/- 4.10
LYS 116	UVB 131	-0.19 +/- 0.01	-9.12 +/- 0.41	6.76 +/- 0.60	-0.10 +/- 0.03	-2.66 +/- 0.49
LYS 116	SO3 137	0.66 +/- 0.47	-96.34 +/- 2.68	74.01 +/- 1.59	-0.84 +/- 0.05	-22.51 +/- 3.07
LYS 121	UVB 131	-0.89 +/- 0.67	-23.24 +/- 0.68	5.23 +/- 0.55	-1.35 +/- 0.16	-20.25 +/- 0.84
LYS 121	SO3 136	0.60 +/- 0.56	-84.88 +/- 2.91	55.61 +/- 1.48	-0.52 +/- 0.04	-29.18 +/- 2.82
LYS 121	SO3 137	-0.25 +/- 0.37	-76.16 +/- 2.83	54.83 +/- 1.17	-0.45 +/- 0.07	-22.04 +/- 2.16
LYS 123	QVB 127	-2.13 +/- 0.54	-13.77 +/- 2.74	10.00 +/- 0.36	-1.74 +/- 0.12	-7.64 +/- 2.21
LYS 123	4GB 128	-0.74 +/- 0.47	-1.28 +/- 0.94	-0.62 +/- 0.06	-0.83 +/- 0.27	-3.47 +/- 0.94
LYS 123	SO3 132	0.73 +/- 0.07	-85.03 +/- 4.11	69.53 +/- 2.28	-0.70 +/- 0.10	-15.45 +/- 2.95

2-MK0	Residues	VDW	Electrost.	PS	Non-PS	Global
GLY 1	UVB 131	-0.43 +/- 0.54	-18.17 +/- 1.78	5.48 +/- 0.98	-0.53 +/- 0.05	-13.64 +/- 2.08
GLY 1	SO3 138	0.87 +/- 0.06	-96.85 +/- 3.00	53.82 +/- 2.43	-0.44 +/- 0.03	-42.62 +/- 4.38
GLY 1	SO3 139	1.40 +/- 0.99	-94.19 +/- 2.72	48.92 +/- 1.38	-0.43 +/- 0.02	-44.29 +/- 1.96
SER 2	SO3 138	0.37 +/- 0.09	-19.19 +/- 2.48	-0.47 +/- 0.02	-0.63 +/- 0.04	-19.92 +/- 3.46
LYS 3	UVB 131	-0.15 +/- 0.03	-8.28 +/- 0.71	4.95 +/- 0.57	-0.07 +/- 0.02	-3.56 +/- 0.79
LYS 3	SO3 138	0.36 +/- 0.54	-92.25 +/- 2.53	64.09 +/- 2.24	-0.63 +/- 0.03	-28.42 +/- 4.16
LYS 6	SO3 138	-0.5 +/- 0.01	-38.87 +/- 1.15	36.85 +/- 1.04	0.00 +/- 0.00	-2.07 +/- 0.32
LYS 6	SO3 139	0.64 +/- 0.06	-97.02 +/- 1.70	61.34 +/- 1.14	-0.66 +/- 0.04	-35.69 +/- 2.03
ARG 52	UVB 131	-1.06 +/- 0.16	-12.58 +/- 1.31	7.40 +/- 0.59	-0.85 +/- 0.13	-7.10 +/- 1.48
ARG 52	BN1 137	-1.53 +/- 0.32	6.81 +/- 0.45	-6.61 +/- 0.31	-1.52 +/- 0.19	-2.84 +/- 0.45
ARG 52	SO3 138	-0.06 +/- 0.02	-39.01 +/- 1.66	35.51 +/- 1.12	-0.00 +/- 0.00	-3.56 +/- 0.72
ARG 52	SO3 139	0.88 +/- 0.79	-81.85 +/- 2.11	46.95 +/- 1.54	-0.46 +/- 0.01	-34.48 +/- 2.16
ASN 56	SO3 135	0.37 +/- 0.83	-4.02 +/- 1.92	-1.78 +/- 0.72	-0.34 +/- 0.02	-5.78 +/- 1.24
LYS 59	SO3 135	0.43 +/- 0.64	-87.41 +/- 5.19	64.13 +/- 2.79	-0.61 +/- 0.05	-23.45 +/- 4.67
LYS 59	SO3 136	0.51 +/- 0.71	-84.99 +/- 11.05	59.71 +/- 3.46	-0.57 +/- 0.09	-25.34 +/- 7.6
LYS 66	QVB 129	-0.28 +/- 0.02	-12.23 +/- 0.53	10.58 +/- 0.40	-0.11 +/- 0.02	-2.04 +/- 0.32
LYS 66	SO3 136	0.57 +/- 0.43	-97.03 +/- 2.71	70.15 +/- 1.98	-0.87 +/- 0.07	-27.19 +/- 2.64
TYR 67	WGB 130	-1.52 +/- 0.11	-0.12 +/- 0.16	-0.54 +/- 0.06	-1.04 +/- 0.08	-3.23 +/- 0.26
TYR 67	UVB 131	-1.39 +/- 0.09	-1.58 +/- 0.33	-0.35 +/- 0.15	-0.82 +/- 0.08	-4.15 +/- 0.55
PHE 69	WGB 128	-1.20 +/- 0.14	-0.32 +/- 0.34	0.18 +/- 0.02	-0.89 +/- 0.10	-2.24 +/- 0.20
PHE 69	QVB 129	-1.19 +/- 0.14	-0.96 +/- 0.33	-0.03 +/- 0.12	-1.03 +/- 0.15	-3.21 +/- 0.53
TRP 72	SO3 132	-0.49 +/- 0.12	-4.55 +/- 0.92	2.67 +/- 0.36	-0.18 +/- 0.04	-2.54 +/- 0.67
LYS 82	QVB 127	-0.11 +/- 0.21	-13.53 +/- 0.89	9.17 +/- 0.38	-0.45 +/- 0.03	-4.91 +/- 1.09
LYS 82	SO3 132	0.26 +/- 0.55	-86.17 +/- 3.15	52.83 +/- 1.60	-0.47 +/- 0.06	-33.55 +/- 4.14
LYS 82	SO3 133	0.70 +/- 0.07	-88.27 +/- 2.83	56.06 +/- 1.81	-0.51 +/- 0.05	-32.01 +/- 2.59
ARG 84	QVB 127	-0.23 +/- 0.01	-10.67 +/- 0.44	7.36 +/- 0.32	-0.08 +/- 0.00	-3.61 +/- 0.57
ARG 84	SO3 132	0.36 +/- 0.77	-91.27 +/- 1.66	50.83 +/- 2.07	-0.71 +/- 0.04	-40.79 +/- 3.12
ARG 84	SO3 133	-0.09 +/- 0.02	-40.38 +/- 1.72	37.08 +/- 1.64	-0.02 +/- 0.01	-3.43 +/- 0.56
ASN 94	UVB 131	-0.77 +/- 0.45	-2.74 +/- 0.58	0.48 +/- 0.21	-0.82 +/- 0.09	-3.84 +/- 0.35
ASN 94	SO3 139	0.15 +/- 0.54	-4.17 +/- 1.75	-2.64 +/- 1.13	-0.18 +/- 0.02	-6.84 +/- 1.74
CYX 97	UVB 131	-1.03 +/- 0.33	-2.02 +/- 0.34	1.17 +/- 0.18	-0.86 +/- 0.06	-2.74 +/- 0.43
CYX 97	SO3 139	-0.22 +/- 0.04	-7.29 +/- 0.62	3.51 +/- 0.33	-0.08 +/- 0.02	-4.09 +/- 0.69
GLN 98	UVB 131	-1.21 +/- 0.62	-4.51 +/- 0.66	0.25 +/- 0.33	-1.19 +/- 0.11	-6.65 +/- 0.87
GLN 98	SO3 138	-0.02 +/- 0.74	-6.59 +/- 1.69	-4.55 +/- 1.63	-0.25 +/- 0.02	-11.42 +/- 1.49
GLN 98	SO3 139	-0.38 +/- 0.03	-14.66 +/- 2.53	0.42 +/- 1.27	-0.32 +/- 0.06	-14.94 +/- 3.48
LYS 105	QVB 127	-0.19 +/- 0.02	-13.71 +/- 0.76	11.13 +/- 0.48	-0.08 +/- 0.03	-2.86 +/- 0.54
LYS 105	SO3 132	-0.06 +/- 0.02	-37.81 +/- 2.12	35.56 +/- 1.58	-0.00 +/- 0.00	-2.31 +/- 0.65
LYS 105	SO3 133	1.12 +/- 0.85	-94.84 +/- 4.24	67.64 +/- 1.36	-0.80 +/- 0.04	-26.88 +/- 3.51
LYS 110	ISO 126	-0.74 +/- 0.09	-4.28 +/- 0.28	3.27 +/- 0.15	-0.69 +/- 0.09	-2.45 +/- 0.30
LYS 110	QVB 127	-1.68 +/- 0.35	-18.14 +/- 1.12	12.77 +/- 0.53	-1.40 +/- 0.15	-8.46 +/- 1.15
LYS 110	SO3 132	-0.19 +/- 0.03	-36.17 +/- 1.37	33.70 +/- 0.89	-0.09 +/- 0.03	-2.75 +/- 0.76
LYS 110	SO3 133	0.62 +/- 0.06	-83.84 +/- 2.83	60.61 +/- 1.38	-0.62 +/- 0.07	-23.23 +/- 2.86
LYS 114	QVB 127	0.13 +/- 0.03	-16.01 +/- 0.86	7.72 +/- 0.53	-0.43 +/- 0.03	-8.58 +/- 0.33

2-MK0	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 114	SO3 132	0.73 +/- 0.80	-82.73 +/- 2.46	54.77 +/- 1.19	-0.48 +/- 0.04	-27.71 +/- 2.27
LYS 121	QVB 127	-2.07 +/- 0.59	-16.02 +/- 1.31	7.98 +/- 0.49	-1.49 +/- 0.13	-11.59 +/- 1.07
LYS 121	SO3 132	0.91 +/- 0.59	-86.74 +/- 2.67	51.88 +/- 1.91	-0.42 +/- 0.03	-34.37 +/- 2.78
LYS 121	SO3 133	-0.10 +/- 0.02	-42.35 +/- 1.33	38.95 +/- 1.25	-0.02 +/- 0.01	-3.53 +/- 0.51
LYS 123	WGB 128	-1.41 +/- 0.24	-8.96 +/- 1.04	8.19 +/- 0.74	-1.13 +/- 0.11	-3.32 +/- 0.46
LYS 123	QVB 129	-0.79 +/- 0.37	-17.47 +/- 1.09	11.91 +/- 0.45	-0.82 +/- 0.10	-7.17 +/- 1.11
LYS 123	SO3 135	1.09 +/- 0.84	-83.68 +/- 3.47	64.76 +/- 2.00	-0.70 +/- 0.08	-18.52 +/- 2.83
LYS 123	SO3 136	-0.12 +/- 0.03	-44.34 +/- 3.23	41.85 +/- 1.99	-0.05 +/- 0.02	-2.66 +/- 1.34
GLY 1	QVB 129	-0.14 +/- 0.02	-11.83 +/- 0.48	10.02 +/- 0.67	-0.09 +/- 0.02	-2.03 +/- 0.63
GLY 1	SO3 138	1.04 +/- 0.92	-105.14 +/- 5.46	79.59 +/- 2.00	-0.85 +/- 0.07	-25.31 +/- 4.58
GLY 1	SO3 139	-0.04 +/- 0.01	-42.66 +/- 2.61	40.04 +/- 2.14	-0.01 +/- 0.01	-2.67 +/- 0.69
LYS 3	PGB 128	-0.72 +/- 0.22	-12.38 +/- 1.33	12.10 +/- 1.09	-0.65 +/- 0.11	-1.68 +/- 0.43
LYS 3	QVB 129	-1.29 +/- 0.31	-17.70 +/- 1.76	12.85 +/- 0.70	-1.11 +/- 0.17	-7.25 +/- 1.62
3-MK0	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 3	SO3 138	-0.49 +/- 0.21	-49.49 +/- 3.31	45.42 +/- 2.51	-0.25 +/- 0.09	-4.81 +/- 2.08
LYS 3	SO3 139	0.93 +/- 0.05	-89.06 +/- 4.50	60.00 +/- 1.95	-0.62 +/- 0.05	-28.75 +/- 4.34
LYS 5	QVB 127	-0.37 +/- 0.14	-11.48 +/- 1.01	8.63 +/- 0.62	-0.24 +/- 0.14	-3.46 +/- 1.06
LYS 5	SO3 132	0.82 +/- 0.08	-89.91 +/- 3.75	64.06 +/- 2.58	-0.66 +/- 0.06	-25.68 +/- 4.35
TYR 23	ISO 126	-0.98 +/- 0.26	0.01 +/- 0.01	-0.06 +/- 0.04	-1.10 +/- 0.18	-2.13 +/- 0.37
ARG 38	ISO 126	-0.78 +/- 0.17	-3.91 +/- 0.39	3.30 +/- 0.22	-0.72 +/- 0.11	-2.11 +/- 0.34
ARG 38	QVB 127	-0.61 +/- 0.34	-15.17 +/- 1.45	9.21 +/- 0.47	-0.59 +/- 0.07	-7.16 +/- 1.53
ARG 38	SO3 132	1.02 +/- 0.93	-82.33 +/- 3.17	50.11 +/- 1.77	-0.51 +/- 0.03	-31.70 +/- 3.40
ARG 38	SO3 133	-0.12 +/- 0.02	-44.61 +/- 1.77	40.75 +/- 1.48	-0.06 +/- 0.02	-4.04 +/- 0.77
ARG 47	QVB 127	-0.15 +/- 0.01	10.01 +/- 0.26	7.38 +/- 0.36	-0.07 +/- 0.01	-2.84 +/- 0.49
ARG 47	SO3 132	1.07 +/- 0.90	-89.01 +/- 2.74	52.35 +/- 2.39	0.71 +/- 0.05	-36.29 +/- 4.08
LYS 50	QVB 127	-0.35 +/- 0.09	-12.23 +/- 0.55	10.20 +/- 0.33	-0.19 +/- 0.09	-2.58 +/- 0.61
LYS 50	SO3 132	-0.13 +/- 0.06	-42.83 +/- 5.98	40.48 +/- 4.67	-0.08 +/- 0.06	-2.56 +/- 1.55
LYS 50	SO3 133	1.02 +/- 0.09	-91.17 +/- 3.31	67.96 +/- 1.44	-0.82 +/- 0.07	-23.00 +/- 2.71
ARG 52	QVB 127	-0.98 +/- 0.52	-25.02 +/- 1.35	11.59 +/- 0.57	-1.09 +/- 0.10	-15.50 +/- 1.48
ARG 52	BZ1 136	-1.49 +/- 0.32	-2.68 +/- 0.51	2.48 +/- 0.31	-1.23 +/- 0.20	-2.92 +/- 0.55
LYS 59	QVB 129	-0.69 +/- 0.45	-16.95 +/- 3.70	10.92 +/- 0.54	-0.96 +/- 0.07	-7.68 +/- 3.54
LYS 59	QVB 131	-1.17 +/- 0.30	-4.68 +/- 0.41	4.13 +/- 0.35	-0.88 +/- 0.12	-2.59 +/- 0.78
LYS 59	SO3 138	0.09 +/- 0.68	-76.61 +/- 4.06	57.93 +/- 1.46	-0.55 +/- 0.09	-19.14 +/- 3.26
LYS 59	SO3 139	0.61 +/- 0.07	-86.31 +/- 2.94	51.71 +/- 1.92	-0.41 +/- 0.03	-34.39 +/- 3.58
PHE 61	LV1 147	-0.90 +/- 0.24	-0.64 +/- 0.45	0.59 +/- 0.35	-0.59 +/- 0.19	-1.54 +/- 0.45
LYS 66	QVB 131	-0.64 +/- 0.54	-24.11 +/- 3.23	13.84 +/- 1.10	-0.74 +/- 0.20	-11.66 +/- 3.02
LYS 66	SO3 145	1.29 +/- 0.80	-88.40 +/- 2.70	60.15 +/- 1.87	-0.49 +/- 0.04	-27.45 +/- 2.86
TYR 67	BZ1 142	-0.72 +/- 0.23	0.05 +/- 0.16	-0.02 +/- 0.10	-0.69 +/- 0.15	-1.39 +/- 0.38
LYS 68	QVB 131	-0.23 +/- 0.05	-13.09 +/- 0.82	11.37 +/- 0.53	-0.05 +/- 0.02	-2.00 +/- 0.53
LYS 68	SO3 145	0.72 +/- 0.07	-96.09 +/- 6.62	73.72 +/- 2.71	-0.82 +/- 0.11	-22.47 +/- 4.77
LYS 105	PGB 130	-0.10 +/- 0.04	-20.87 +/- 1.24	16.67 +/- 0.49	-0.47 +/- 0.05	-4.77 +/- 0.95
LYS 105	CF1 140	-0.86 +/- 0.29	-3.67 +/- 0.85	3.21 +/- 0.50	-0.71 +/- 0.15	-2.03 +/- 0.58
LYS 105	BZ1 142	-0.07 +/- 0.04	-6.10 +/- 1.86	3.74 +/- 0.41	-0.28 +/- 0.10	-2.70 +/- 1.50
LYS 105	BN1 143	-1.51 +/- 0.28	-8.98 +/- 0.56	6.52 +/- 0.27	-1.44 +/- 0.09	-5.41 +/- 0.51

3-MK0	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 110	QVB 131	-0.25 +/- 0.07	-12.45 +/- 1.30	9.66 +/- 0.49	-0.18 +/- 0.08	-3.22 +/- 1.09
LYS 110	BN1 143	-1.69 +/- 0.27	-5.63 +/- 0.40	5.13 +/- 0.25	-1.62 +/- 0.21	-3.81 +/- 0.55
LYS 110	SO3 144	1.04 +/- 0.95	-86.93 +/- 3.34	65.69 +/- 1.39	-0.69 +/- 0.05	-20.87 +/- 3.05
LYS 112	QVB 129	-0.08 +/- 0.04	-22.70 +/- 1.25	11.49 +/- 0.72	-0.45 +/- 0.05	-11.74 +/- 1.13
LYS 112	PGB 130	-0.86 +/- 0.34	-17.46 +/- 1.20	14.98 +/- 0.52	-0.79 +/- 0.07	-4.12 +/- 0.99
LYS 112	SO3 139	1.07 +/- 0.89	-90.94 +/- 2.39	52.12 +/- 1.87	-0.53 +/- 0.03	-38.28 +/- 2.81
ASN 113	SO3 144	0.10 +/- 0.06	-13.63 +/- 2.18	5.42 +/- 1.05	-0.36 +/- 0.05	-8.46 +/- 2.21
LYS 121	QVB 129	-0.16 +/- 0.02	-13.44 +/- 0.90	10.59 +/- 0.44	-0.06 +/- 0.01	-3.06 +/- 0.69
LYS 121	SO3 138	-0.04 +/- 0.01	-43.52 +/- 1.83	41.39 +/- 1.62	-0.01 +/- 0.01	-2.17 +/- 0.52
LYS 121	SO3 139	1.32 +/- 0.85	-100.54 +/- 3.13	61.61 +/- 2.34	-0.56 +/- 0.05	-38.17 +/- 4.12
LYS 123	QVB 131	-0.22 +/- 0.39	-13.82 +/- 1.34	8.82 +/- 0.48	-0.62 +/- 0.08	-5.83 +/- 1.07
LYS 123	PV1 141	-1.07 +/- 0.45	-1.37 +/- 1.51	-0.41 +/- 0.05	-1.17 +/- 0.09	-4.04 +/- 1.08
LYS 123	SO3 144	0.48 +/- 0.07	-83.62 +/- 3.60	62.61 +/- 1.64	-0.57 +/- 0.05	-21.11 +/- 3.09

**A.T8.** Tabla de energías de enlaces efectivas (kcal/mol) mediante la descomposición por residuo a través del método MM-PBSA a partir de los resultados de dinámica molecular libres y MD-TAR para la serie pentasacáridica con la conformación lineal de la MK (contribución energética favorable  $E_{global} < -1.20$  kcal/mol).

1-MK2	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 50	UVB 131	-0.67 +/- 0.49	-9.84 +/- 2.30	8.03 +/- 1.13	-0.61 +/- 0.49	-3.09 +/- 2.23
LYS 50	SO3 137	0.68 +/- 0.07	-87.84 +/- 7.15	68.96 +/- 3.29	-0.75 +/- 0.08	-18.95 +/- 5.07
ARG 52	UVB 131	-0.35 +/- 0.33	-13.25 +/- 1.83	5.71 +/- 0.44	-0.65 +/- 0.06	-8.53 +/- 1.94
ARG 52	SO3 136	0.78 +/- 0.57	-83.23 +/- 2.98	49.77 +/- 3.71	-0.57 +/- 0.06	-33.24 +/- 5.17
ARG 52	SO3 137	0.34 +/- 0.09	-77.46 +/- 4.15	53.94 +/- 2.15	-0.71 +/- 0.10	-23.90 +/- 5.45
LYS 59	UVB 131	-0.13 +/- 0.02	-7.53 +/- 0.49	4.82 +/- 0.32	-0.07 +/- 0.01	-2.90 +/- 0.48
LYS 59	SO3 136	0.70 +/- 0.08	-93.24 +/- 2.29	64.87 +/- 1.02	-0.70 +/- 0.05	-28.37 +/- 2.38
LYS 66	UVB 131	-0.62 +/- 0.37	-10.11 +/- 1.07	5.15 +/- 0.66	-0.64 +/- 0.33	-6.22 +/- 1.51
LYS 66	SO3 136	0.84 +/- 0.46	-86.77 +/- 4.20	63.79 +/- 3.77	-0.52 +/- 0.10	-22.66 +/- 2.61
LYS 105	QVB 129	-0.73 +/- 0.55	-26.91 +/- 3.63	15.93 +/- 1.07	-1.11 +/- 0.24	-12.82 +/- 3.42
LYS 105	SO3 135	0.34 +/- 0.05	-86.64 +/- 3.37	64.51 +/- 1.61	-0.73 +/- 0.04	-22.52 +/- 3.27
LYS 110	SO3 133	1.09 +/- 1.42	-94.09 +/- 6.17	69.77 +/- 2.96	-0.65 +/- 0.12	-23.88 +/- 4.69
LYS 112	SO3 132	0.27 +/- 0.04	-81.81 +/- 10.43	66.71 +/- 6.71	-0.68 +/- 0.21	-15.49 +/- 4.98
LYS 112	SO3 133	0.70 +/- 0.08	-83.15 +/- 15.55	61.19 +/- 6.71	-0.45 +/- 0.16	-21.70 +/- 9.77
LYS 114	4GB 128	-0.11 +/- 0.47	-9.25 +/- 1.51	4.94 +/- 0.79	-0.91 +/- 0.06	-5.32 +/- 0.78
LYS 114	QVB 129	-0.29 +/- 0.05	-14.59 +/- 1.55	9.17 +/- 0.58	-0.21 +/- 0.08	-5.92 +/- 1.72
LYS 114	SO3 133	-0.19 +/- 0.09	-47.95 +/- 3.46	44.62 +/- 2.80	-0.09 +/- 0.06	-3.63 +/- 0.99
LYS 114	SO3 134	0.82 +/- 0.67	-89.29 +/- 2.11	63.58 +/- 1.70	-0.75 +/- 0.05	-25.64 +/- 2.23
LYS 116	QVB 129	-0.09 +/- 0.47	-16.70 +/- 4.08	10.67 +/- 0.68	-0.51 +/- 0.06	-6.63 +/- 3.42
LYS 116	SO3 134	0.35 +/- 0.01	-90.68 +/- 4.24	62.17 +/- 1.22	-0.72 +/- 0.06	-28.87 +/- 3.46
LYS 116	SO3 135	0.55 +/- 0.02	-81.52 +/- 6.11	58.90 +/- 1.10	-0.43 +/- 0.09	-22.50 +/- 5.03
LYS 118	QVB 129	-0.31 +/- 0.11	-12.01 +/- 0.88	10.13 +/- 0.39	-0.24 +/- 0.12	-2.44 +/- 0.59
LYS 118	SO3 135	0.76 +/- 0.07	-94.57 +/- 2.96	70.19 +/- 1.46	-0.77 +/- 0.08	-24.39 +/- 2.61

LYS 123	SO3 134	1.093 +/- 0.96	-87.97 +/- 4.03	65.44 +/- 2.02	-0.71 +/- 0.05	-22.15 +/- 4.12
LYS 123	QVB 129	-0.32 +/- 0.14	-11.72 +/- 1.99	8.45 +/- 0.85	-0.38 +/- 0.18	-3.98 +/- 1.74
<b>2-MK2</b>	<b>Residues</b>	<b>VDW</b>	<b>Electrost.</b>	<b>PS</b>	<b>Non-PS</b>	<b>Global</b>
LYS 48	QVB 129	-0.24 +/- 0.17	-9.13 +/- 0.77	6.26 +/- 0.44	-0.42 +/- 0.05	-3.53 +/- 0.59
LYS 48	SO3 136	-0.03 +/- 0.00	-39.98 +/- 1.18	37.13 +/- 0.64	0.00 +/- 0.00	-2.87 +/- 0.62
LYS 48	SO3 135	1.04 +/- 0.83	-88.43 +/- 3.31	60.74 +/- 1.31	-0.51 +/- 0.04	-27.16 +/- 3.28
LYS 50	ISO 126	-1.08 +/- 0.12	-4.45 +/- 0.52	2.92 +/- 0.16	-0.88 +/- 0.07	-3.49 +/- 0.40
LYS 50	QVB 127	-1.44 +/- 0.44	-19.67 +/- 1.32	11.79 +/- 0.68	-1.20 +/- 0.08	-10.52 +/- 1.46
LYS 50	SO3 132	0.10 +/- 0.01	-77.30 +/- 3.80	58.84 +/- 1.04	0.40 +/- 0.05	-18.75 +/- 3.73
LYS 50	SO3 133	0.18 +/- 0.68	-76.48 +/- 2.98	56.80 +/- 1.42	-0.44 +/- 0.04	-19.93 +/- 2.50
ARG 52	QVB 127	-0.30 +/- 0.03	-14.99 +/- 0.78	6.77 +/- 0.49	-0.55 +/- 0.05	-8.78 +/- 0.87
ARG 52	SO3 132	0.95 +/- 0.06	-78.17 +/- 4.39	48.98 +/- 1.67	-0.59 +/- 0.06	-28.82 +/- 5.71
ARG 52	SO3 133	-0.03 +/- 0.00	-35.14 +/- 0.79	32.25 +/- 0.62	0.00 +/- 0.00	-2.92 +/- 0.69
ASN 56	QVB 127	-0.31 +/- 0.15	-2.08 +/- 1.22	-0.08 +/- 0.23	-0.22 +/- 0.10	-2.69 +/- 1.32
ASN 56	SO3 132	-0.56 +/- 0.17	-5.26 +/- 3.9	0.84 +/- 2.04	-0.27 +/- 0.08	-5.25 +/- 2.80
LYS 59	QVB 127	-1.02 +/- 0.22	-13.37 +/- 0.72	10.35 +/- 0.42	-0.78 +/- 0.05	-4.83 +/- 0.83
LYS 59	SO3 132	0.24 +/- 0.67	-85.23 +/- 5.24	63.83 +/- 1.39	-0.68 +/- 0.11	-21.83 +/- 4.67
LYS 59	SO3 133	0.86 +/- 0.94	-94.13 +/- 4.13	62.47 +/- 1.78	-0.58 +/- 0.04	-31.39 +/- 4.82
GLU 60	QVB 127	-1.57 +/- 0.35	5.23 +/- 1.38	-5.62 +/- 0.54	-1.03 +/- 0.15	-3.00 +/- 1.24
GLU 60	WGB 128	-0.95 +/- 0.44	0.87 +/- 0.03	-2.11 +/- 1.73	-0.61 +/- 0.08	-2.79 +/- 1.87
PHE 61	WGB 128	-1.29 +/- 0.19	-0.61 +/- 0.66	0.22 +/- 0.31	-0.58 +/- 0.09	-2.26 +/- 0.64
LYS 66	QVB 127	-0.50 +/- 0.06	-14.36 +/- 0.75	10.25 +/- 0.56	-0.28 +/- 0.03	-4.91 +/- 1.14
LYS 66	SO3 133	1.49 +/- 0.76	-92.93 +/- 2.28	58.09 +/- 1.67	-0.49 +/- 0.02	-33.84 +/- 2.31
TYR 67	BN1 137	-0.58 +/- 0.19	0.01 +/- 0.00	0.05 +/- 0.05	-0.67 +/- 0.24	-1.20 +/- 0.41
TRP 72	SO3 135	-0.56 +/- 0.36	-10.97 +/- 1.31	1.73 +/- 1.08	-0.56 +/- 0.06	-10.36 +/- 1.90
LYS 82	QVB 129	-0.12 +/- 0.01	-10.39 +/- 0.40	7.44 +/- 0.33	-0.04 +/- 0.01	-3.12 +/- 0.34
LYS 82	SO3 135	0.18 +/- 0.48	-86.02 +/- 2.71	62.08 +/- 1.51	-0.46 +/- 0.04	-24.21 +/- 2.76
THR 104	UVB 131	-1.17 +/- 0.37	-1.20 +/- 0.65	-0.06 +/- 0.23	-1.15 +/- 0.18	-3.58 +/- 0.79
LYS 105	QVB 129	0.11 +/- 0.06	-22.42 +/- 0.83	10.01 +/- 0.57	-0.58 +/- 0.04	-12.86 +/- 0.61
LYS 105	UVB 131	-1.43 +/- 0.25	-2.21 +/- 0.47	2.47 +/- 0.32	-0.86 +/- 0.12	-2.02 +/- 0.36
LYS 105	SO3 135	0.12 +/- 0.04	-77.78 +/- 1.16	50.68 +/- 1.22	-0.45 +/- 0.03	-27.42 +/- 1.72
LYS 105	SO3 136	0.76 +/- 0.76	-87.91 +/- 2.32	49.67 +/- 1.52	-0.34 +/- 0.02	-37.81 +/- 2.48
LYS 110	SO3 138	0.89 +/- 1.05	-93.40 +/- 4.51	74.32 +/- 1.48	-0.92 +/- 0.07	-19.10 +/- 3.99
LYS 112	QVB 129	-0.09 +/- 0.36	-16.91 +/- 1.37	8.84 +/- 0.58	-0.46 +/- 0.03	-8.62 +/- 1.43
LYS 112	SO3 135	0.79 +/- 0.07	-79.51 +/- 2.16	55.79 +/- 1.32	-0.41 +/- 0.02	-23.34 +/- 2.17
LYS 112	SO3 136	0.29 +/- 0.04	-73.28 +/- 1.93	51.65 +/- 1.65	-0.33 +/- 0.04	-21.67 +/- 1.42
LYS 116	QVB 129	-0.16 +/- 0.01	-15.21 +/- 0.64	11.32 +/- 0.54	-0.5 +/- 0.01	-4.11 +/- 0.53
LYS 116	SO3 136	0.65 +/- 0.65	-98.37 +/- 2.71	62.26 +/- 1.19	-0.65 +/- 0.04	-36.10 +/- 3.06
LYS 116	SO3 138	-0.16 +/- 0.06	-47.60 +/- 2.05	45.35 +/- 1.98	-0.15 +/- 0.06	-2.56 +/- 0.42
LYS 118	UVB 131	-0.64 +/- 0.12	-15.24 +/- 1.84	8.51 +/- 0.75	-57 +/- 0.11	-7.95 +/- 1.75
LYS 118	SO3 138	0.48 +/- 0.76	-87.32 +/- 2.99	65.09 +/- 2.15	-0.76 +/- 0.07	-23.10 +/- 3.19
LYS 118	SO3 139	1.35 +/- 1.23	-88.64 +/- 2.71	62.77 +/- 2.65	-0.66 +/- 0.05	-25.18 +/- 3.22
LYS 119	QVB 129	-0.93 +/- 0.47	-26.93 +/- 2.54	15.53 +/- 0.87	-1.09 +/- 0.09	-13.43 +/- 2.51
LYS 119	WGB 130	-0.72 +/- 0.21	3.69 +/- 1.35	1.68 +/- 0.78	-0.66 +/- 0.18	3.99 +/- 1.12
LYS 119	SO3 136	0.87 +/- 0.66	-89.56 +/- 2.82	56.71 +/- 2.39	-0.53 +/- 0.05	32.51 +/- 3.32

3-MK2	Residues	VDW	Electrost.	PS	Non-PS	Global
ARG 47	QVB 129	-0.27 +/- 0.40	-15.19 +/- 1.76	7.09 +/- 0.49	-0.60 +/- 0.08	-8.98 +/- 1.93
ARG 47	SO3 138	1.08 +/- 1.01	-82.13 +/- 2.70	51.56 +/- 2.72	-0.58 +/- 0.06	-30.06 +/- 3.58
ARG 47	SO3 139	-0.05 +/- 0.02	-39.47 +/- 1.64	36.28 +/- 1.25	-0.00 +/- 0.00	-3.25 +/- 1.00
LYS 50	SO3 132	1.07 +/- 0.54	-95.48 +/- 3.48	77.22 +/- 1.40	-0.96 +/- 0.06	-18.14 +/- 1.99
ARG 52	QVB 131	-0.43 +/- 0.51	-16.29 +/- 2.92	10.02 +/- 0.53	-0.83 +/- 0.11	-7.53 +/- 2.42
ARG 52	SO3 144	0.98 +/- 1.41	-80.98 +/- 3.49	54.04 +/- 2.86	-0.69 +/- 0.03	-26.64 +/- 3.19
ARG 52	SO3 145	-0.32 +/- 0.20	-60.94 +/- 4.71	48.96 +/- 1.46	-0.35 +/- 0.05	-12.64 +/- 4.35
ARG 52	LV1 147	-1.33 +/- 0.30	-8.99 +/- 0.97	8.74 +/- 0.71	-1.09 +/- 0.11	-2.68 +/- 0.66
LYS 59	SO3 145	-0.07 +/- 0.02	-45.10 +/- 2.72	42.44 +/- 2.23	-0.04 +/- 0.02	-2.77 +/- 0.67
LYS 59	LV1 147	0.45 +/- 0.52	-27.50 +/- 1.21	16.78 +/- 0.38	-0.95 +/- 0.11	-11.32 +/- 1.21
GLU 60	SO3 145	-0.25 +/- 0.04	57.56 +/- 1.94	-54.61 +/- 1.62	-0.07 +/- 0.02	2.62 +/- 0.44
LYS 66	CF1 146	-0.57 +/- 0.19	0.95 +/- 0.89	1.27 +/- 0.36	-0.60 +/- 0.25	1.05 +/- 0.73
LYS 66	QVB 131	-0.40 +/- 0.50	-28.61 +/- 2.49	14.98 +/- 0.94	-0.87 +/- 0.10	-14.90 +/- 2.28
LYS 66	SO3 145	1.42 +/- 1.15	-87.62 +/- 3.55	58.75 +/- 1.76	-0.51 +/- 0.03	-27.96 +/- 2.95
TYR 67	BZ1 142	-0.48 +/- 0.09	0.08 +/- 0.10	-0.04 +/- 0.07	-0.54 +/- 0.13	-1.05 +/- 0.23
LYS 68	QVB 131	-0.17 +/- 0.01	-14.46 +/- 0.68	11.90 +/- 0.53	-0.06 +/- 0.01	-2.80 +/- 0.35
LYS 68	SO3 145	1.34 +/- 0.97	-99.16 +/- 2.65	69.50 +/- 0.85	-0.84 +/- 0.04	-29.16 +/- 2.09
LYS 105	QVB 129	-0.48 +/- 0.36	-24.62 +/- 3.83	12.13 +/- 1.03	-0.67 +/- 0.14	-13.64 +/- 3.46
LYS 105	SO3 139	1.45 +/- 0.93	-88.18 +/- 2.90	58.47 +/- 2.42	-0.58 +/- 0.04	-28.83 +/- 4.21
LYS 105	BZ1 142	-1.26 +/- 0.37	-3.12 +/- 1.21	2.46 +/- 0.36	-0.93 +/- 0.15	-2.86 +/- 0.71
THR 108	BZ1 142	-0.41 +/- 0.04	-2.60 +/- 0.89	0.42 +/- 0.14	-0.58 +/- 0.11	-3.17 +/- 0.42
LYS 110	QVB 131	-0.20 +/- 0.03	-11.19 +/- 0.40	9.22 +/- 0.47	-0.12 +/- 0.03	-2.29 +/- 0.37
LYS 110	SO3 144	0.57 +/- 0.05	-96.54 +/- 2.53	74.86 +/- 1.20	-0.88 +/- 0.05	-21.98 +/- 2.81
LYS 112	QVB 131	-0.32 +/- 0.04	-13.80 +/- 1.88	8.40 +/- 0.78	-0.61 +/- 0.07	-6.33 +/- 1.45
LYS 112	PV1 141	-0.58 +/- 0.03	-1.56 +/- 0.09	0.09 +/- 0.03	-0.65 +/- 0.08	-2.69 +/- 0.77
LYS 112	SO3 144	0.26 +/- 0.05	-84.07 +/- 30.1	64.67 +/- 1.71	-0.59 +/- 0.05	-19.78 +/- 1.84
LYS 116	QVB 129	-0.23 +/- 0.07	-11.95 +/- 0.70	9.33 +/- 0.52	-0.17 +/- 0.09	-3.03 +/- 0.65
LYS 116	SO3 139	1.18 +/- 0.89	-94.59 +/- 3.61	67.57 +/- 2.45	-0.75 +/- 0.04	-26.58 +/- 4.45
LYS 116	BN1 143	-0.74 +/- 0.33	-7.05 +/- 1.57	5.56 +/- 0.69	-1.13 +/- 0.29	-3.35 +/- 1.39
LYS 119	QVB 129	-0.14 +/- 0.02	-11.24 +/- 0.40	8.40 +/- 0.41	-0.07 +/- 0.01	-3.05 +/- 0.48
LYS 119	SO3 138	0.57 +/- 0.64	-96.17 +/- 3.13	70.26 +/- 2.66	-0.80 +/- 0.08	-26.13 +/- 3.10
LYS 121	PGB 128	-0.20 +/- 0.04	-17.65 +/- 1.36	15.36 +/- 0.70	-0.05 +/- 0.01	-2.55 +/- 0.82
LYS 121	QVB 129	-0.55 +/- 0.35	-17.99 +/- 1.35	11.35 +/- 0.68	-0.72 +/- 0.14	-7.91 +/- 1.38
LYS 121	BN1 137	-1.31 +/- 0.32	-5.24 +/- 0.39	4.85 +/- 0.33	-1.34 +/- 0.22	-3.04 +/- 0.47
LYS 121	SO3 138	-0.26 +/- 0.16	-58.17 +/- 7.68	51.26 +/- 3.23	-0.22 +/- 0.10	-7.39 +/- 4.89
LYS 121	SO3 139	0.99 +/- 0.09	-85.05 +/- 4.91	61.23 +/- 1.95	-0.55 +/- 0.05	-23.38 +/- 4.40
LYS 123	PGB 128	-0.33 +/- 0.03	-26.04 +/- 0.91	18.17 +/- 0.61	-0.67 +/- 0.08	-8.86 +/- 0.74
LYS 123	QVB 129	-0.41 +/- 0.11	-17.37 +/- 0.76	8.81 +/- 0.68	-0.38 +/- 0.07	-9.35 +/- 0.65

3-MK2	Residues	VDW	Electrost.	PS	Non-PS	Global
LYS 123	BZ1 136	-1.57 +/- 0.34	-2.82 +/- 1.26	3.00 +/- 0.65	-1.36 +/- 0.11	-2.75 +/- 0.72
LYS 123	BN1 137	-0.85 +/- 0.38	-5.68 +/- 0.26	4.55 +/- 0.11	-0.85 +/- 0.21	-2.83 +/- 0.58
LYS 123	SO3 138	0.46 +/- 0.01	-86.49 +/- 4.05	59.95 +/- 1.44	-0.65 +/- 0.04	-26.74 +/- 4.00
LYS 123	SO3 139	-0.03 +/- 0.00	-38.94 +/- 1.84	36.73 +/- 1.28	0.00 +/- 0.00	-2.23 +/- 0.63

**A.99.** *Tabla de energías de enlaces efectivas (kcal/mol) mediante la descomposición por residuo a través del método MM-PBSA a partir de los resultados de dinámica molecular libres y MD-TAR para la serie pentasacáridica con la conformación en forma de bisagra de la MK (contribución energética favorable  $E_{global} < -1.20$  kcal/mol).*



