REFERENCES

Ashley, E., McGready, R., Proux, S. & Nosten, F. 2006. Malaria. *Travel Medicine and Infectious Disease,* 4:159-173.

Atwell, G.J., Bos, C.D., Baguley, B.C. & Denny, W.A. 1988. Potential "minimal" DNA-intercalating ligands as antitumor drugs: Phenylquinoline-8-carboxamides. *Journal of Medicinal Chemistry,* 31:1048-1052.

Ayad, F., Tilley, L. & Deady, L.W. 2001. Synthesis, antiplasmodial activity and inhibition of haem detoxification of novel bisquinolines. *Bioorganic & Medicinal Chemistry Letters*, 11:2075-2077

Bawa, S., Kumar, S., Drabu, S. & Kumar, R. 2010. Structural modifications of quinoline-based antiplasmodial agents: Recent developments. *Journal of Pharmacy and Bioallied Sciences*, 2(2):64-71.

Bell, D., Wangsrichanalai, C. & Barnwell, J.W. 2006. Ensuring quality and access for malaria diagnosis: how can it be achieved? *Nature Reviews Microbiology,* 4:682-695.

Berg, J.M., Tymoczko, J.L. & Stryer, L. 2002. Biochemistry. 5th ed. New York: W H Freeman.

Biagini, G.A., O'neill, P.M., Nzila, A., Ward, S.A. & Bray, P.G. 2003. Antiplasmodial chemotherapy: Young guns or back to the future? *Trends in Parasitology*, 19(11):479-487.

Blagbrough, I.S., Carrington, S. & Geall, A.J. 1997. Plyamines and polyamine amides as potent selective receptor probes, novel therapeutic lead compounds and synthetic vectors in gene therapy. *Pharmaceutical Sciences*, 3:223-233.

Bray, P.G., Martin, R.E., Tilley, L., Ward, S.A., Kirk, K. & Fidock, D.A. 2005. Micro Review, defining the role of PfCRT in *Plasmodium falciparum* chloroquine resistance. *Molecular Microbiology*, 56(2):323-333.

Breman, J.G., Galileo, M.S. & Mills, A. 2004. Conquering the intolerable burden of malaria: what's new, what's needed: A summary. *The American Journal of Tropical Medicine and Hygiene,* 71(2):1-15.

Buller, R., Peterson, M.L., Larsson, O. & Leiserowitz, L. 2002. Quinoline binding site on malaria pigment crystal: A rational pathway for antiplasmodial drug design. *Crystal growth & Design,* 2(6):553-562.

Caffrey, C.R., Steverding, D., Swenerton, R.K., Kelly, B., Walshe, D., Debnath, A., Zhou, Y., Doyle, P.S., Fafarman, A.T., Zorn, J.A., Land, K.M., Beauchene, J., Schreiber, K., Moll, H., Ponte-sucre, A., Schirmeister, T., Saravanamuthu, A., Fairlamb, A.H., Cohen, F.E., McKerrow, J.H., Weisman, J.L. & May, B.C.H. 2007. Bis-acridines as lead antiparasitic agents: Structure-activity analysis of a discrete compound library in vitro. *Antimicrobial Agents and Chemotherapy*, 51(6):2164-2172.

Canfield, C.J., Pudney, M & W Gutteridge, W.E. 1995. Interactions of atovaquone with other antiplasmodial drugs against *Plasmodium falciparum in vitro*. *Experimental Parasitology*, 80(3):373-381

CDC (Centre for Disease Control). 2009. *Plasmodium falciparum* life cycle. Atlanta Georgia. http://www.dpd.cdc.gov/dpdx (Date of access: 4 December 2011).

Chong, C.R. & Sullivan Jr. D.J. 2003. Inhibition of heme crystal growth by antiplasmodials and other compounds: implications for drug discovery. *Biochemical Pharmacology*, 66:2201-2212.

Chou, A.C., Chevli, R. & Fitch, C.D. 1980. Ferriprotoporphyrin IX fulfils the criteria for identification as the chloroquine receptor of malaria parasites. *Biochemistry,* 19:1543-1549.

Clark, I.A. & Schofield, L. 2000. Pathogenesis of malaria. *Parasitology Today*, 16(10):451-4.

De Villiers, K.A., Osipova, M., Mabotha, T.E., Solomonov, I., Feldman, Y., Kjaer, K., Weissbuch, I., Egan, T.J., & Leiserowitz, L. 2009. Oriented nucleation of β-haematin crystals induced at various interfaces: Relevance to hemozoin formation. *Crystal Growth & Design*, 9(1):626-632.

De, D., Krogstad, F.M., Byers, L.D. & Krogstad, D.J. 1998. Structure-activity relationship for antiplasmodial activity among 7-substituted 4-aminoquinolines. *Journal of Medicinal Chemistry*, 41:4918-4926.

Deady, L.W., Desneves, J., Kaye, A.J., Finlay, G.J., Baguley, B.C. & Denny, W.A. 2000. Synthesis and antitumor activity of some indeno[1,2-b]quinoline-based biscarboxamides. *Bioorganic & Medicinal Chemistry*, 8:977-984.

Dondorp, A.M. 2005. Review Pathophysiology, clinical presentation and treatment of cerebral malaria. *Neurology Asia*, 10:67-77.

Dorn, A., Vippagunta, S.R., Matile, H., Jaquet, C., Vennerstrom, J.L. & Ridley, R.G. 1998. An assessment of drug-haematin binding as a mechanism for inhibition of haematin polymerisation by quinoline antiplasmodials. *Biochemical Pharmacology*, 55:727-736.

Egan, T.J., Hunter, R., Kaschula, C.H., Marques, H.M., Misplon, A. & Walden, J. 2000. Structure-function relationships in aminoquinolines: Effect of amino and chloro groups on quinoline-hematin complex formation, inhibition of β-hematin formation, and antiplasmodial activity. *Journal of Medicinal Chemistry*, 43:283-291.

Egan, T.J., Mavuso, W.W. & Ncokazi, K. K. 2001. The mechanism of β-hematin formation in acetate solution. Parallels between hemozoin formation and biomineralisation processes. *Biochemistry*, 40:204-213.

Egan, T.J., Combrinck, J.M. Egan, J., Hearne, G.R., Marques, H.M., Ntenteni, S., Sewelll, B.T., Smith, P.J., Taylor, D., Van Schalckwyk, D.A. & Walden, J.C. 2002. Fate of heme iron in the malaria parasite Plasmodium falciparum. *Biochemical Journal*, 365:343-347.

Egan, T.J. 2003. Review, Hemozoin (malaria pigment): a unique crystalline drug target. *Targets,* 2(3):115-124.

Egan, T.J. 2006. Chloroquine and primaquine: combining old drugs as a new weapon against *falciparum* malaria? *Trends in Parasitology*, 22:235-237.

Egan, T.J. 2008. Recent advances in understanding the mechanism of hemozoin (malaria pigment) formation. *Journal of Inorganic Biochemistry*, 102:1288-1299.

Fidock, D.A., Nomura, T.,Talley, A.K., Cooper, R.A., Dzekunov, S.M., Ferdig, M.T., Ursos, L.M.B., Sidhu, A.B.S., Naude, B., Deitsch, K.W., SU, X., Wootton, J.C., Roepe, P.D. & Wellems, T.E. 2000. Mutations in the *P. falciparum* digestive vacuole transmembrane protein PfCRT and evidence for their role in chloroquine resistance. *Molecules and Cells*, 6(4):861-871.

Fidock, D.A., Rosenthal, P.J., Croft, S.L., Brun, R. & Nwaka, S. 2004. Antiplasmodial drug discovery: Efficacy models for compound screening. *Nature Reviews Drug Discovery,* 3:509-520.

Fitch, C.D. & Kanjananggulpan, P. 1987. The state of ferriprotoporphyrin IX in malaria pigment. *The Journal of Biological Chemistry,* 262(32):15552-15555.

Fitch, C.D. 2004. Ferriprotoporphyrin IX, phospholipids, and the antiplasmodial actions of quinoline drugs. *Life Sciences,* 74:1957-1972.

Fitch, C.D., Chen, Y. & Cai, G. 2003. Chloroquine-induced masking of a lipid that promotes ferriprotoporphyrin IX dimerisation in malaria. *The journal of Biological Chemistry,* 278(25):22596-22599.

Florence, L., Washburn, M.P., Raine, J.D., Anthony, R.M., Grainger, M., Haynes, J.D., Moch, J.K., Muster, N., Sacci, J.B., Tabb, D.L., Witney, A.A., Wolters, D., Wu, Y., Gardner, M.J., Holder, A.A., Sinden, R.E., Yates, J.R. & Carucci, D.J. 2002. A proteomic view of the *Plasmodium falciparum* life cycle. *Nature,* 419:520-526.

Foley, M. & Tilley, L. 1998. Quinoline antimalarials: mechanisms of action and resistance and prospects for new agents. *Pharmacology & Therapeutics,* 79(1):55-87.

Garrett, R.H. & Grisham, C.M., *eds.* 1997. Principles of Biochemistry, with a human focus. United States: Brooks/Cole Thomson Learning.

Ghosh, A. & Bansal, M. 2003. Aglossary of DNA structures from A to Z. *Acta. Crystallographica part D*, 59(4):620-6

Gilles, H.M. 1997. Pathology of malaria. (*In* Carosi, G. & Castelli, F., *eds*. Handbook of Malaria infection in the Tropics, Italy, 15, p. 1-6).

Girault, S., Grellier, P., Berecibar, A., Maes, L., Lemie`re, P., Mouray, E., Davioud-charvet, E. & Sergheraert, C. 2001. Antiplasmodial activity and cytotoxicity of bis-, tris-, and tetraquinolines with linear or cyclic amino linkers. *Journal of Medicinal Chemistry*, 44:1658-1665.

Goldberg, D.E. 2005. Hemoglobin degradation. (*In* Sullivan, D.J. & Krishna, S., *eds*. Malaria: Drugs, Disease and Post-genomic Biology. Heidelberg: Springer-Verlag. 295, p. 275-291).

Grimberg, B.T. & Mehlotra, R.K. 2011. Review, Expanding the antiplasmodial drug arsenal-Now, but how*? Pharmaceuticals*, 4:681-712.

Guillon, J., Grellier, P., Labaied, M., Sonnet, P., Le´ger, J., De´prez-poulain, R., Forfar-bares, I., Dallemagne, P., Lemaiˆtre, N., Pe´hourcq, F., Rochette, J., Sergheraert, C. & Jarry, C. 2004. Synthesis, antiplasmodial activity, and molecular modelling of new pyrrolo[1,2-*a*]quinoxalines, bispyrrolo[1,2-*a*]quinoxalines, bispyrido[3,2-*e*]pyrrolo[1,2-*a*]pyrazines and bispyrrolo[1,2-*a*]thieno[3,2-*e*]pyrazines. *Journal of Medicinal Chemistry*. 47:1997-2009.

Hempelmann, E., Motta, C., Hughes, R., Ward, S. A. & Bray, P.G. 2003. *Plasmodium falciparum:* Sacrificing membrane to grow crystals? *Trends in Parasitology*, 19(1):23-26.

Ismail, F.D.M., Dascombe, M.J., Carr, P., Merette, S.A.M. & Rouault, P. 1998. Novel aryl-bis-quinolines with antiplasmodial activity in vivo. *Journal of Pharmacy and Pharmacology*, 50:483-492.

Kaschula, C.H., Egan, T.J., Hunter, R., Basilico, N., Parapini, S., Tarmelli, D., Pasini, E. & Monti, D. 2002. Structure-activity relationships in 4-aminoquinoline antiplasmodials. The role of the group at the 7-position. *Journal of Medicinal Chemistry*, 45:3531-3539.

Katzung, B.G., Masters, S.B., & Trevor, A.J. 2001. Basic & Clinical Pharmacology. New York: McGraw-Hill Medical.

Kumar, S., Guha, M., Choubey, V., Maity, P. & Bandyopadhyay, U. 2007. Antiplasmodial drugs inhibiting hemozoin (β-hematin) formation: A mechanistic update. *Life Sciences,* 80:813-823.

Leed, A., Dubay, K., Ursos, L.M.B., Sears, D., De Dios, A.C. & Roepe, P.D. 2002. Solution structures of antiplasmodial drug-heme complexes. *Biochemistry*, 41:10245-10255.

Lin, A.J. & Loo, T.L. 1977. Synthesis and antitumor activity of halogen-substituted 4-(3,3-dimethyl-1-triazeno)quinolines. *Journal of Medicinal Chemistry*, 21(3):268-272.

Mabeza, G.F., Loyevsky, M., Gordeuk, V.R. & Weiss, G. 1999. Iron chelation therapy for malaria: A review. *Pharmacology & Therapeutics,* 81(1):53-75.

Madrid, P.B., Sherrill, J., Liou, A.P., Weisman, J.L., Derisi, J.L. & Guy, R.K. 2005. Synthesis of ring-substituted 4-aminoquinolines and evaluation of their antiplasmodial activities. *Bioorganic & Medicinal Chemistry Letters,* 15:1015-1018.

Mahalingam, M., Shankar, R., Butcher, R.J., Mohan, P.S. & Kolandaivel, P. 2010. Experimental and theoretical evaluation of dimerisation mechanism in the synthesis of 7H-6,8-dichloro-7-methylpyrano[3,2-*b*:3,2*b'*]diquinoline. *Journal of Molecular Structure*, 979:1-11.

Makler, M.T., Ries, J.M., Williams, J.A., Bancroft, J.E., Piper, R.C., Gibbins, B.L., Hinrichs, D.J. 1993. Parasite lactate dehydrogenase as an assay for Plasmodium falciparum drug sensitivity. The American Society of Tropical Medicine and Hygiene, 48:739-741.

Marom, N., Tkatchenko, A., Kapishnikov, S., Kronik, L., & Leiserowitz, L. 2011. Structure and formation of synthetic hemozoin: insights from first-principles calculations. *Crystal Growth & Design,* 11:3332-3341.

McFadyen, W.D., Denny, W.A. & Wakelin, L.P.G. 1988. Alkyl-linked diquinolines are monofunctional AT-selective DNA-intercalating agents. *Federation of European Biochemical Societies,* 228(2):235-240.

McMurry, J. 2004. Organic Chemistry. 6th ed. Belmont: Brooks/Cole.

Miller, L.H., Good, M.F. & Milon, G. 1994. Malaria pathogenesis. *Science,* 264: 1878 - 1883.
Miller, M.M. & Wasik, S.P. 1985. Relationships between octanol-water partition coefficient and aqueous solubility. *Environmental Science & Technology,* 19(6):522-529.

Mosmann, T. 1983. Rapid colorimetric assay for cellular growth and survival: Application to proliferation and cytotoxicity assays. *Journal of Immunological Methods,* 65:55-63.

Oh, S.S. & Chishti, A.H. 2005. Host receptors in malaria merozoite invasion. (*In* Sullivan, D.J. & Krishna, S., *eds*. Malaria: Drugs, Disease and Post-genomic Biology. Heidelberg: Springer-Verlag. 295, p. 203-232).

Olliaro, P.L. & Goldberg, D.E. 1995. The *Plasmodium* digestive vacuole: Metabolic headquarters and choice drug target. *Parasitology Today*, 11(8):294-296.

Olliaro, P.L. 2001. Mode of action and mechanisms of resistance for antiplasmodial drugs. *Pharmacology & Therapeutics,* 89:207-219.

Pisciotta, J.M. & Sullivan, D. 2008. Hemozoin: Oil versus water*. Parasitology Int*ernational, 57(2):89-96.

Plowe, C.V. 2005. Antiplasmodial drug resistance in Africa: Strategies for monitoring and deterrence. (*In* Sullivan, D.J. & Krishna, S. *eds*. Malaria: Drugs, Disease and Post-genomic Biology. Heidelberg: Springer-Verlag. 295, p. 55-79).

Plowe, C.V., Kublin, J.G. & Doumba, O.K. 1998. *P. Falciparum* dihydrofolate reductase and dihydropteroate synthase mutations: epidemiology and role in clinical resistance to antifolates. *Drug Resistance Updates*, 1:389-396.

Rayenes, K. 1999. Invited review Bisquinoline antiplasmodials: Their role in malaria chemotherapy. *International Journal for Parasitology*, 29:367-379.

Raynes, K., Foley, M., Tilley, L. & Deady, L.W. 1996. Novel bisquinoline antiplasmodials, Synthesis, antiplasmodial activity and inhibition of haem polymerization. *Biochemical Pharmacology*, 52:551-559.

Raynes, K., Galatis D., Cowman, A.F., Tilley, L. & Deady, L.W. 1995. Synthesis and activity of some antiplasmodial bisquinolines. *Journal of Medicinal Chemistry*, 38:204-206.

Ridley, R.G., Matile, H., Jaquet, C., Dorn, A., Hofheinz, W., Leupin, W., Masciadri, R., Theil, F., Richter, W.F., Girometta, M., Guenzi, A., Urwyler, H., Gocke, E., Potthast, J., Csato, M., Thomas, A. & Peters, W. 1997. Antimalarial activity of the bisquinoline trans-N1,N2-bis(7-chloroquinolin-4-yl)cyclohexane-1,2-diamine: Comparison of two stereoisomers and detailed evaluation of the S,S enantiomer, Ro 47-7737. *Antimicrobial Agents and Chemotherapy*, 41(3):677-686.

Rubinstein, L.V., Shoemaker, R.H., Paull, K.D., Simon, R.M., Tosini, S., Skehan, P., Scudiero, D.A., Monks, A. & Boyd, M.R. 1990. Comparison of in vitro anticancer-drug-screening data generated with a tetrazolium assay against a diverse panel of human tumour cell lines. *Journal of the National Cancer Institute,* 82:1113-8.

Sachs, J.D. 2002. A new global effort to control malaria. *Science*, 298(5591):122-124.

Scholl, P.F., Tripathi, A.K. & Sullivan, D.J. 2005. Bioavailible iron and heme metabolism in *Plasmodium falciparum*. (*In* Sullivan, D.J. & Krishna, S., *eds*. Malaria: Drugs, Disease and Post-genomic Biology. Heidelberg: Springer-Verlag. 295, p. 293-324).

Slater, A.F.G, Swiggard, W.J., Orton, B.R., Flitter, W.D., Goldberg, D.E., Cerami, A. & Henderson, G.B. 1991. An iron-carboxylate bond links the heme units of malaria pigment. *The Proceedings of the National Academy of Sciences USA*, 88:325-329.

Solomon, V.R., Puri, S.K., Srivastavab, K., Katti, S.B. 2005. Design and synthesis of new antimalarial agents from 4-aminoquinoline. *Bioorganic & Medicinal Chemistry*, 13:2157-2165.

Strivastava, I.K. & Vaidya, A.B. 1999. A mechanism for the synergistic antiplasmodial action of atovaquone and proguanil. *Antimicrobial Agents and Chemotherapy*, 43(6):1334-1339.

Sullivan, D.J. 2002. Review Theories on malarial pigment formation and quinoline action. *International Journal for Parasitology*, 32:1645-1653.

Sullivan, D.J., Gluzman, I.Y., Russel, D.G. & Goldberg, D.E. 1996. On the molecular mechanism of chloroquine's antiplasmodial action. *The Proceedings of the National Academy of Sciences USA*, 93:11865-11870.

Sullivan, D.J., Matile, H., Ridley, R.G. & Goldberg, D.E. 1998. A common mechanism for blockade of heme polymerization by antiplasmodial quinolines. *The Journal of Biological Chemistry*, 273(47):31103-31107.

Sweetman, S.C. 2009. Martindale: The complete drug reference. United Kingdom: Pharmaceutical Press.

Trager, W., Jensen, J.B. 1976. Human malaria parasite in continuous culture. *Science*, 193(4254):673-676.

Van Schalkwyk, D.A. & Egan, T.J. 2006. Quinoline-resistance reversing agents for the malaria parasite *Plasmodium falciparum*. *Drug Resistance Updates*, 9:211-226.

Vangapandu, S., Jain, M., Kaur, K., Patil, P., Patel, R. & Jain, R. 2006. Review Recent advances in antiplasmodial drug development. *Medicinal Research Reviews*, 27(1):65-107.

Vennerstrom, J.L., Ager, A.L., Dorn, A., Andersen, S.L., Gerena, L., Ridley, R.G. & Milhous, W.K. 1998. Bisquinolines. 2. Antiplasmodial *N,N*-Bis(7-chloroquinolin-4-yl)heteroalkanediamines. *Journal of Medicinal Chemistry*, 41:4360-4364.

Vennerstrom, J.L., Ellis, W.Y., Ager, A.L., Andersen, S.L., Gerena, L. & Milhous, W.K. 1992. Bisquinolines. 1. *N,N*-Bis(7-chloroquinolin-4-yl)alkanediamines with potential against chloroquine-resistant malaria. *Journal of Medicinal Chemistry*, 35:2129-2134.

Vippagunta, S.R., Dorn, A., Matile, H., Bhattacharjee, A.K., Karle, J.M., Ellis, W.Y., Ridley, R.G. & Vennerstrom, J.L. 1999. Structural specificity of chloroquine-hematin binding related to inhibition of hematin polymerization and parasite growth. *Journal of Medicinal Chemistry,* 42:4630-4639.

Warhurst, D.C., Craig, J.C., Adagu, I.S., Meyer, D.J. & Lee, S.T. 2003. The relationship of physic-chemical properties and structure to the differential antiplasmodial activity of the cinchona alkaloids. *Malaria Journal*, 2:1-14.

Weissbuch, I. & Leiserowitz, L. 2008. Interplay between malaria, crystalline hemozoin formation, and antiplasmodial drug action and design. *Chemical Reviews,* 108:4899-4914.
Wellems, T.E. 2002. *Plasmodium* Chloroquine Resistance and the search for a replacement antiplasmodial drug, *Science*, 298(5591):124-126.

White, N.J. 2002. Malaria. (*In* Cook, G.C. & Zumla, A.I., *eds*. Manson's tropical diseases. Philadelphia: Saunders Ltd. p. 1201-1300).

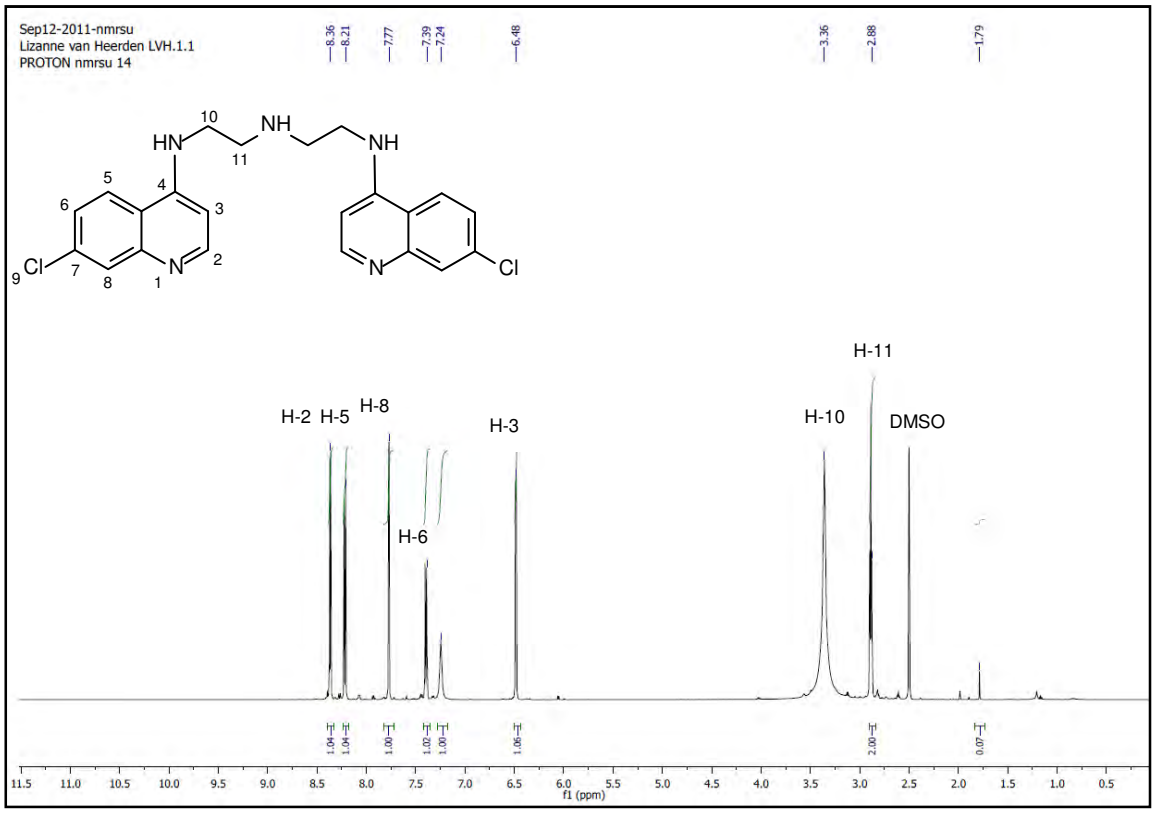
WHO (World Health Organisation). 2010. World Malaria Report. Geneva. p. 51-75
(Technical report series 857)

Yayon, A., Cabantchik, Z.I., & Ginsburg, H. 1984. Identification of the acidic compartment of *Plasmodium falciparum* infected human erythrocytes as the target of the antiplasmodial drug chloroquine. *The EMBO Journal*, 3(11):2695-2700.

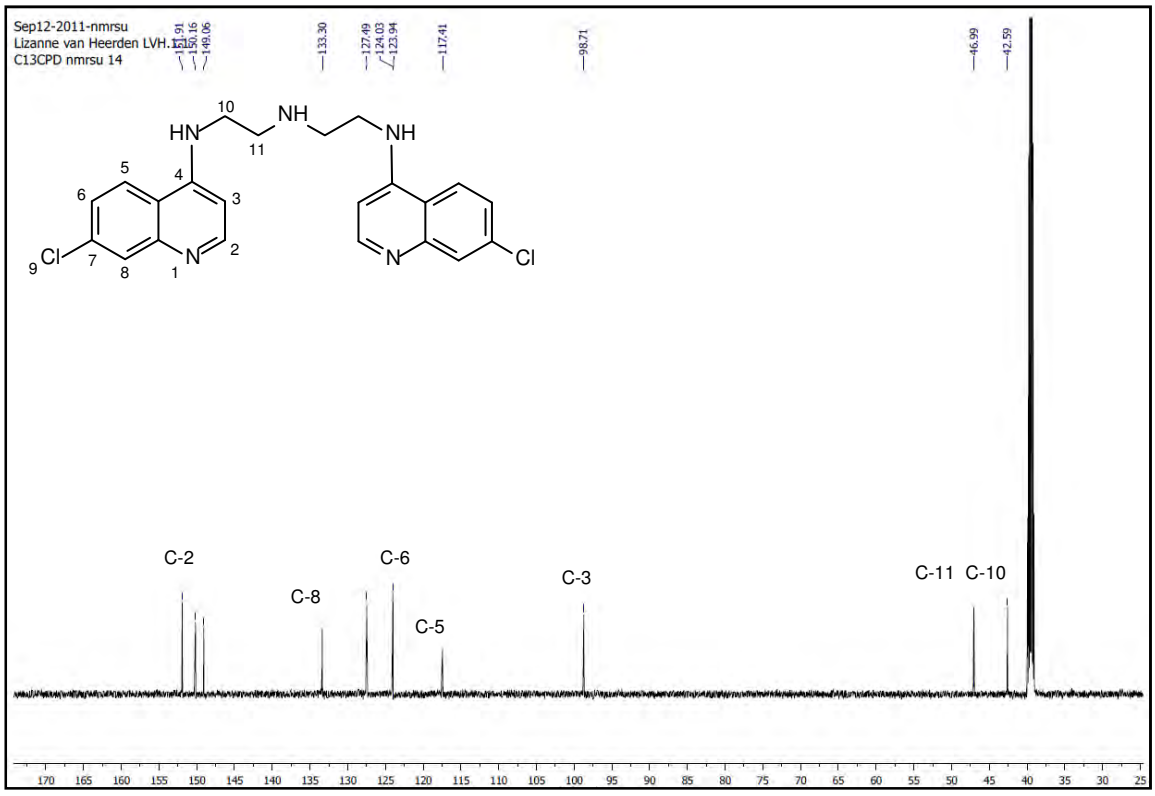
Yayon, A., Cabantchik, Z.I., & Ginsburg, H. 1985. Susceptibility of human malaria parasites to chloroquine is pH dependent. *The Proceedings of the National Academy of Sciences USA*, 82:2784-2788.

Appendix A: Spectra

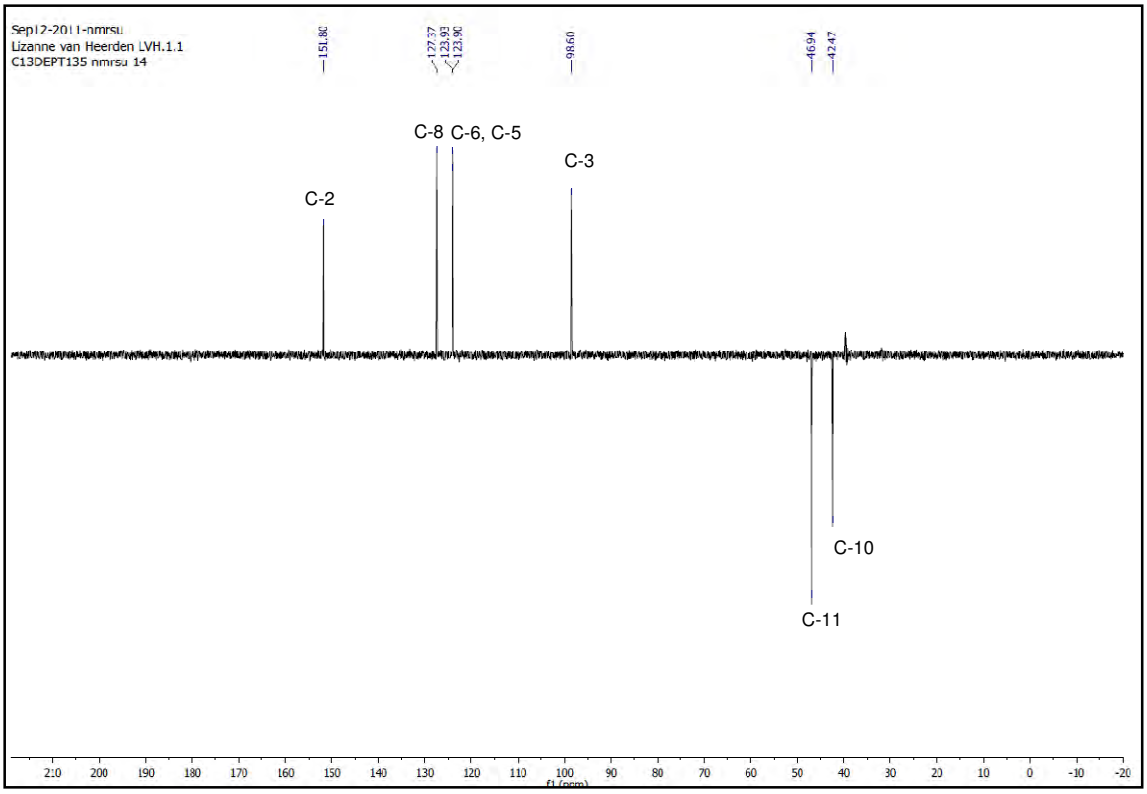
Spectrum 1: ^{1}H NMR of compound 4



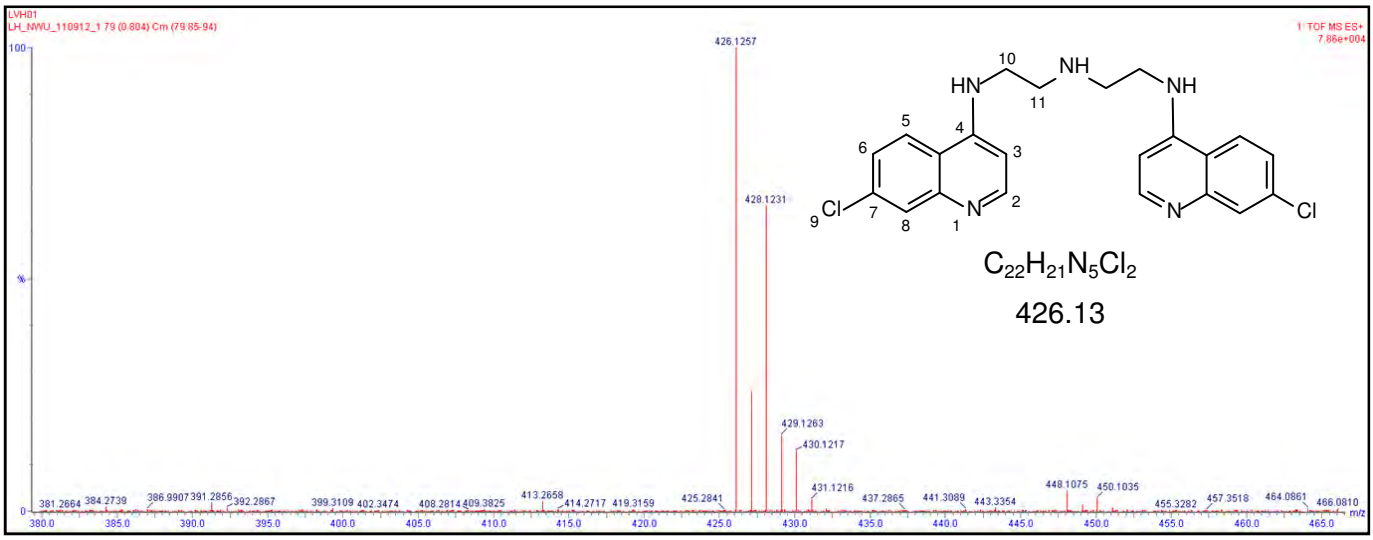
Spectrum 2: ^{13}C NMR of compound 4



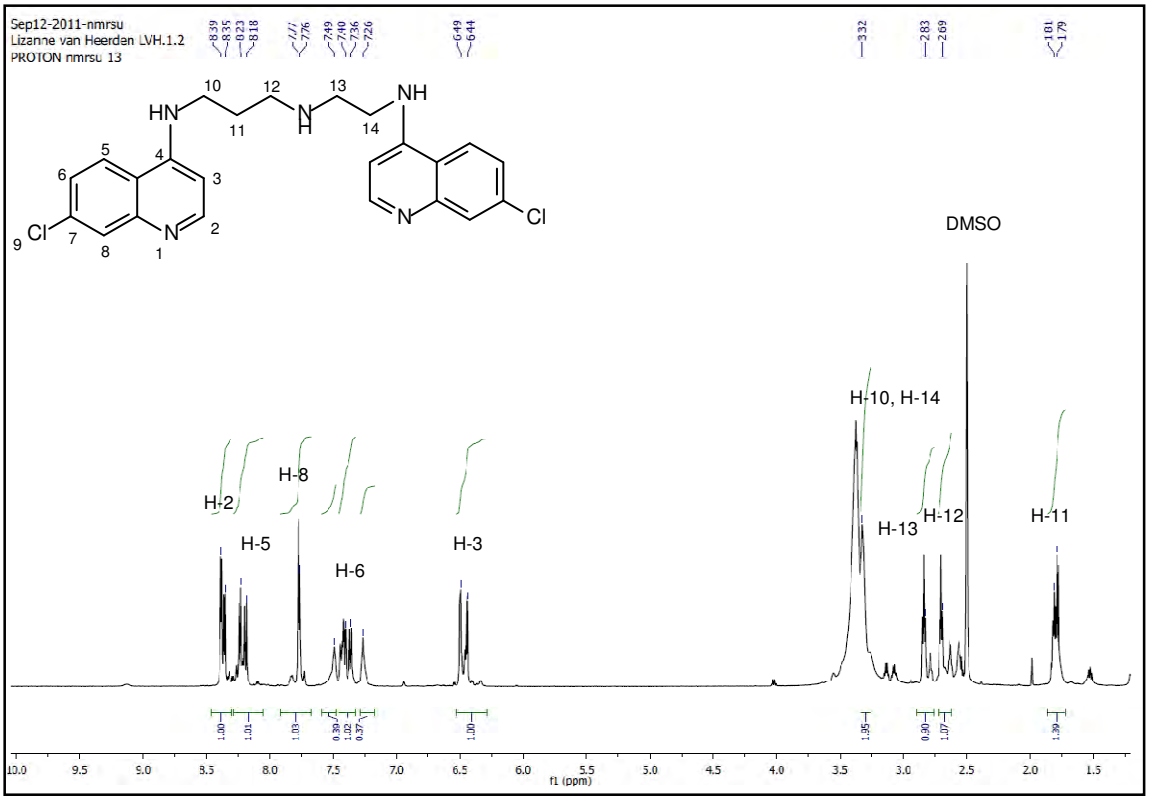
Spectrum 3: DEPT 135 NMR of compound 4



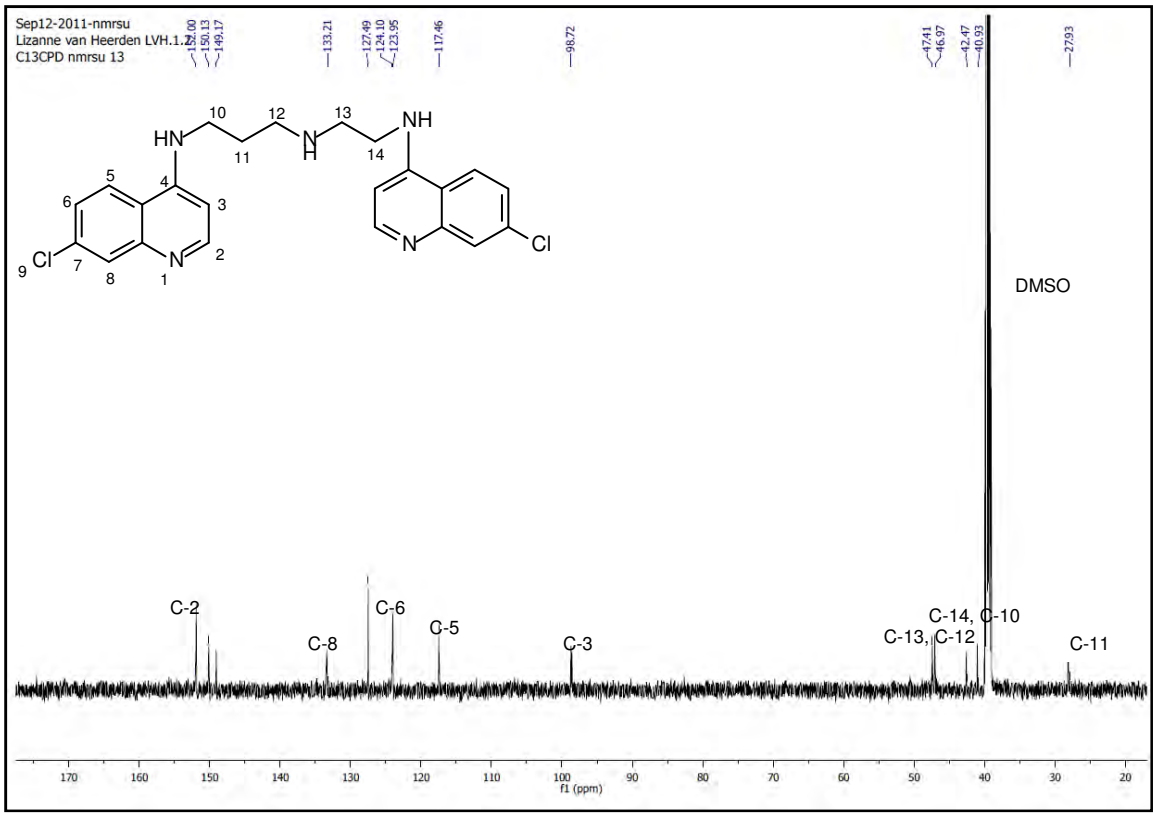
Spectrum 4: MS ES+ of compound 4



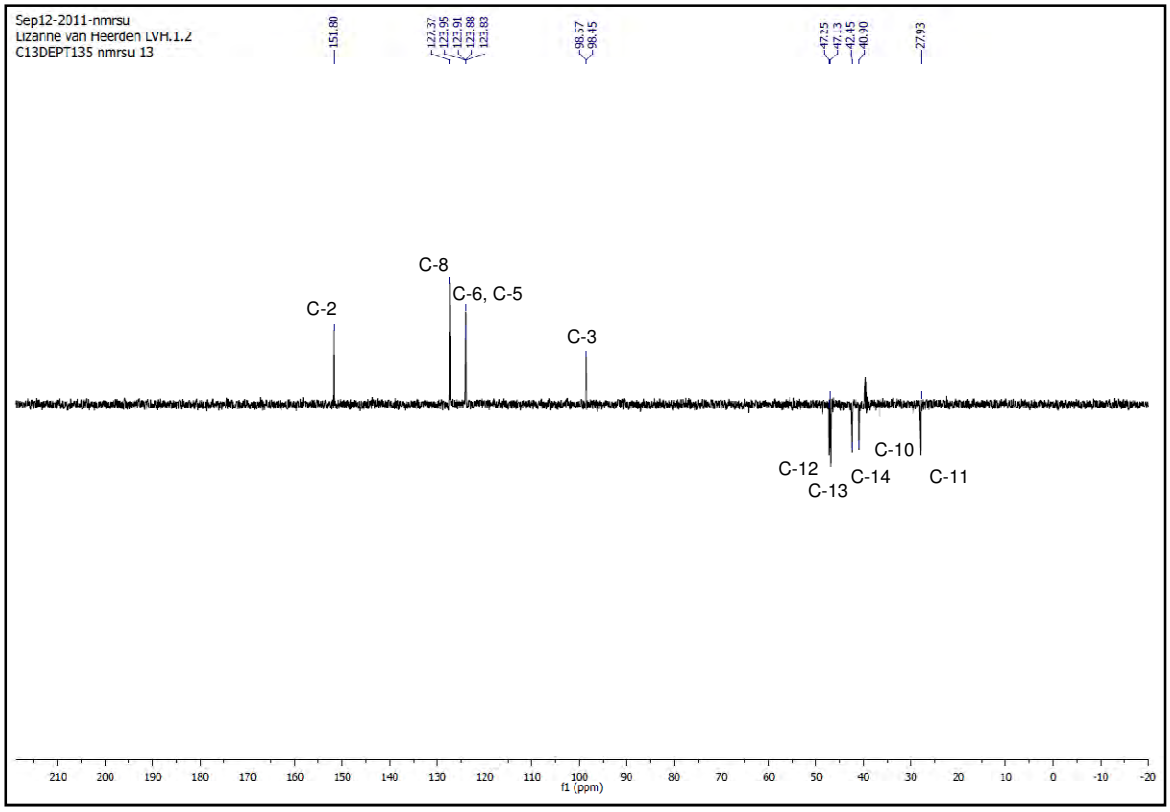
Spectrum 5: ^{1}H NMR of compound 5



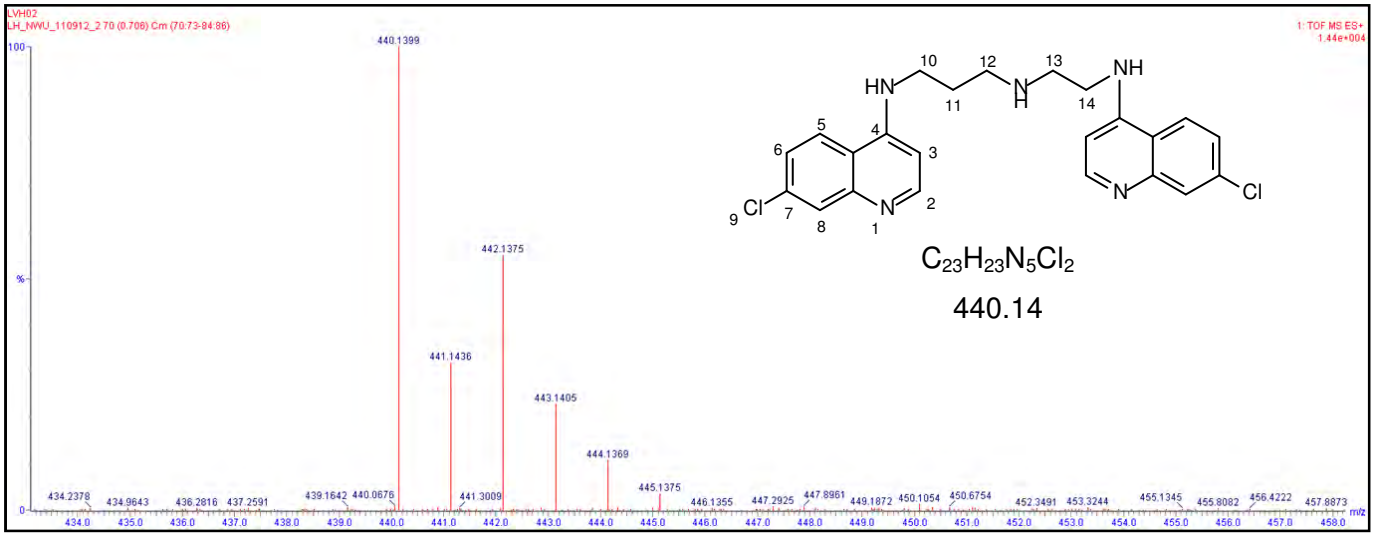
Spectrum 6: ^{13}C NMR of compound 5



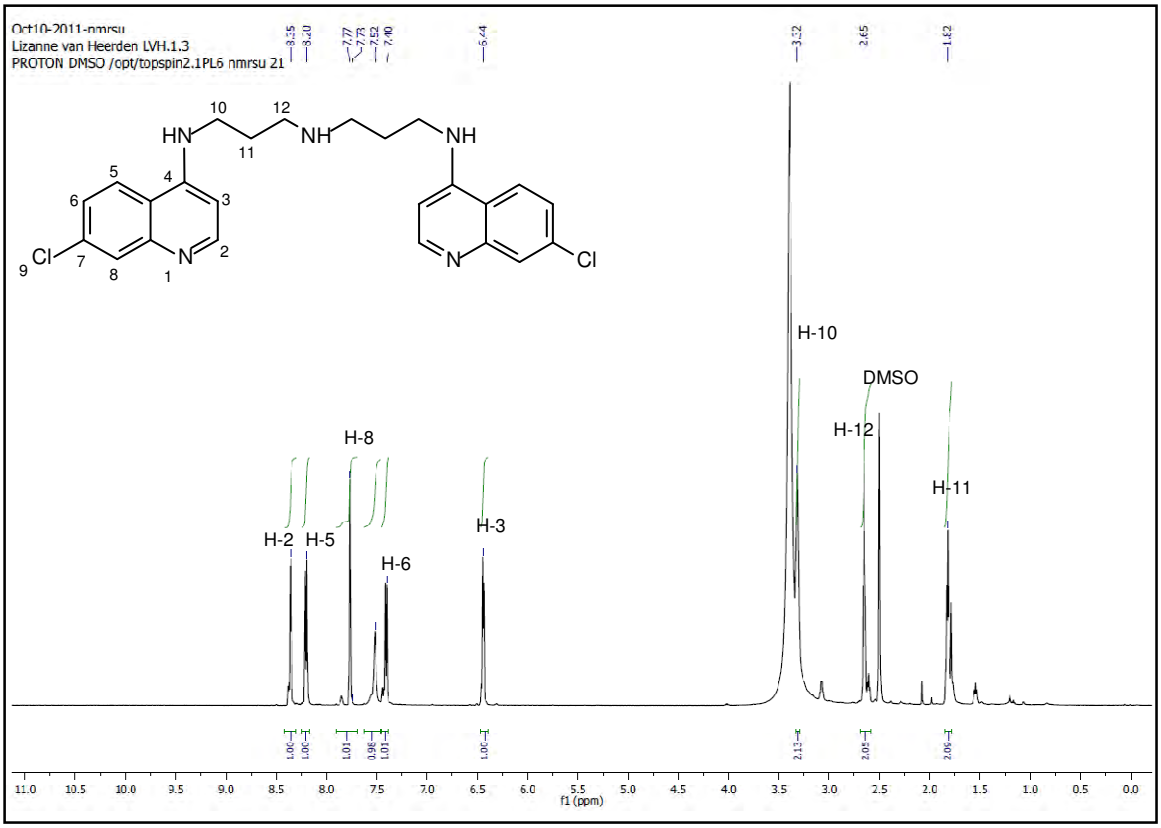
Spectrum 7: DEPT 135 NMR of compound 5



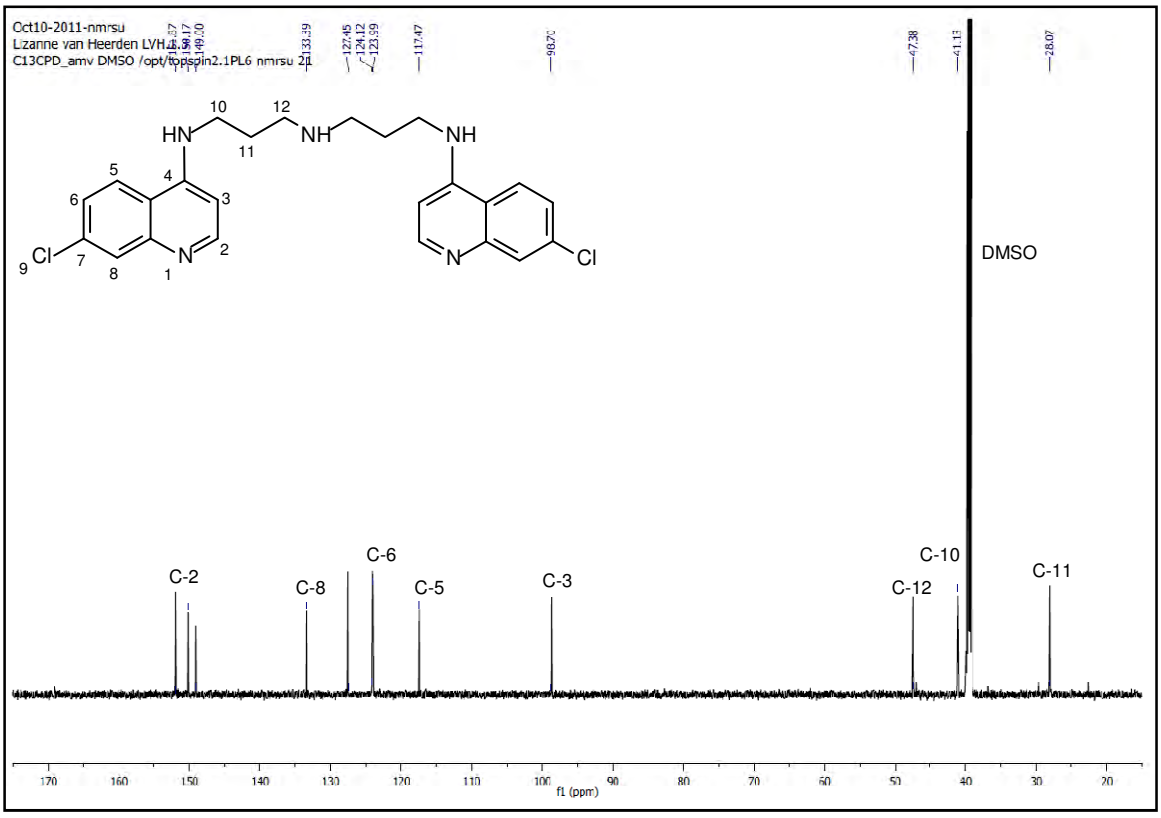
Spectrum 8: MS ES+ of compound 5



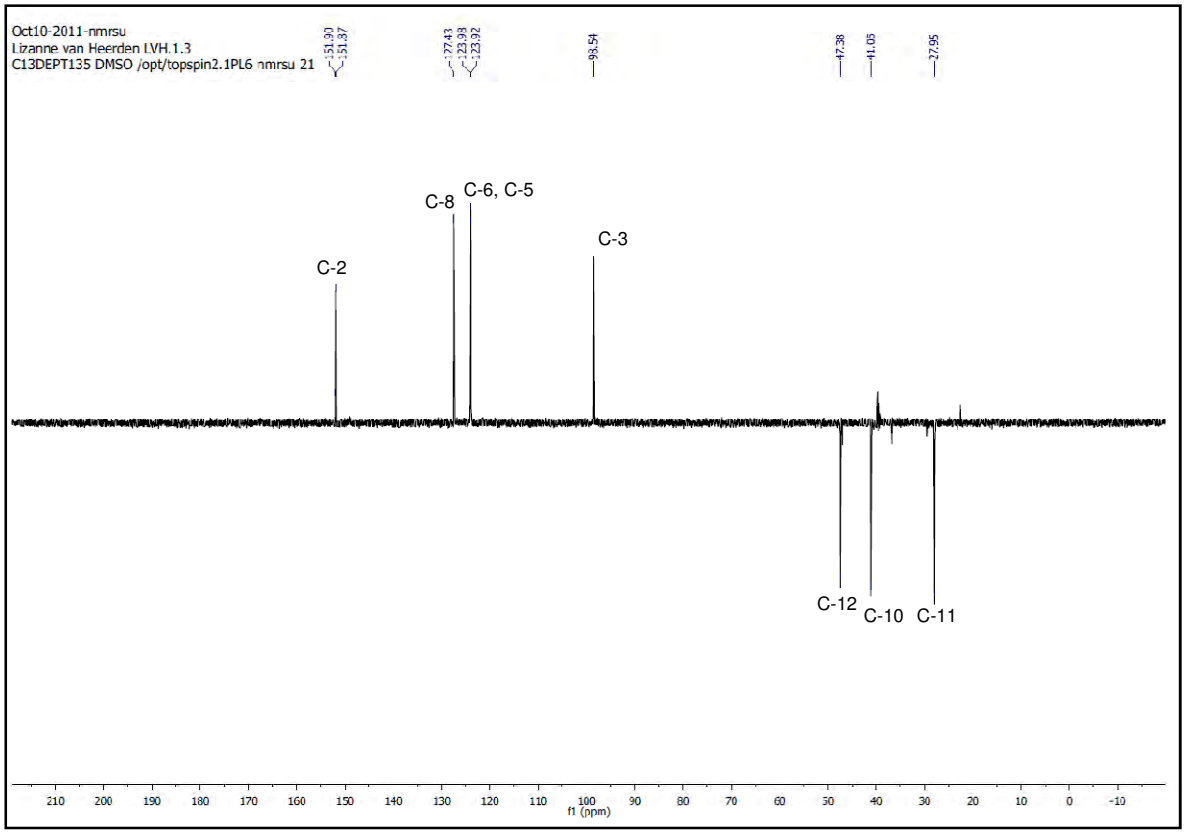
Spectrum 9: ^{1}H NMR of compound 6



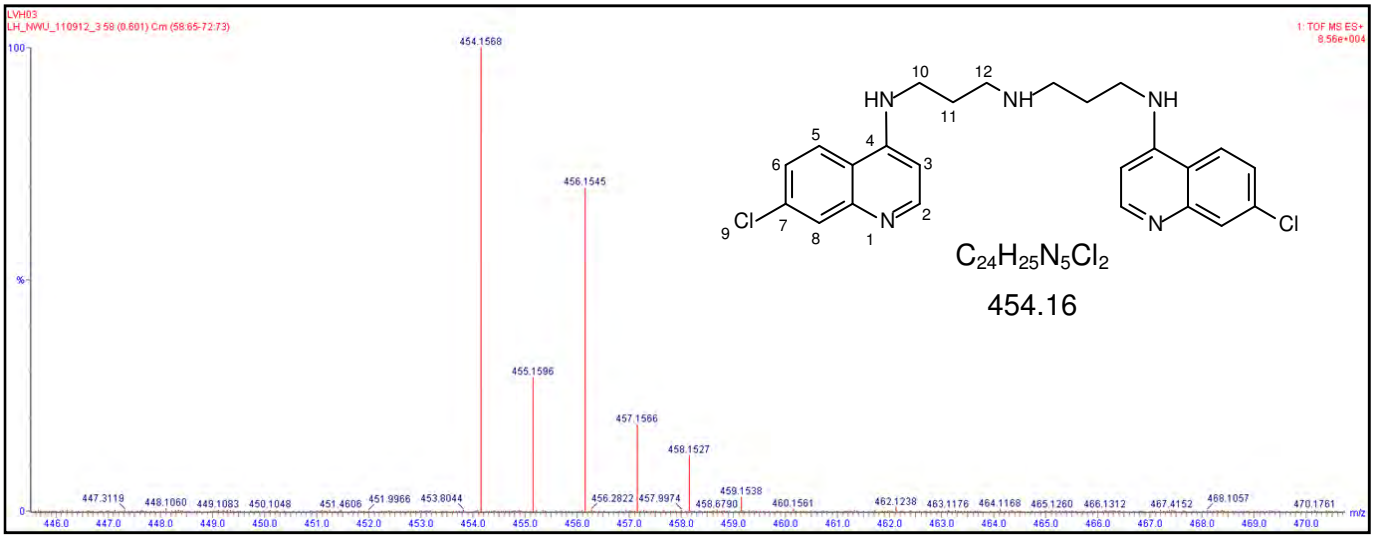
Spectrum 10: ^{13}C NMR of compound 6



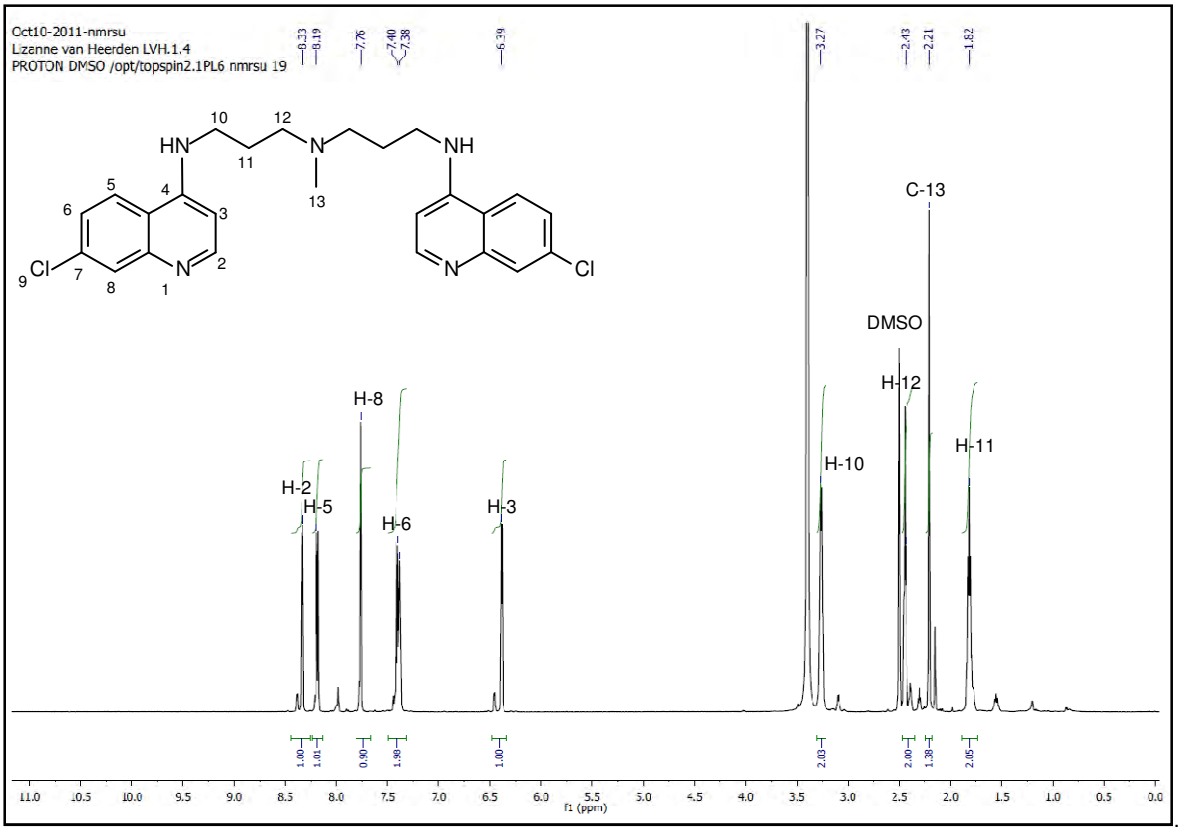
Spectrum 11: DEPT 135 NMR of compound 6



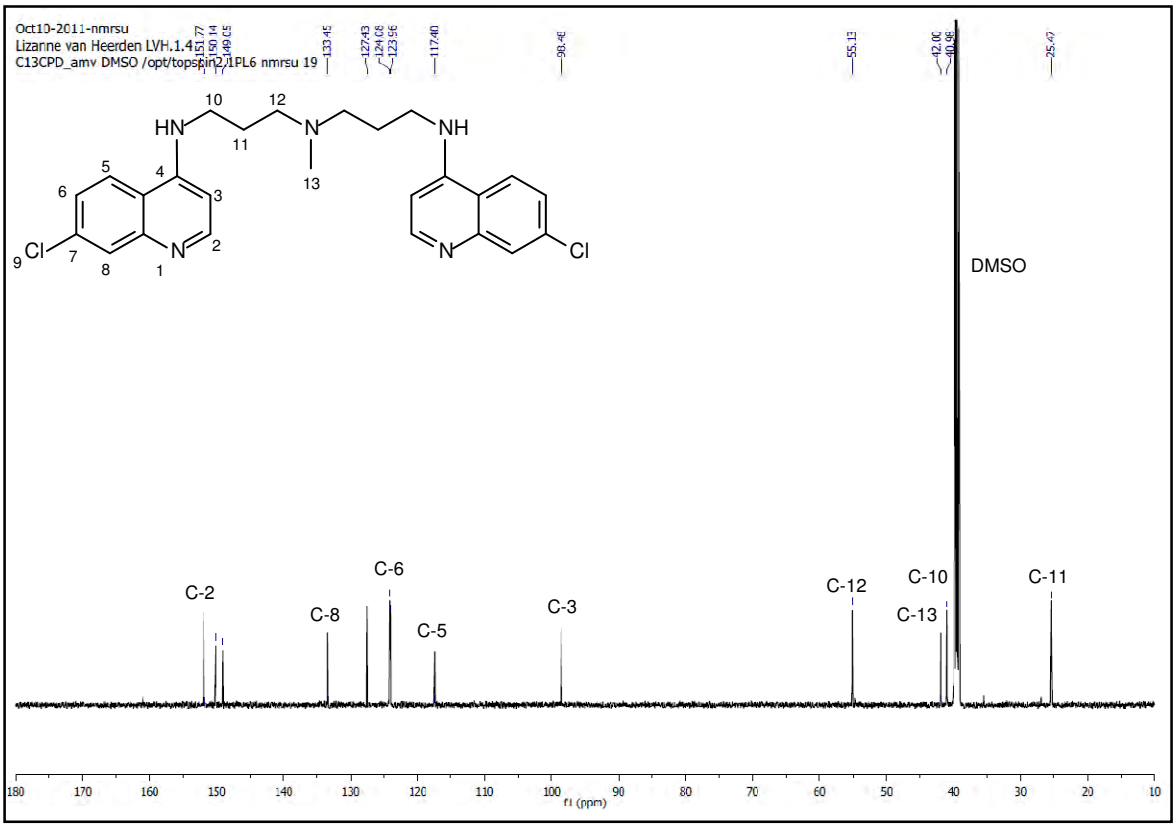
Spectrum 12: MS ES+ of compound 6



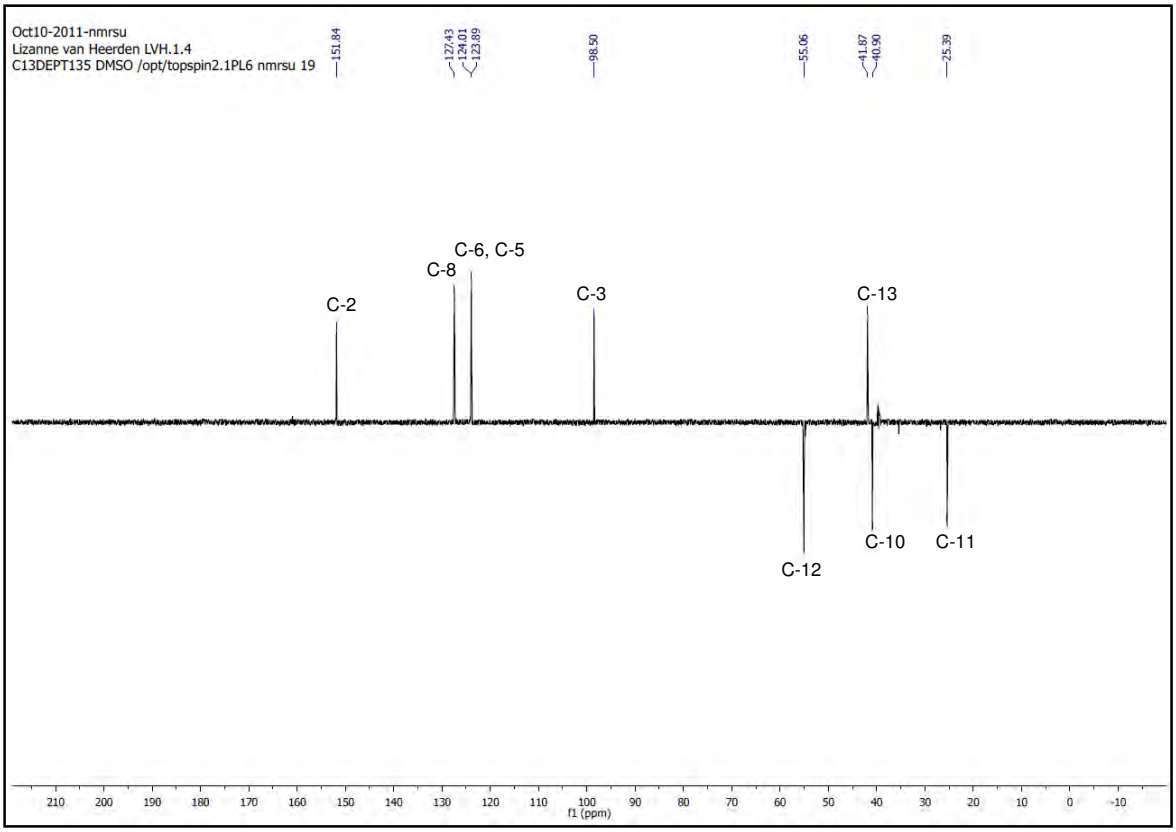
Spectrum 13: ^{1}H NMR of compound 7



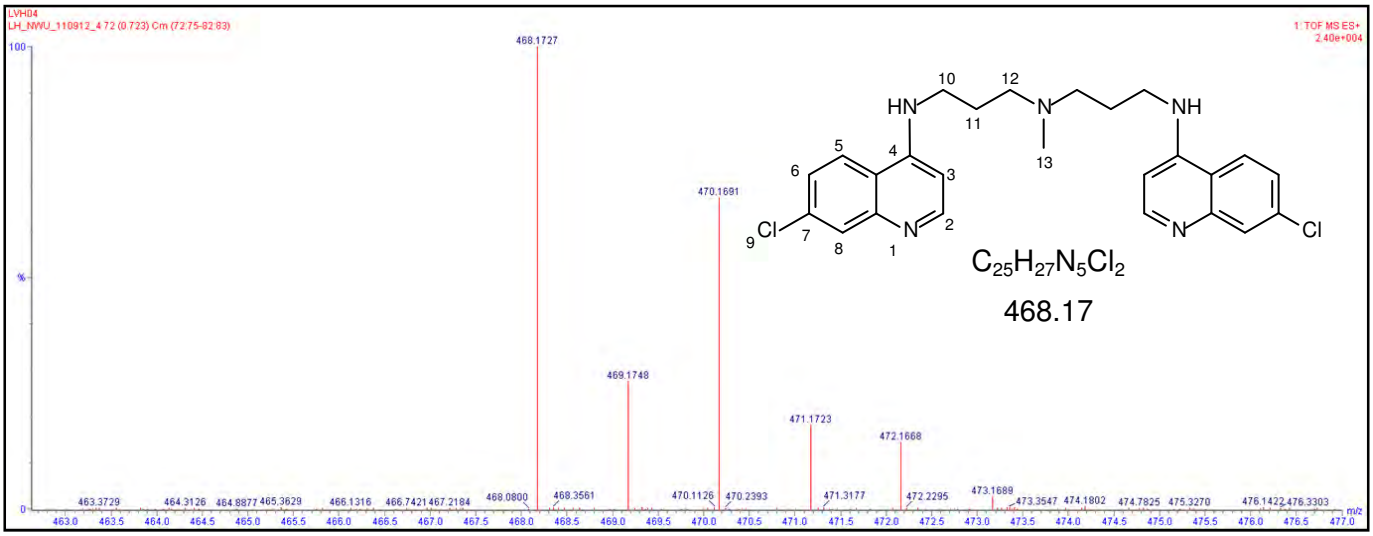
Spectrum 14: ^{13}C NMR of compound 7



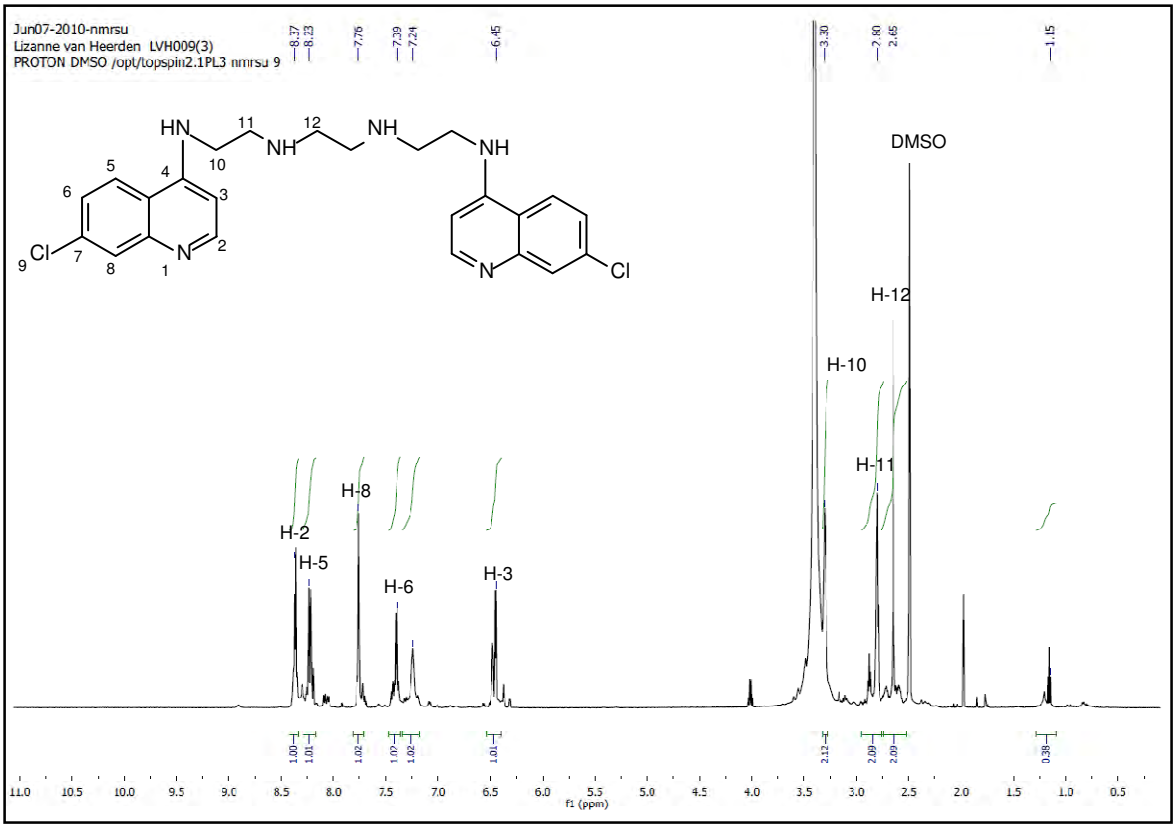
Spectrum 15: DEPT 135 NMR of compound 7



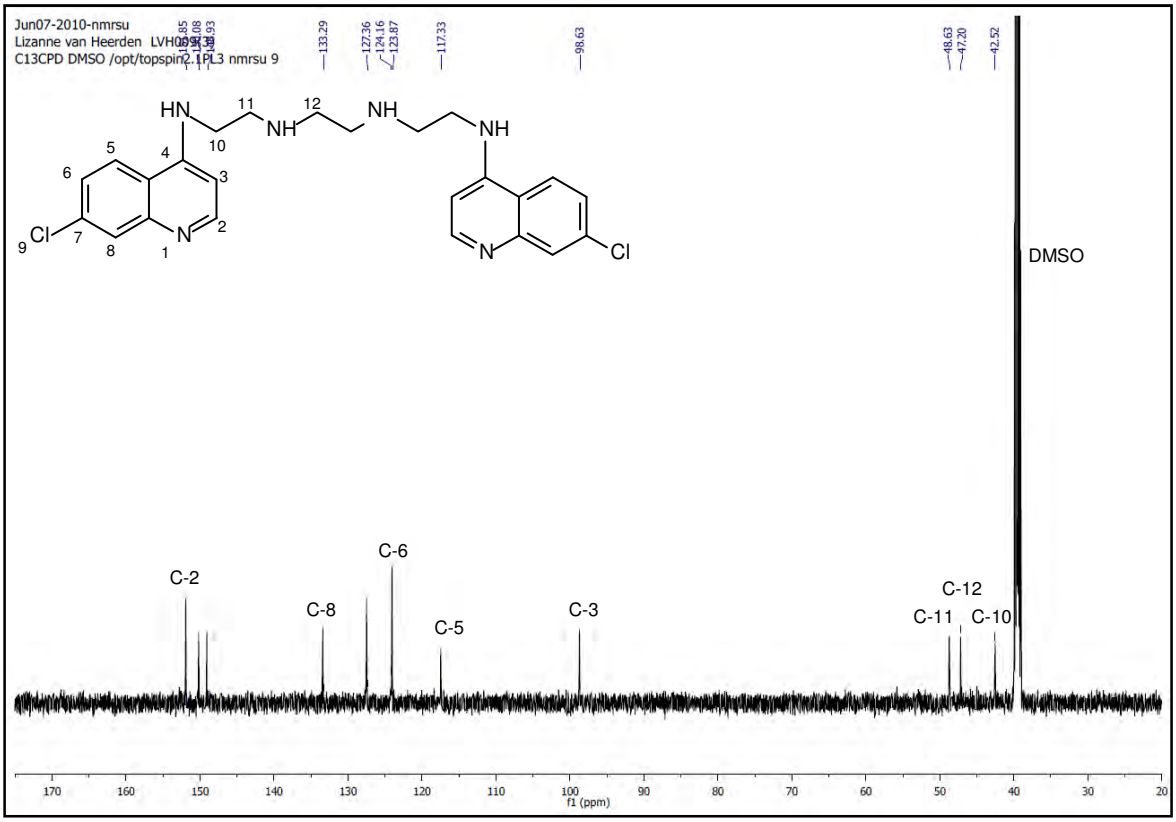
Spectrum 16: MS ES+ of compound 7



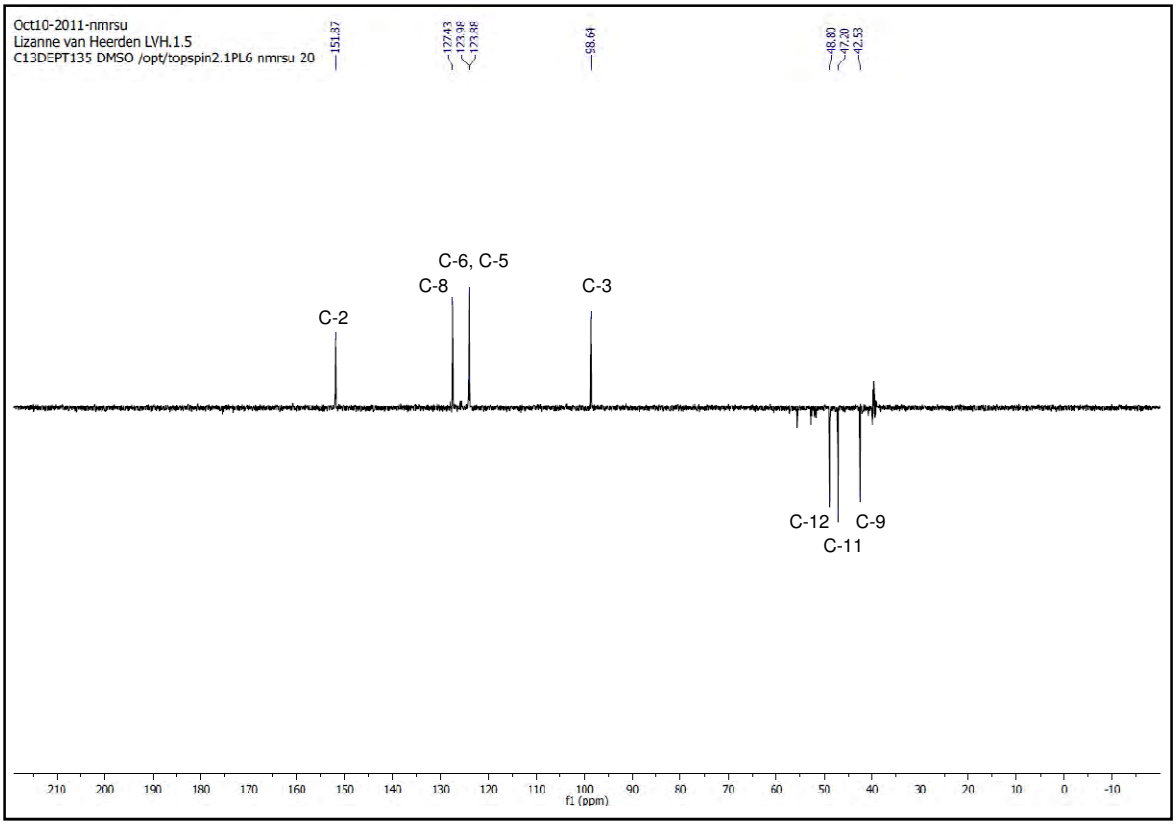
Spectrum 17: ^{1}H NMR of compound 8



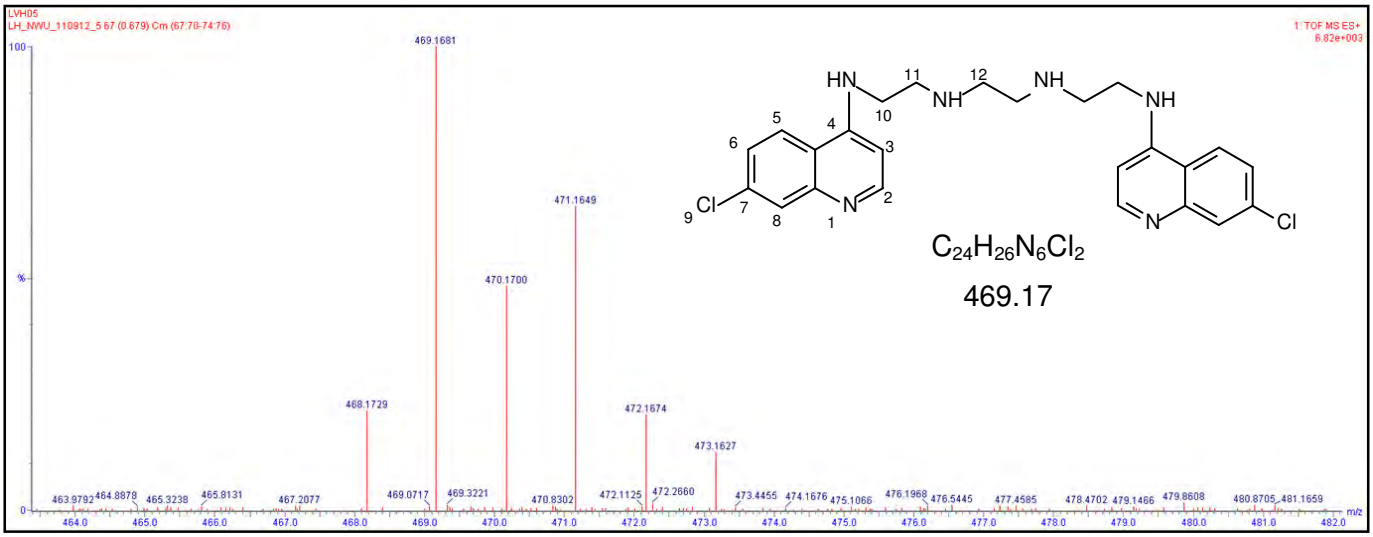
Spectrum 18: ^{13}C NMR of compound 8



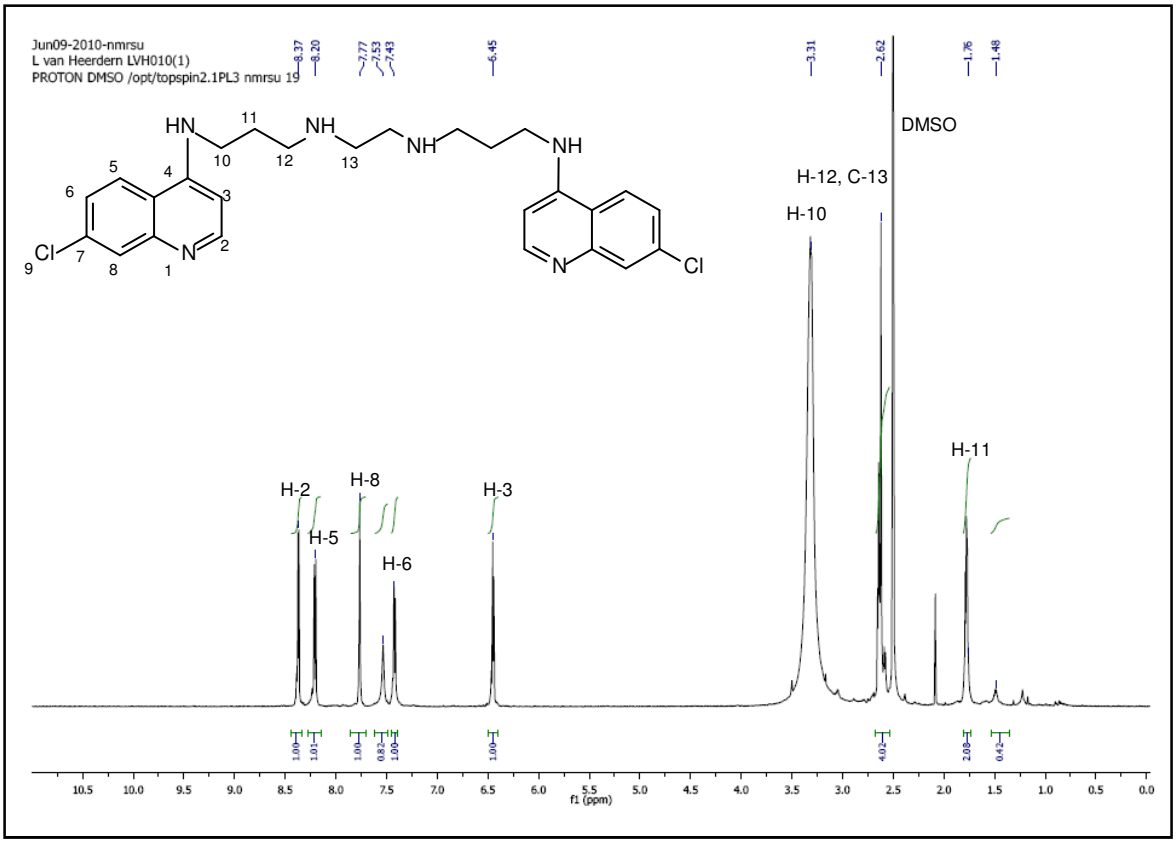
Spectrum 19: DEPT 135 NMR of compound 8



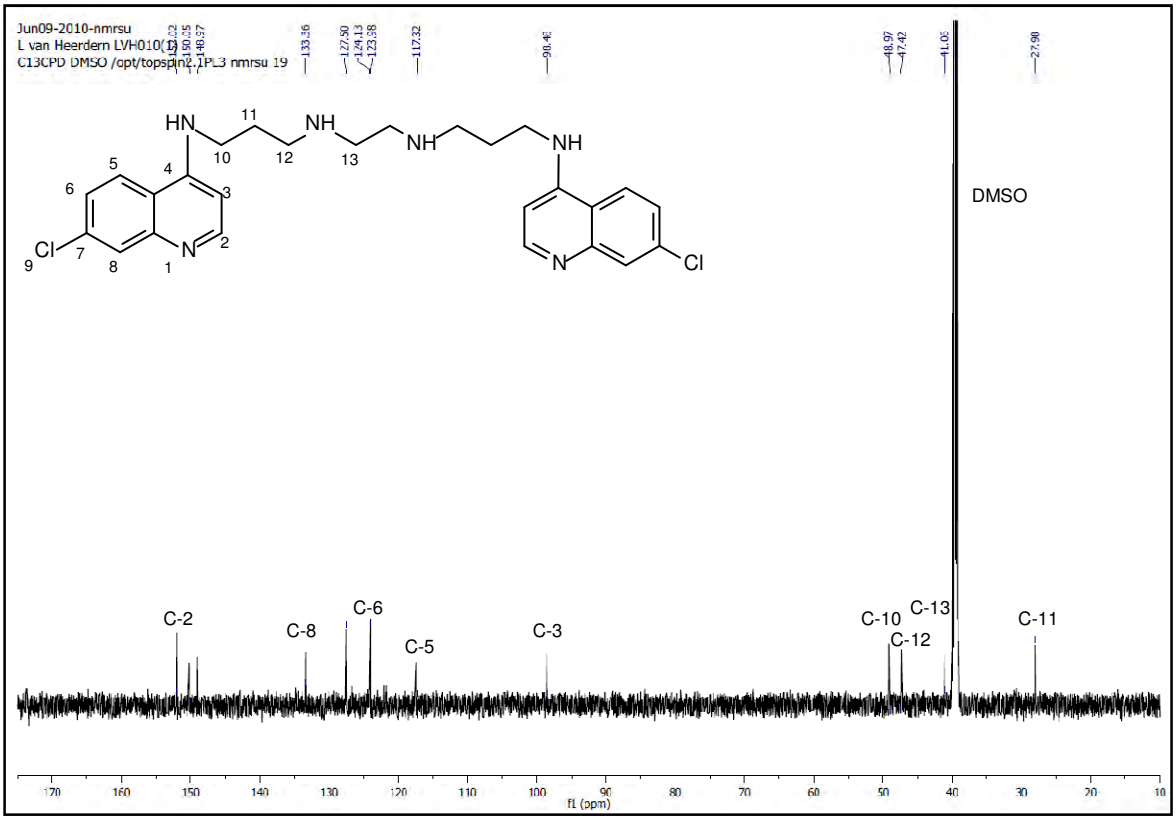
Spectrum 20: MS ES+ of compound 8



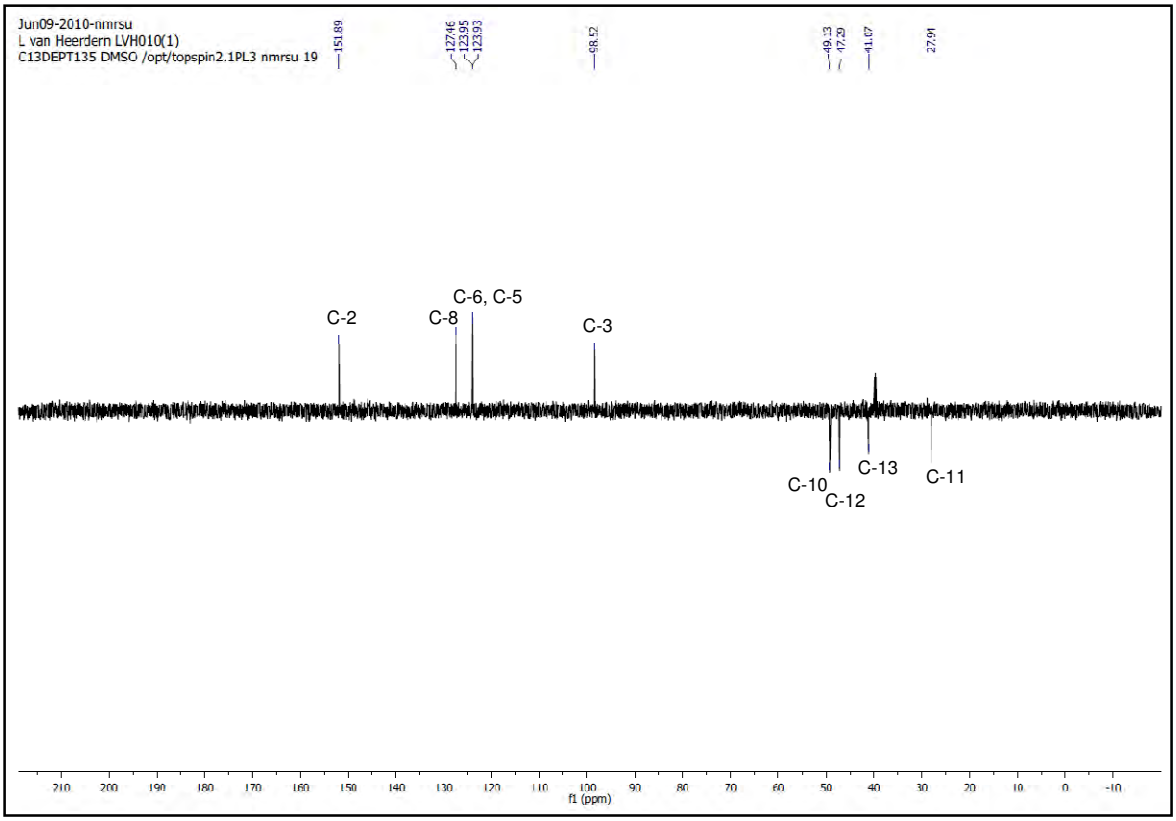
Spectrum 21: ^{1}H NMR of compound 9



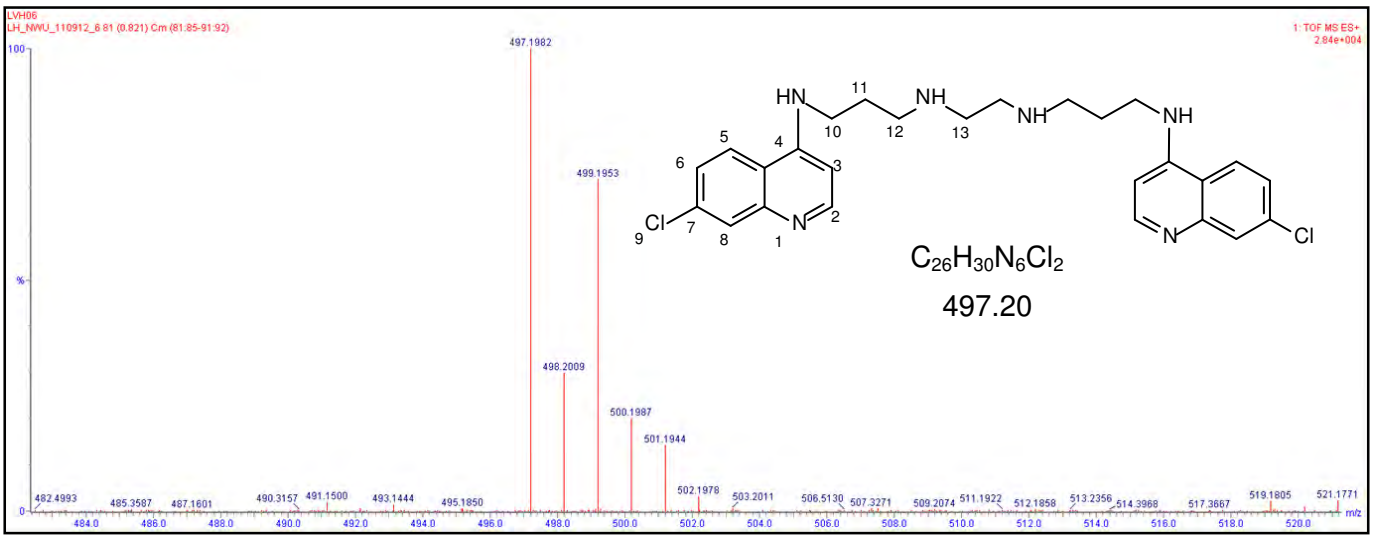
Spectrum 22: ^{13}C NMR of compound 9



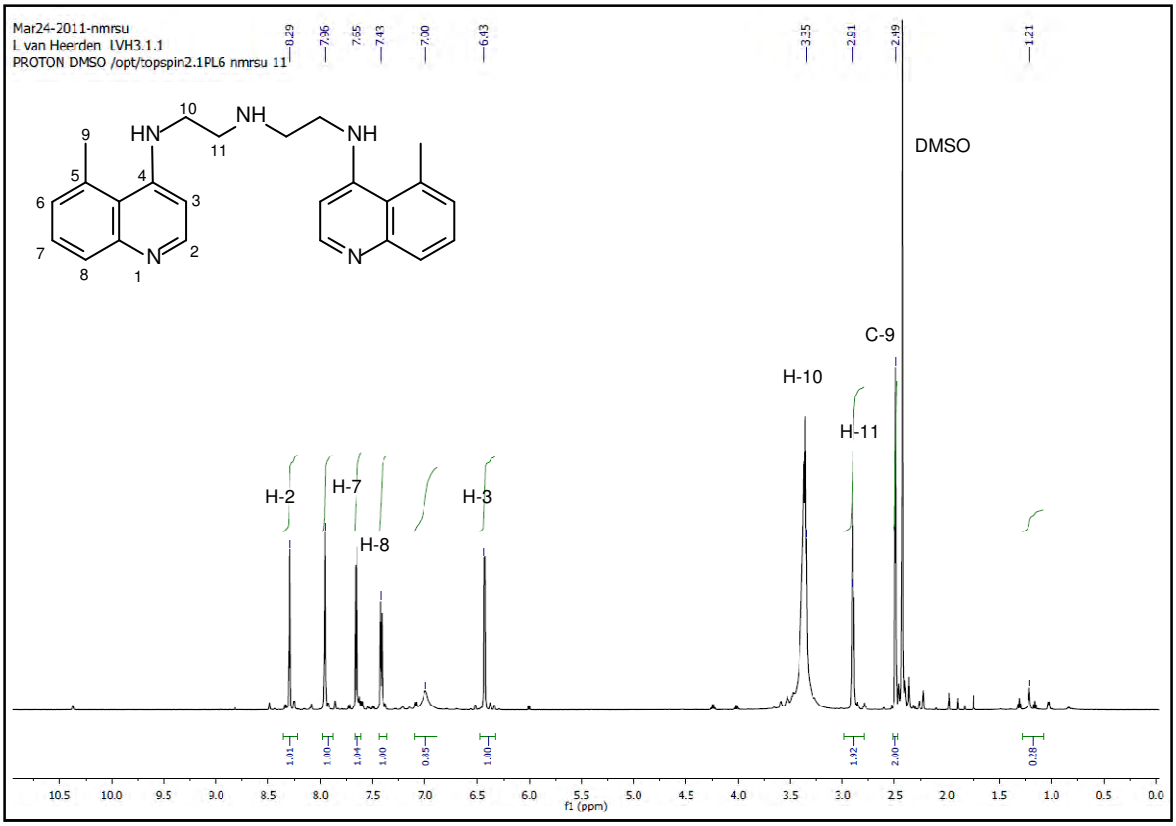
Spectrum 23: DEPT 135 NMR of compound 9



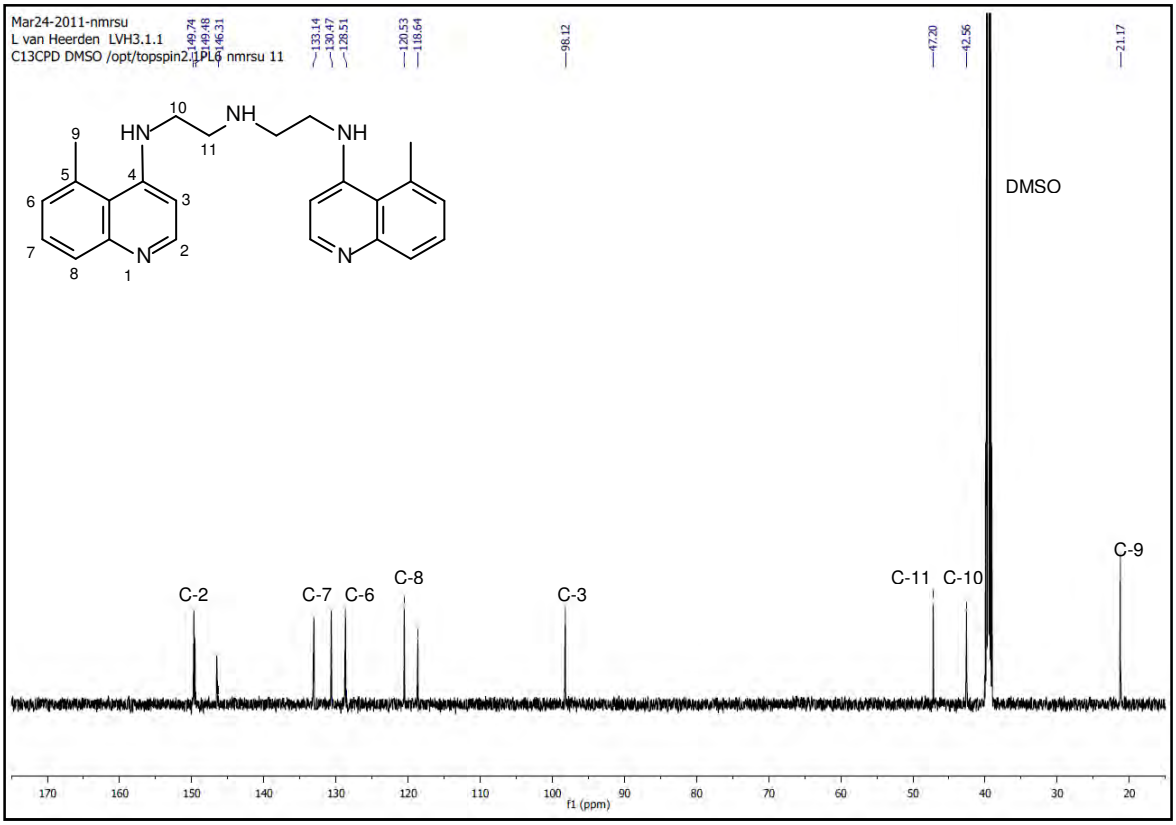
Spectrum 24: MS ES+ of compound 9



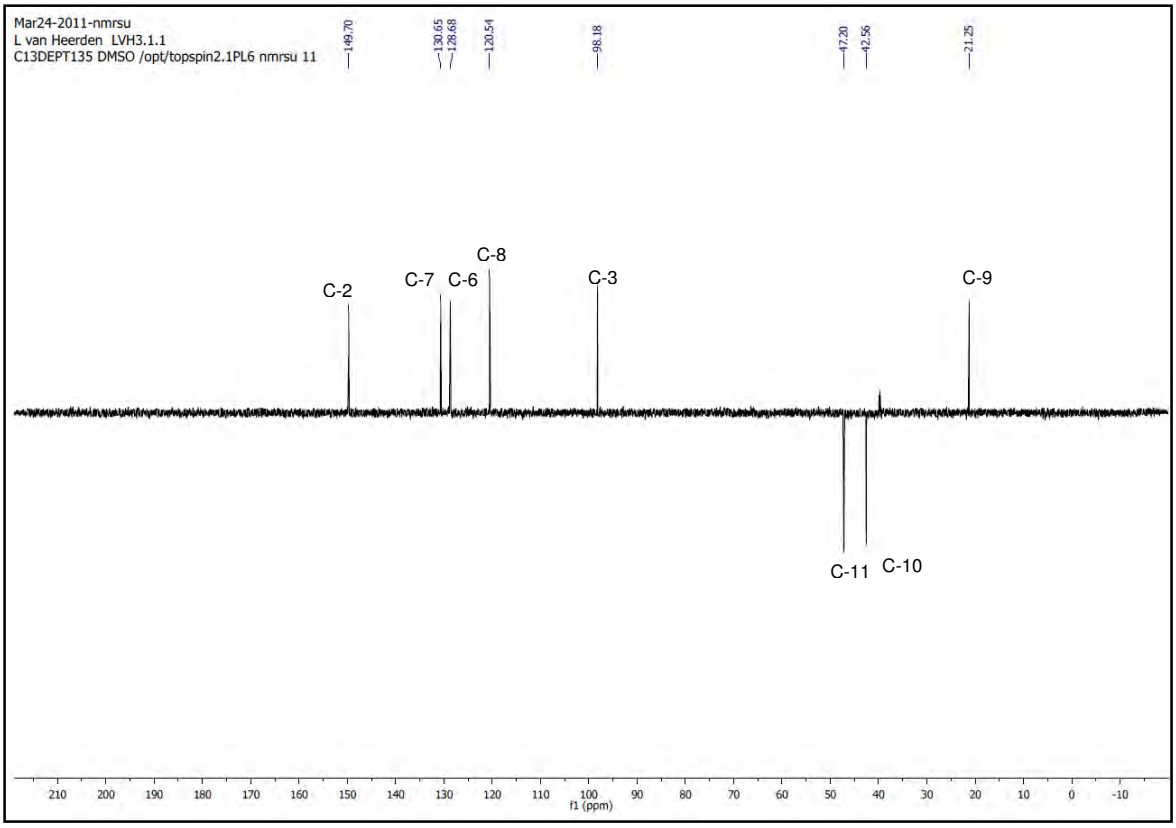
Spectrum 25: ^{1}H NMR of compound 10



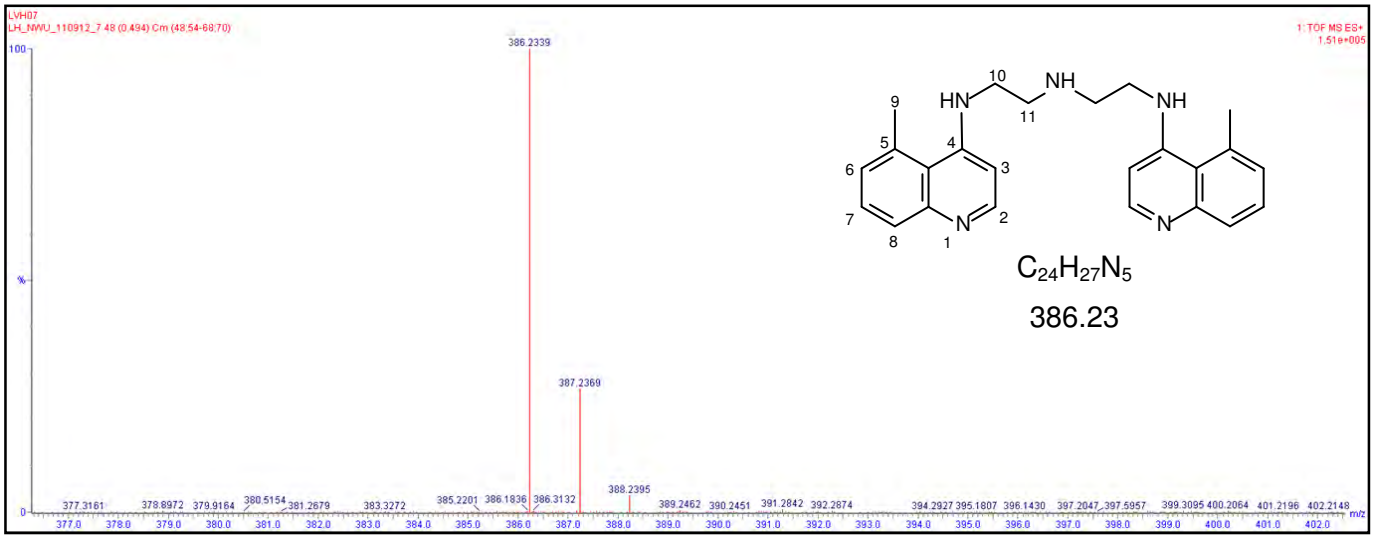
Spectrum 26: ^{13}C NMR of compound 10



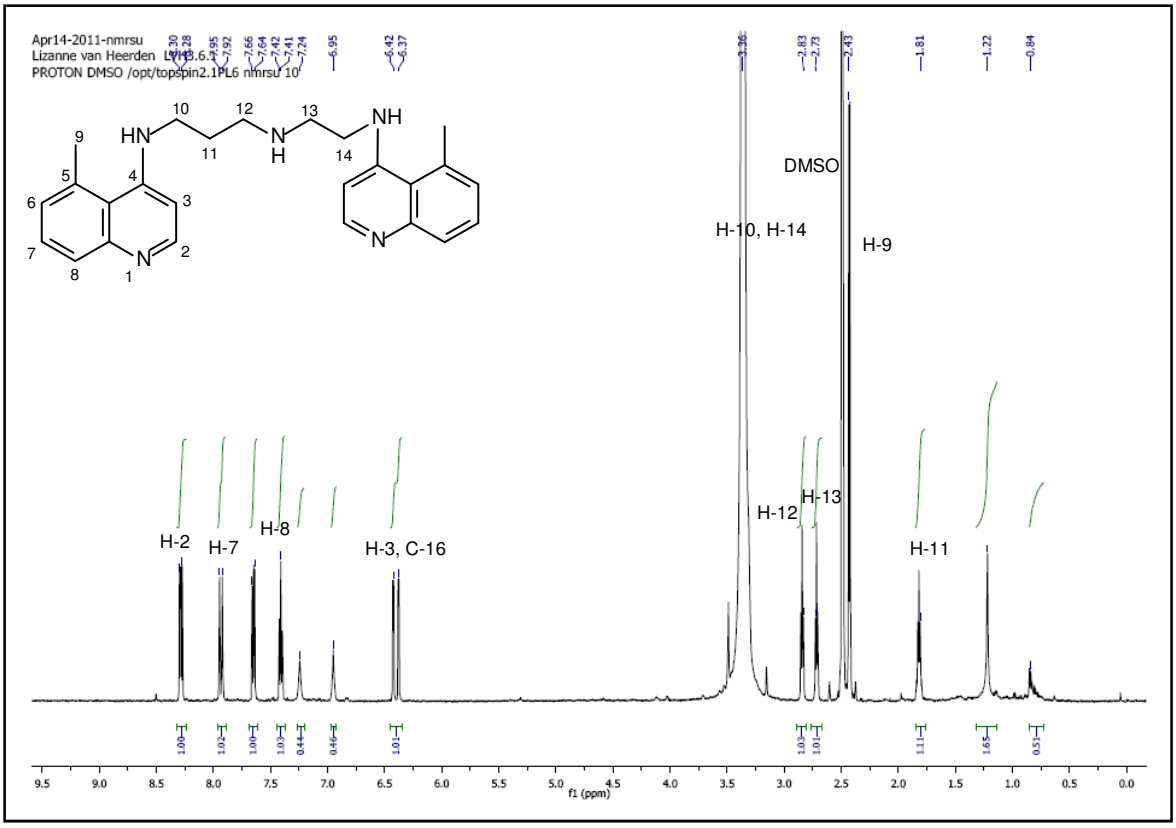
Spectrum 27: DEPT 135 NMR of compound 10



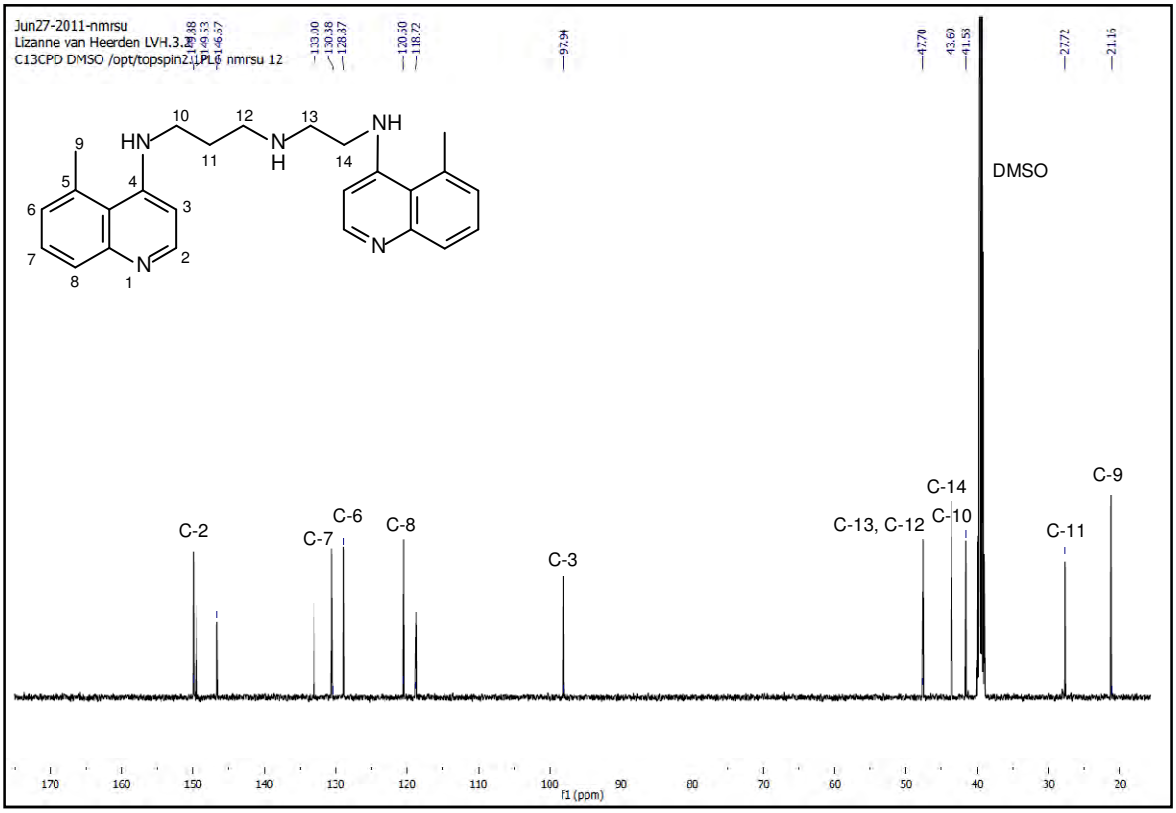
Spectrum 28: MS ES+ of compound 10



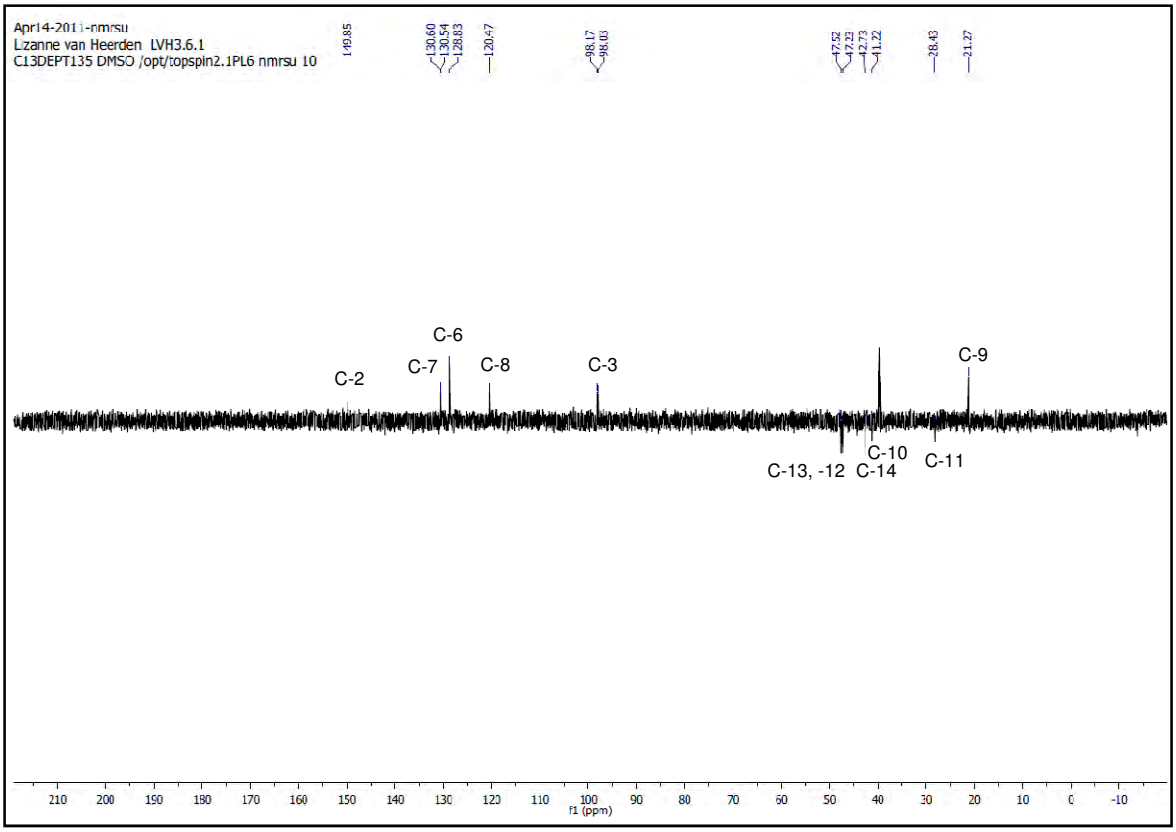
Spectrum 29: ^{1}H NMR of compound 11



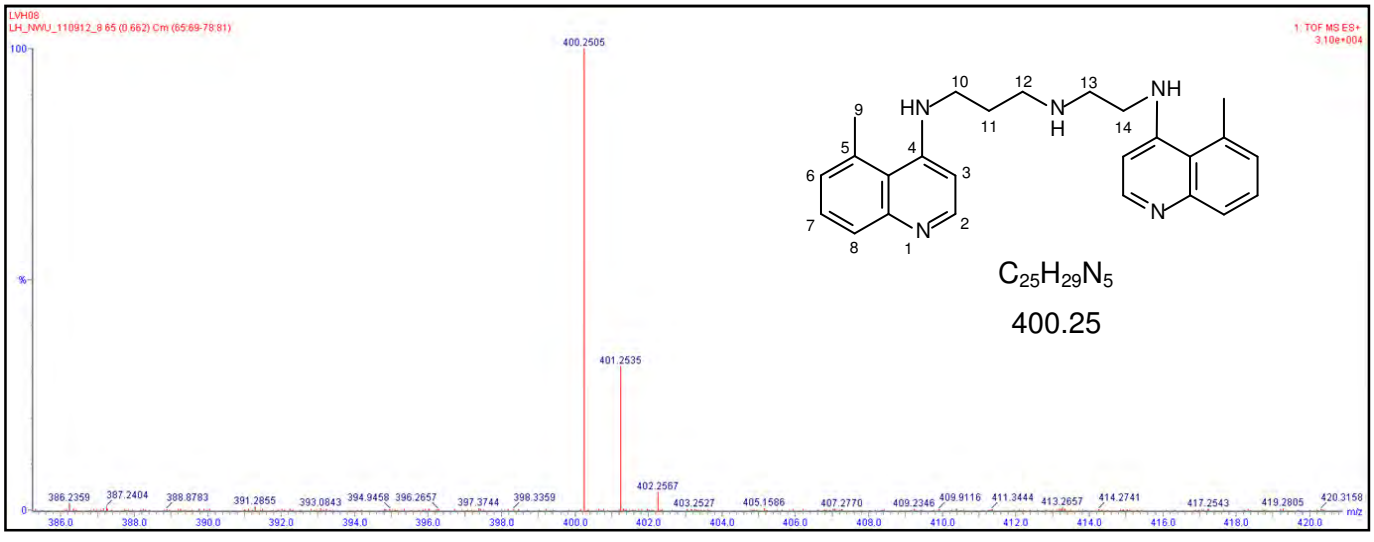
Spectrum 30: ^{13}C NMR of compound 11



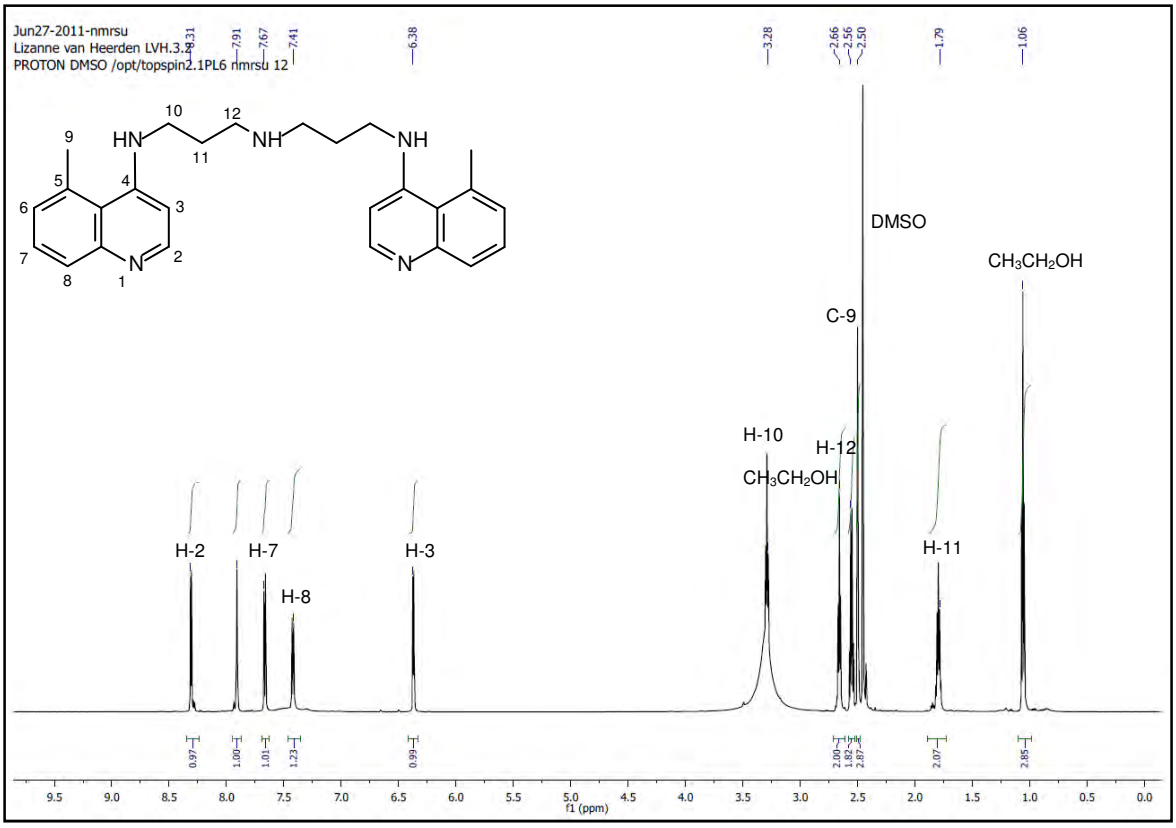
Spectrum 31: DEPT 135 NMR of compound 11



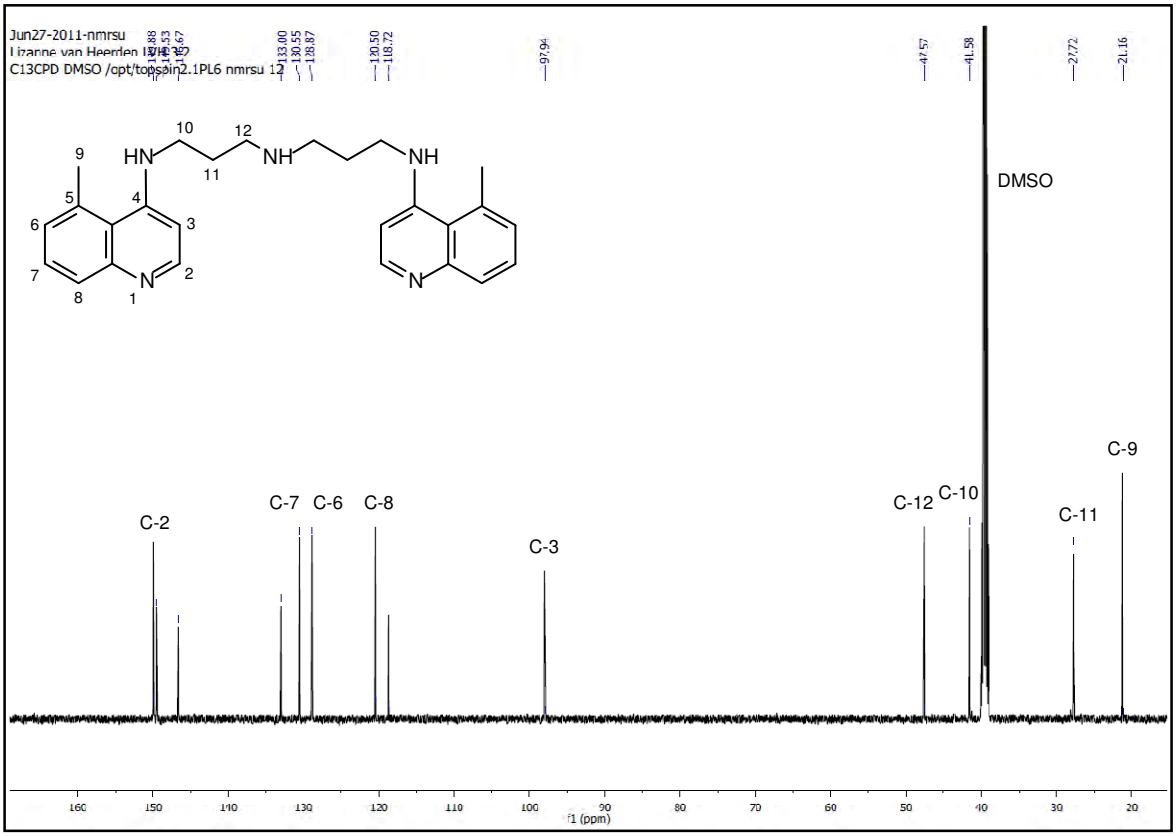
Spectrum 32: MS ES+ of compound 11



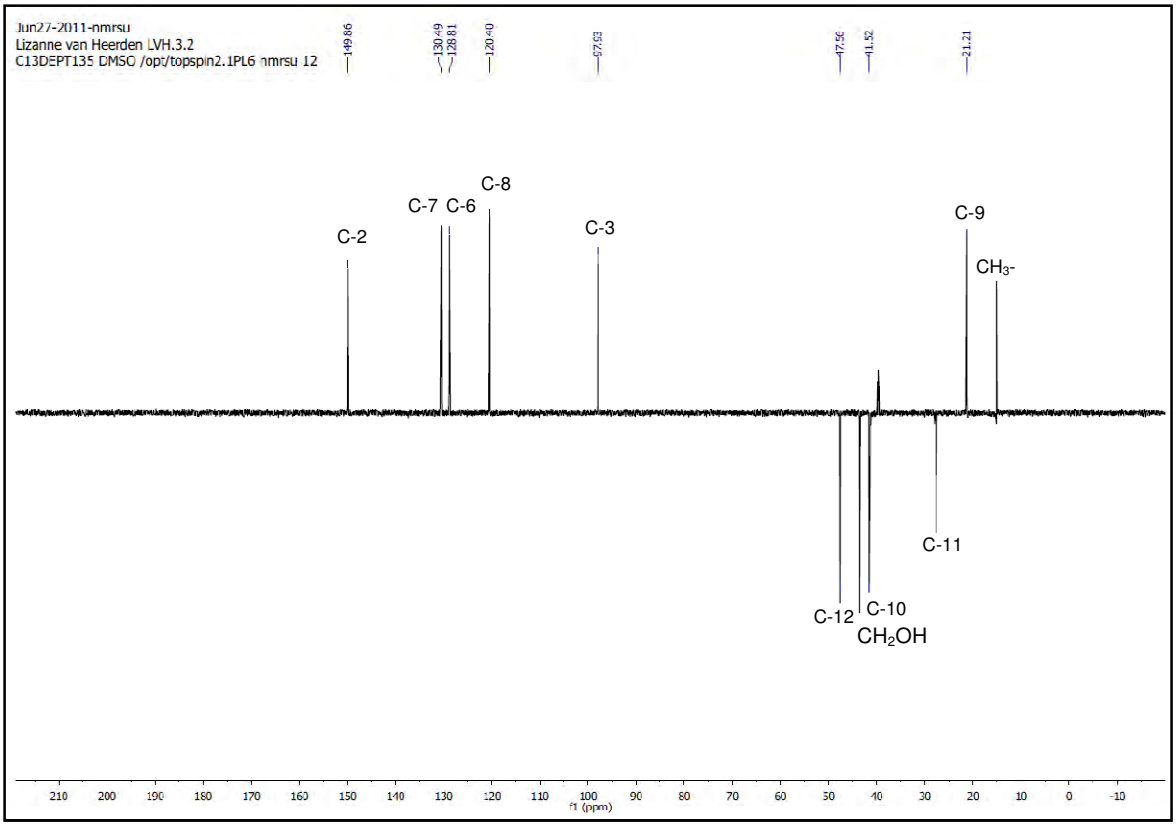
Spectrum 33: ^{1}H NMR of compound 12



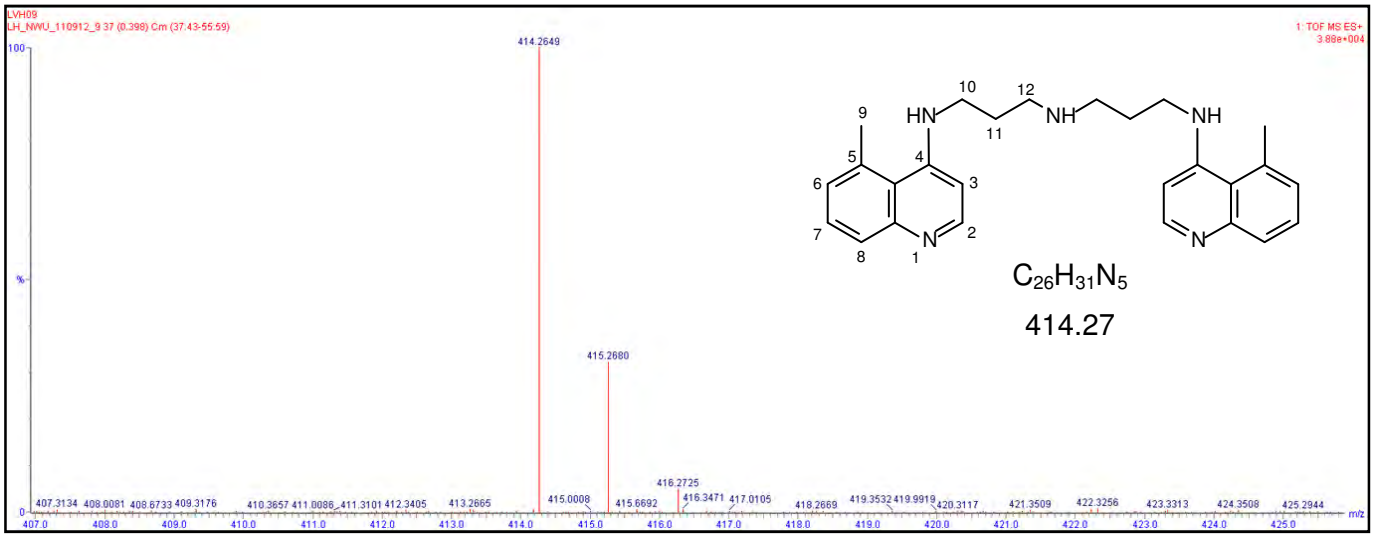
Spectrum 34: ^{13}C NMR of compound 12



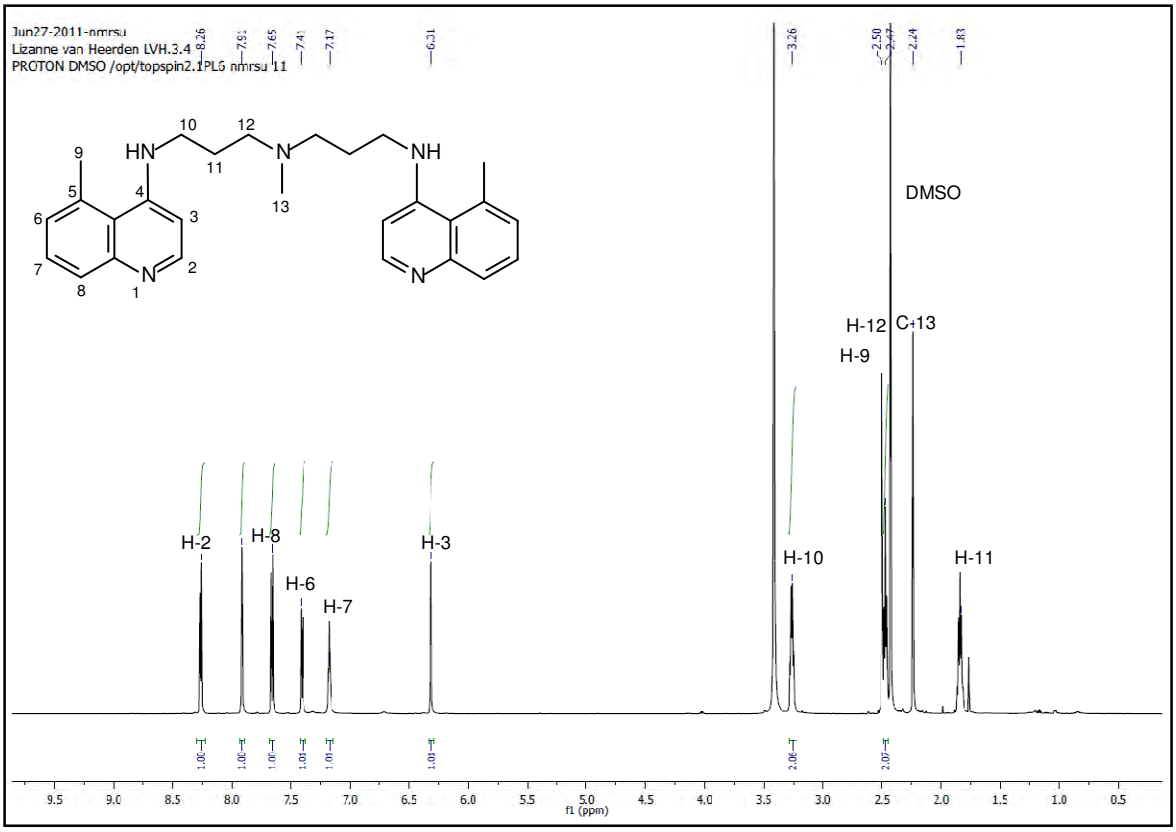
Spectrum 35: DEPT 135 NMR of compound 12



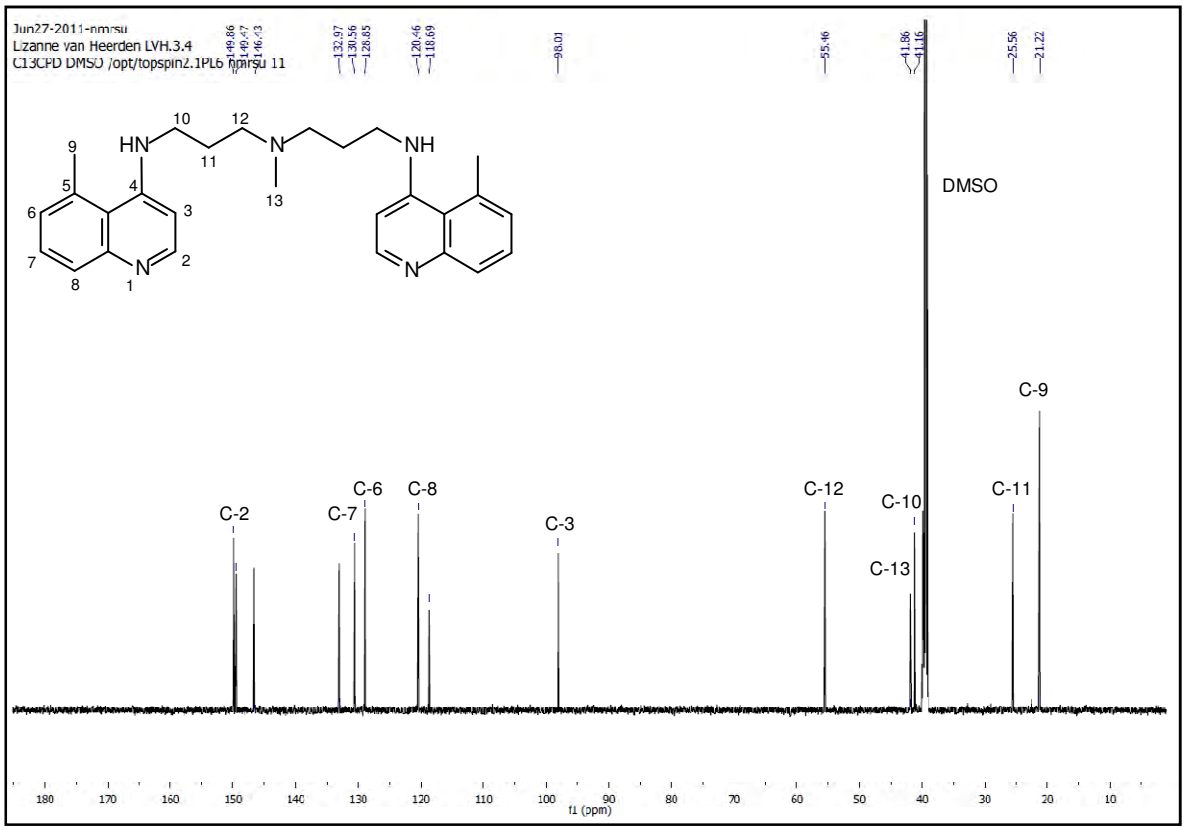
Spectrum 36: MS ES+ of compound 12



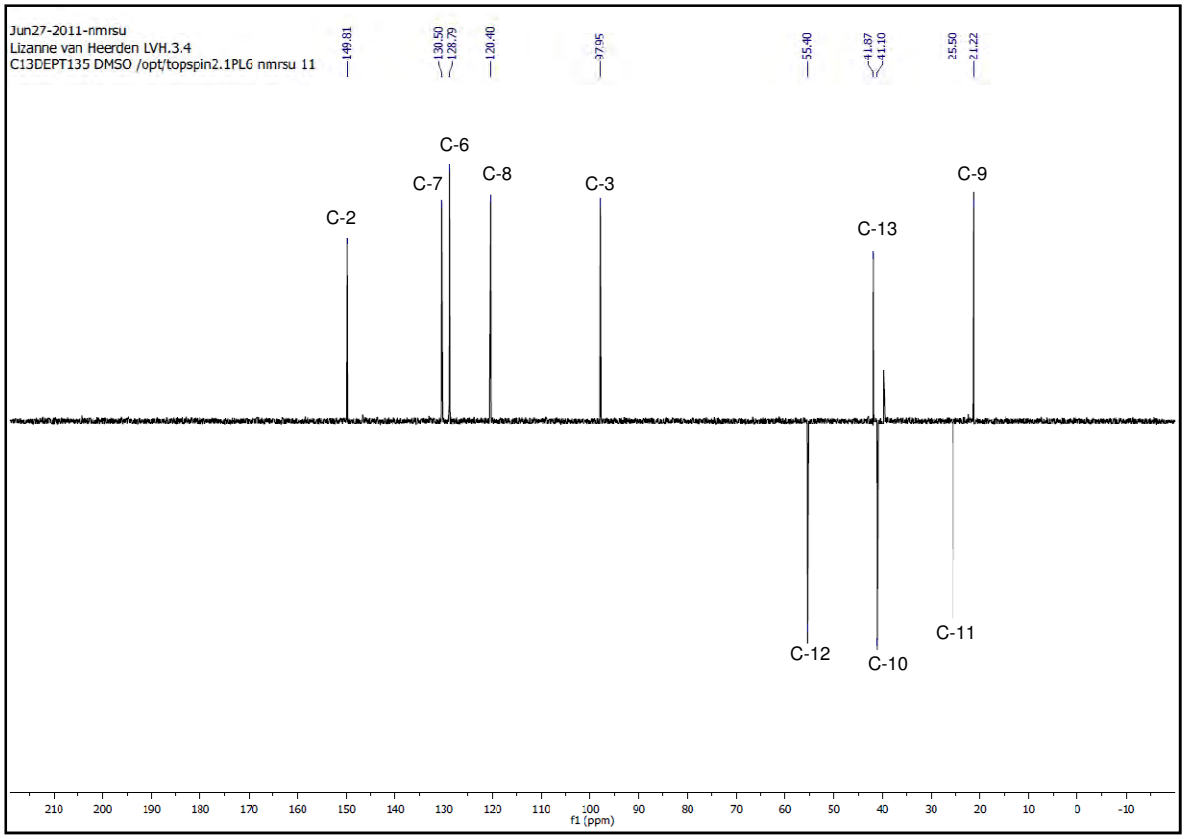
Spectrum 37: ^{1}H NMR of compound 13



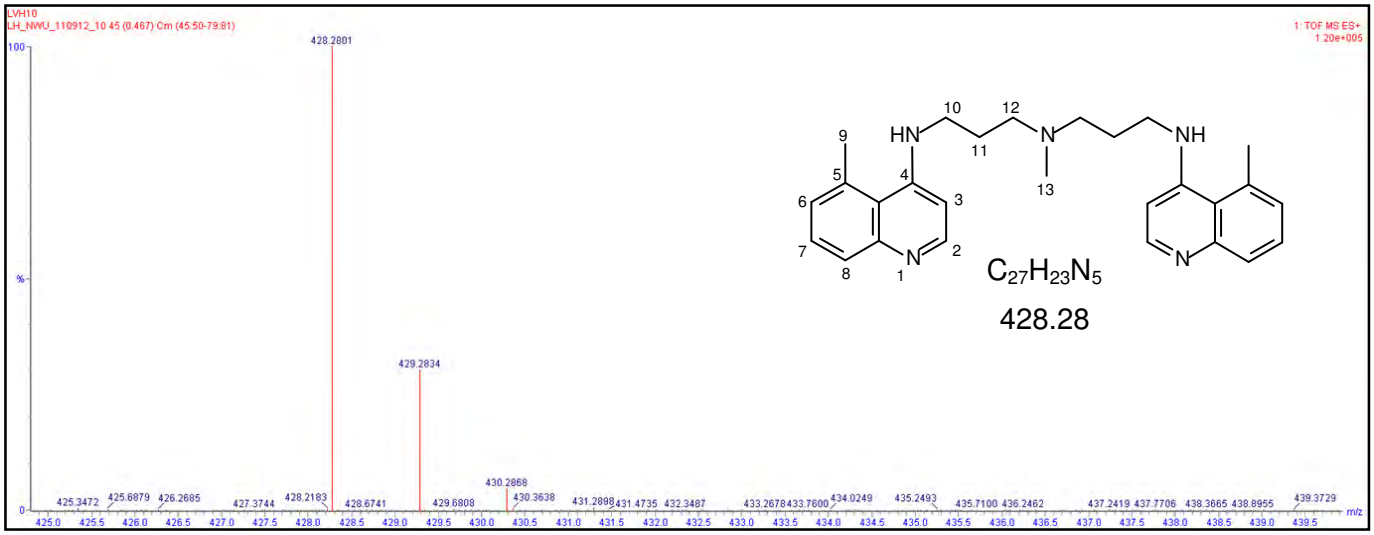
Spectrum 38: ^{13}C NMR of compound 13



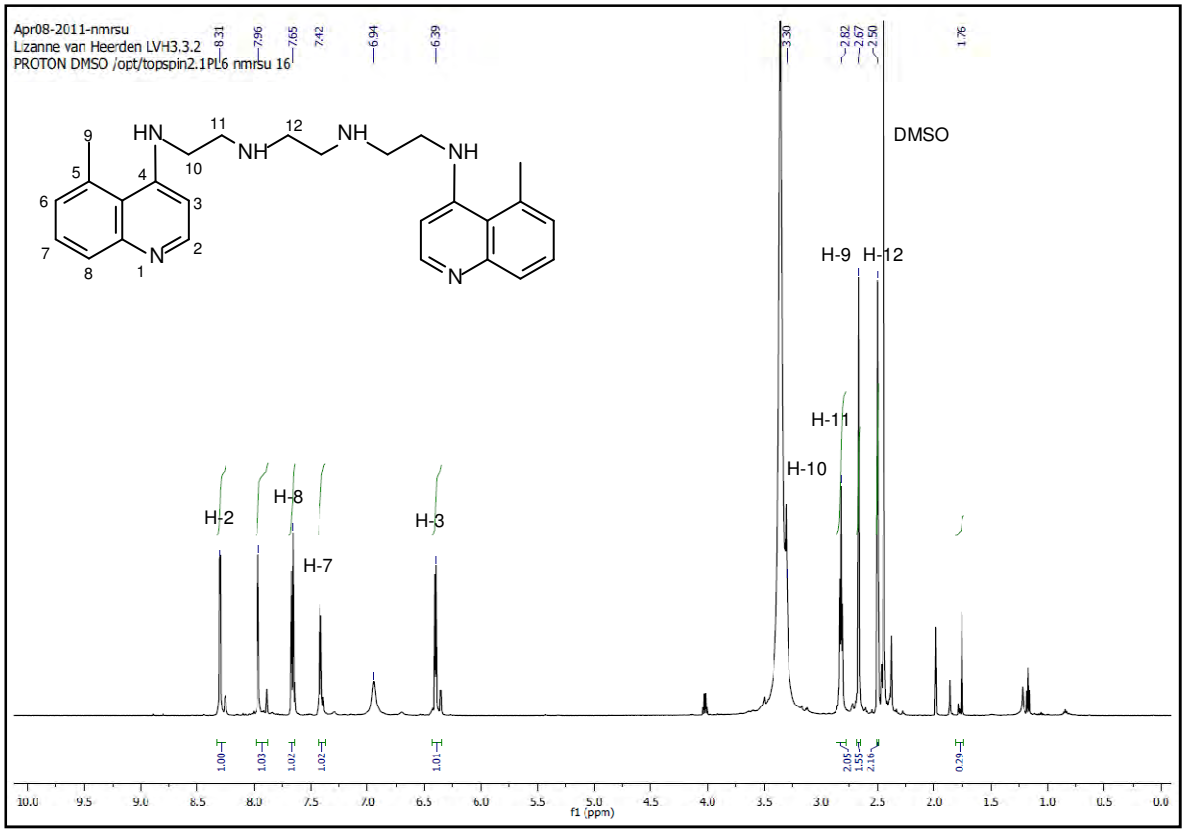
Spectrum 39: DEPT 135 NMR of compound 13



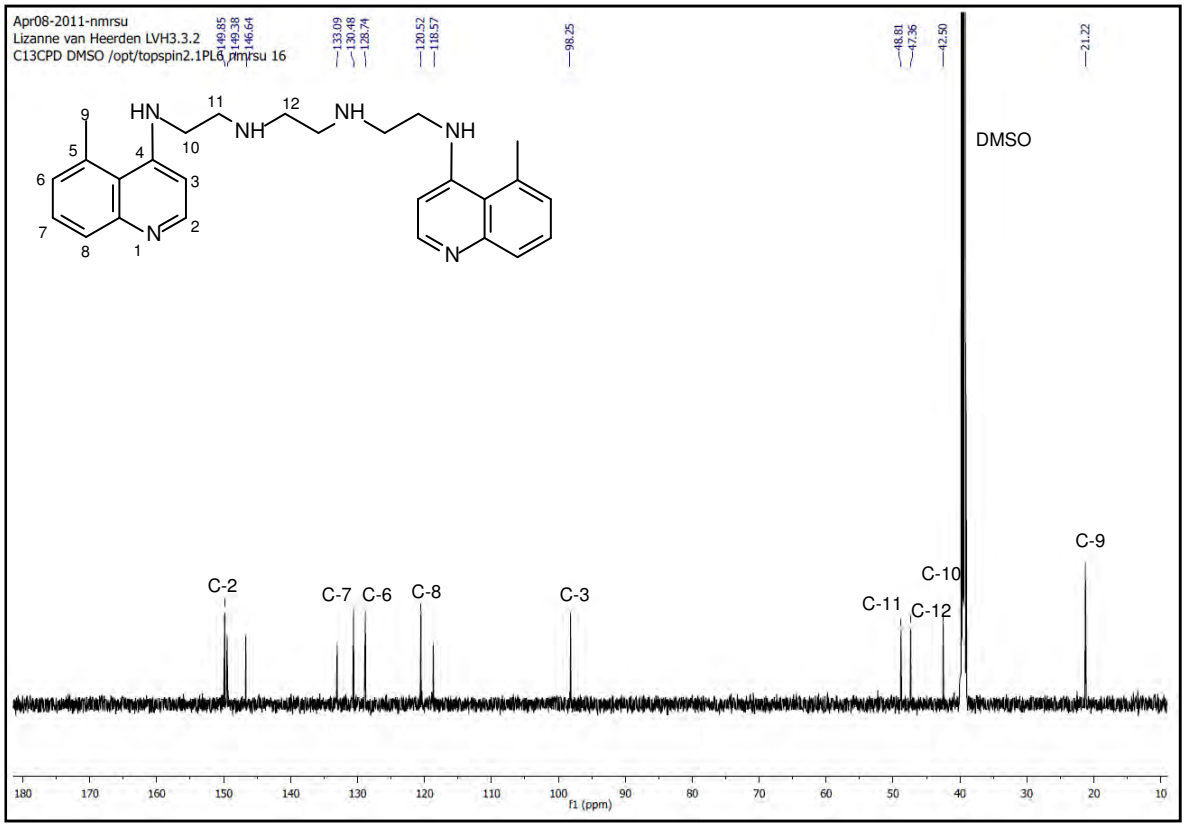
Spectrum 40: MS ES+ of compound 13



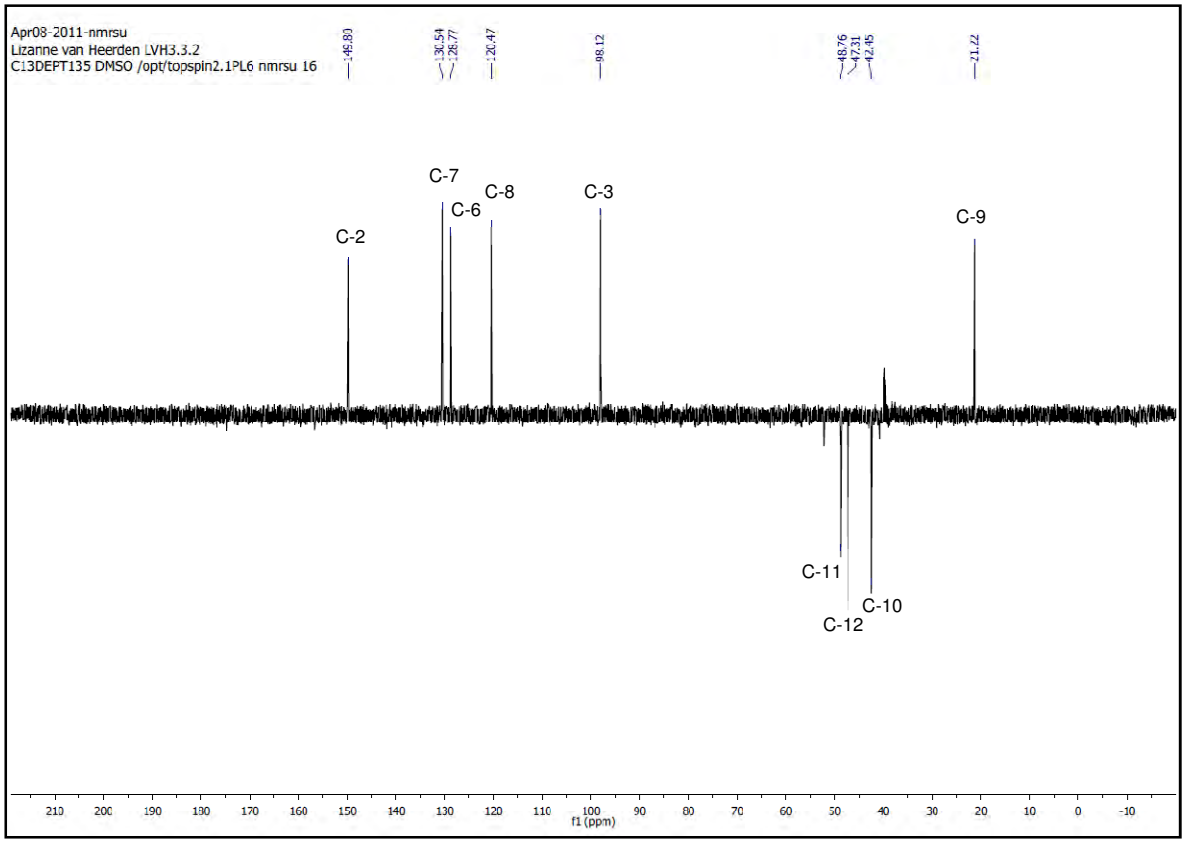
Spectrum 41: ^{1}H NMR of compound 14



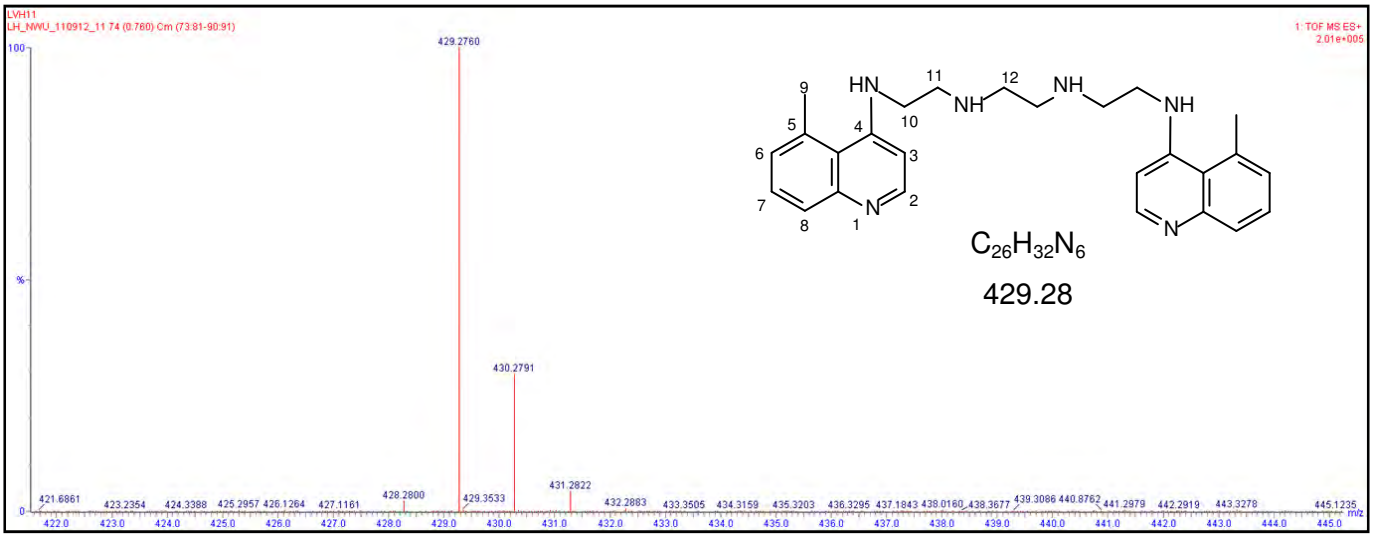
Spectrum 42: ^{13}C NMR of compound 14



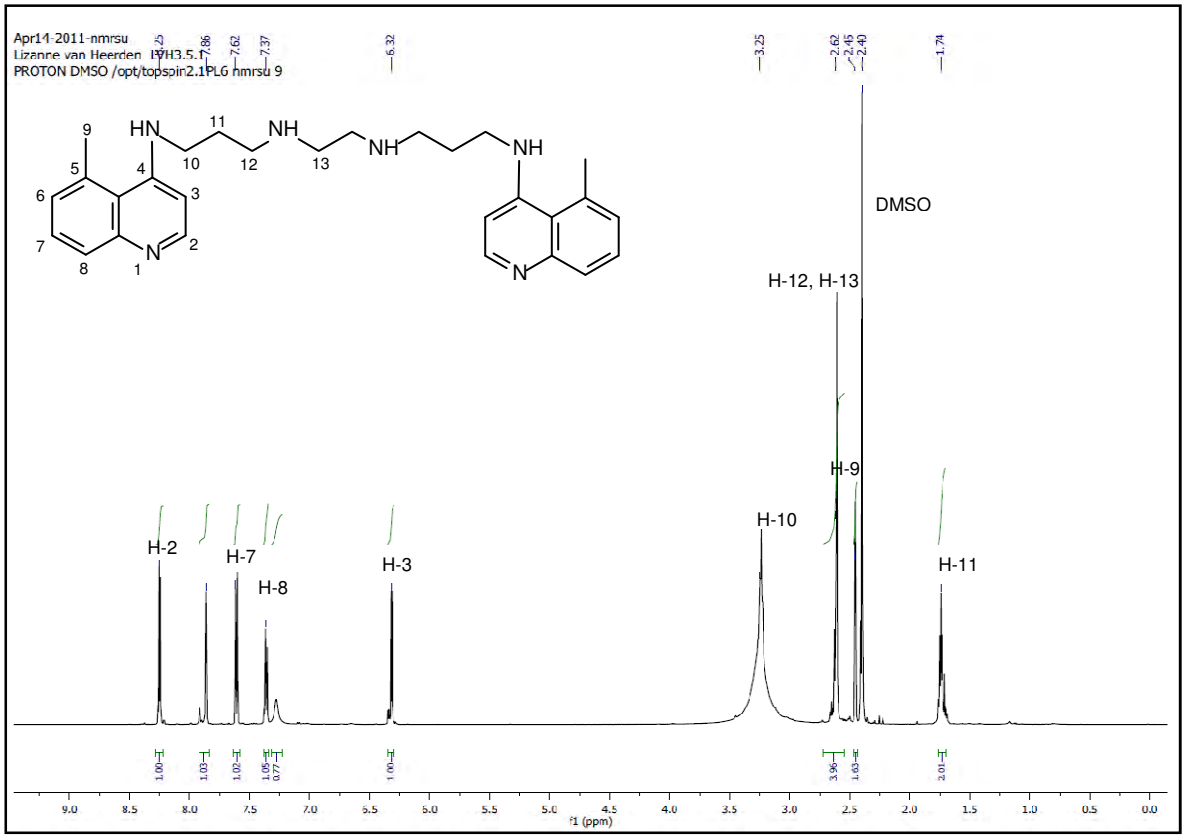
Spectrum 34: DEPT 135 NMR of compound 14



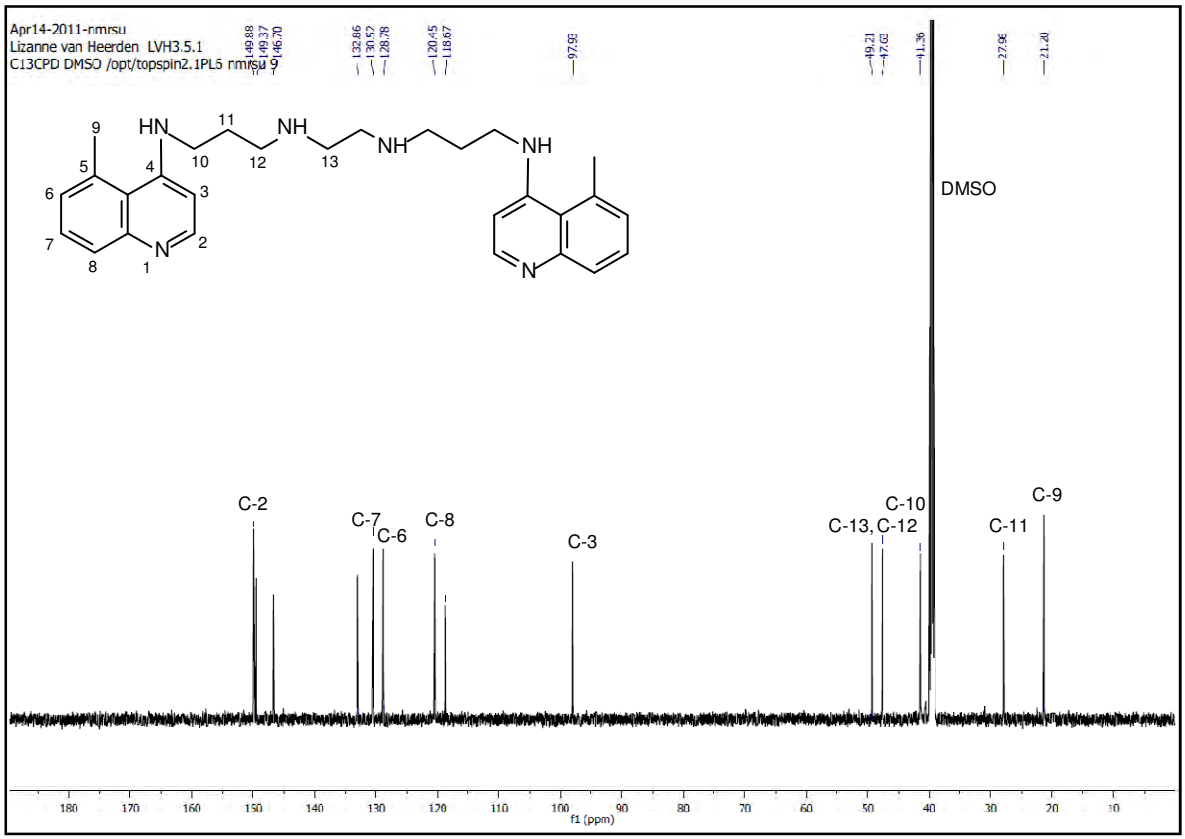
Spectrum 44: MS ES+ of compound 14



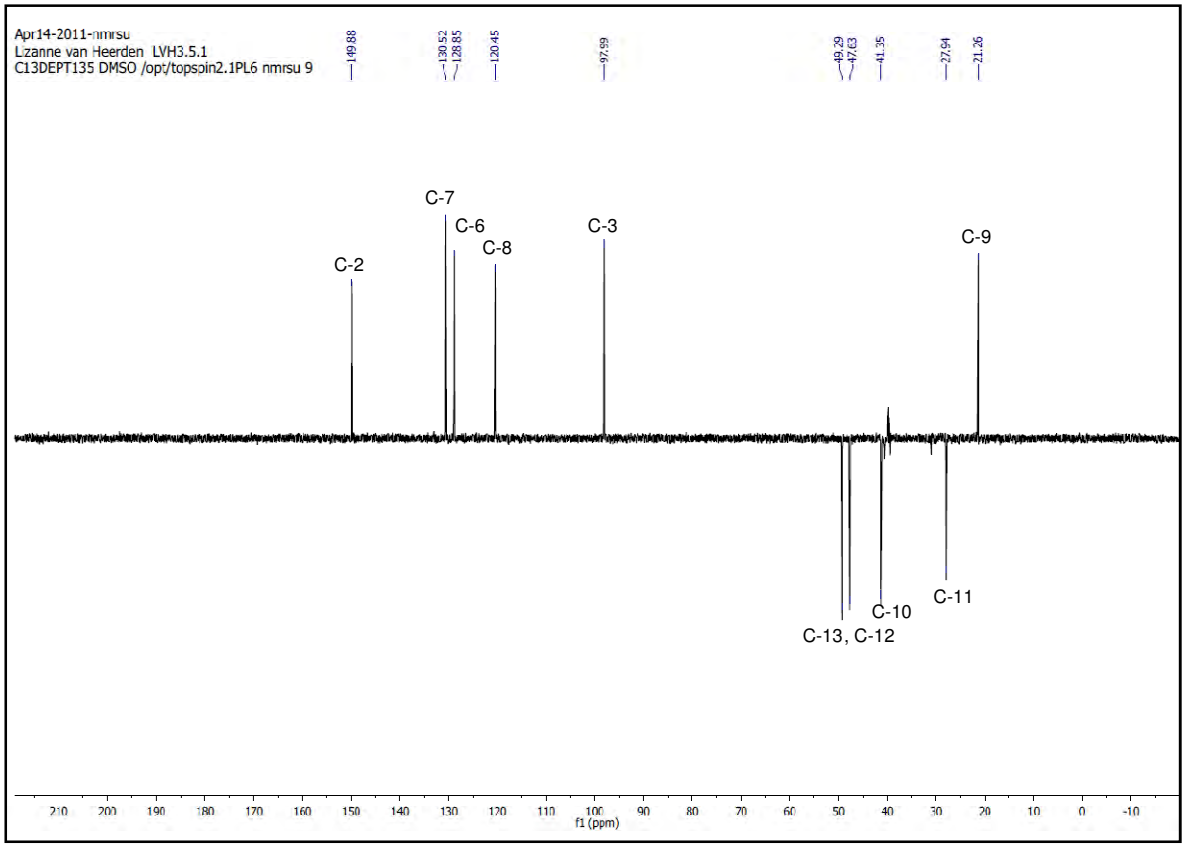
Spectrum 45: ^{1}H NMR of compound 15



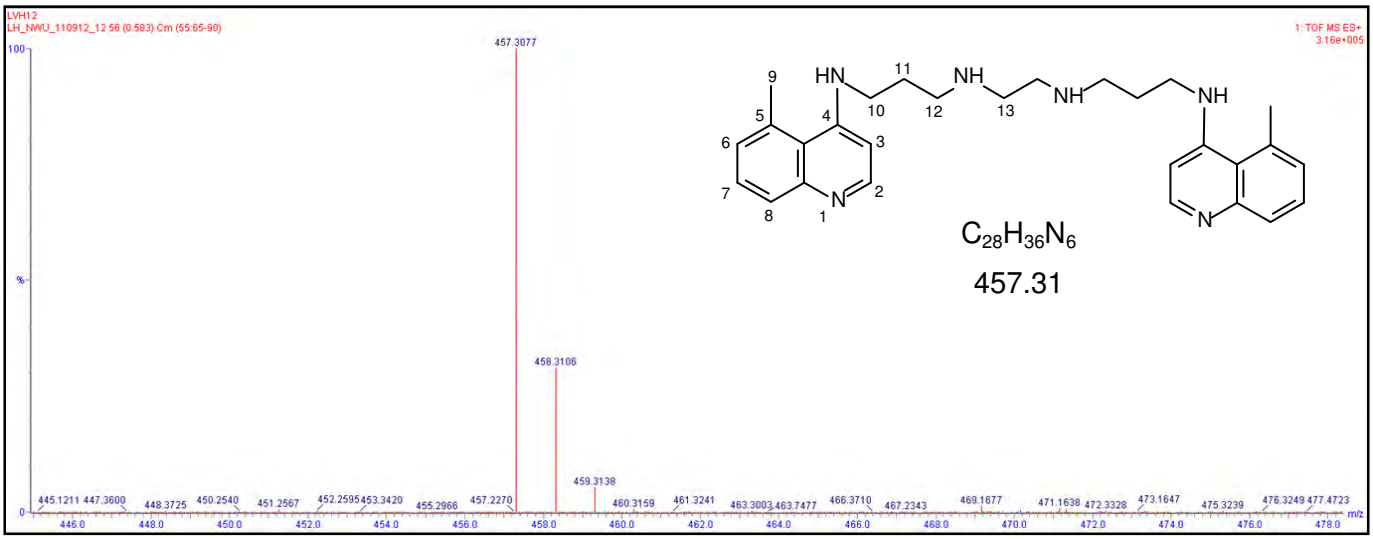
Spectrum 46: ^{13}C NMR of compound 15



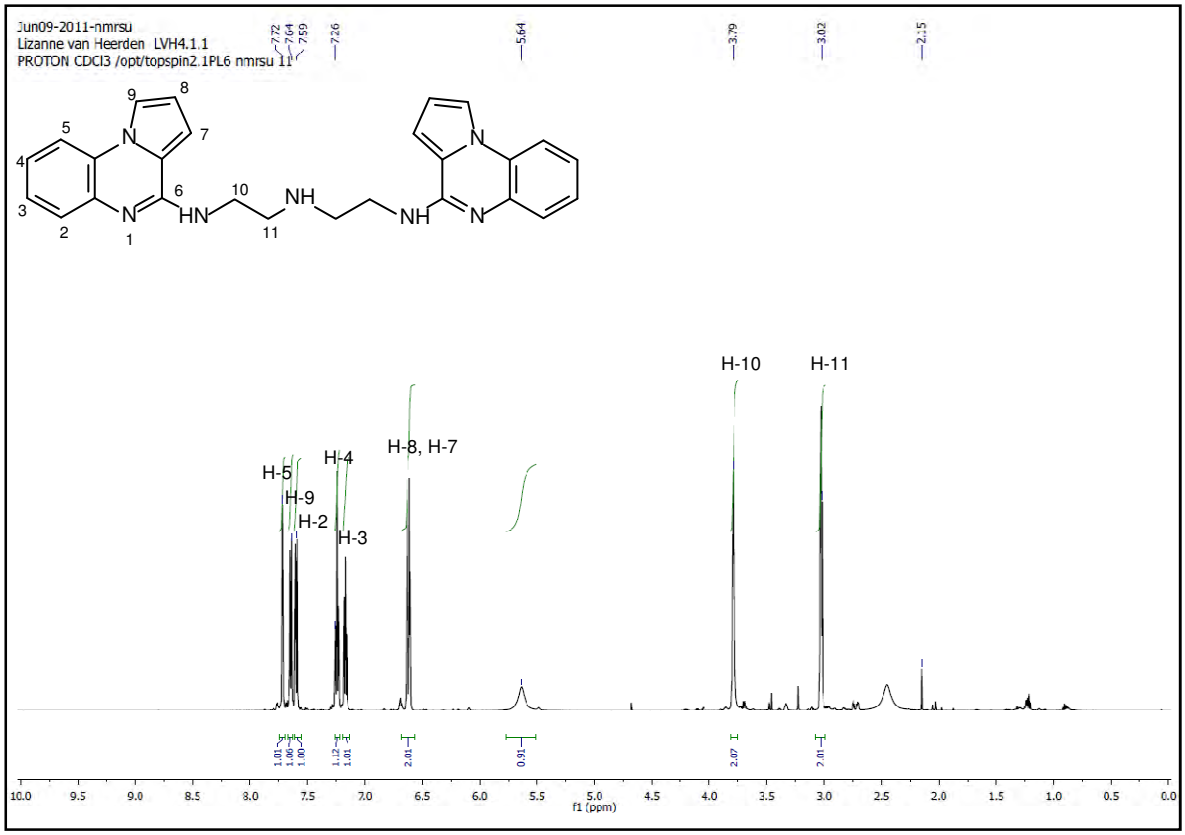
Spectrum 47: DEPT 135 NMR of compound 15



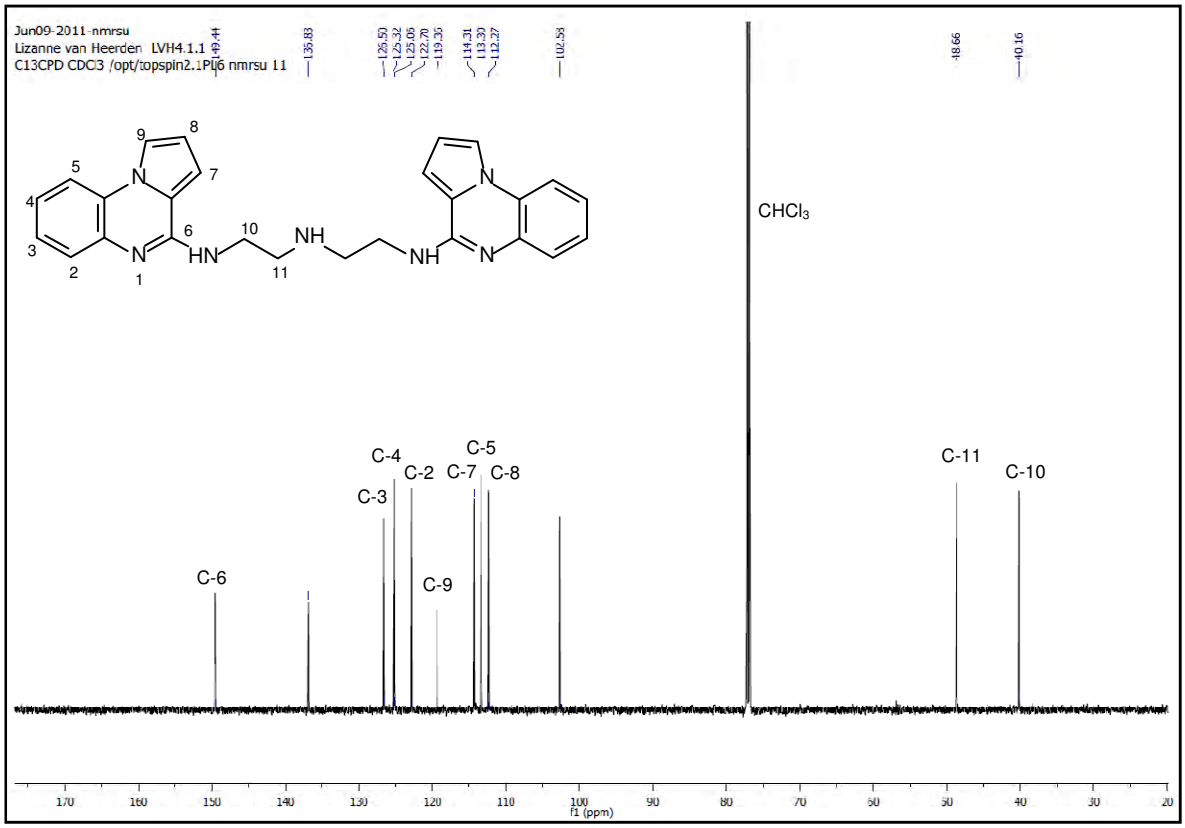
Spectrum 48: MS ES+ of compound 15



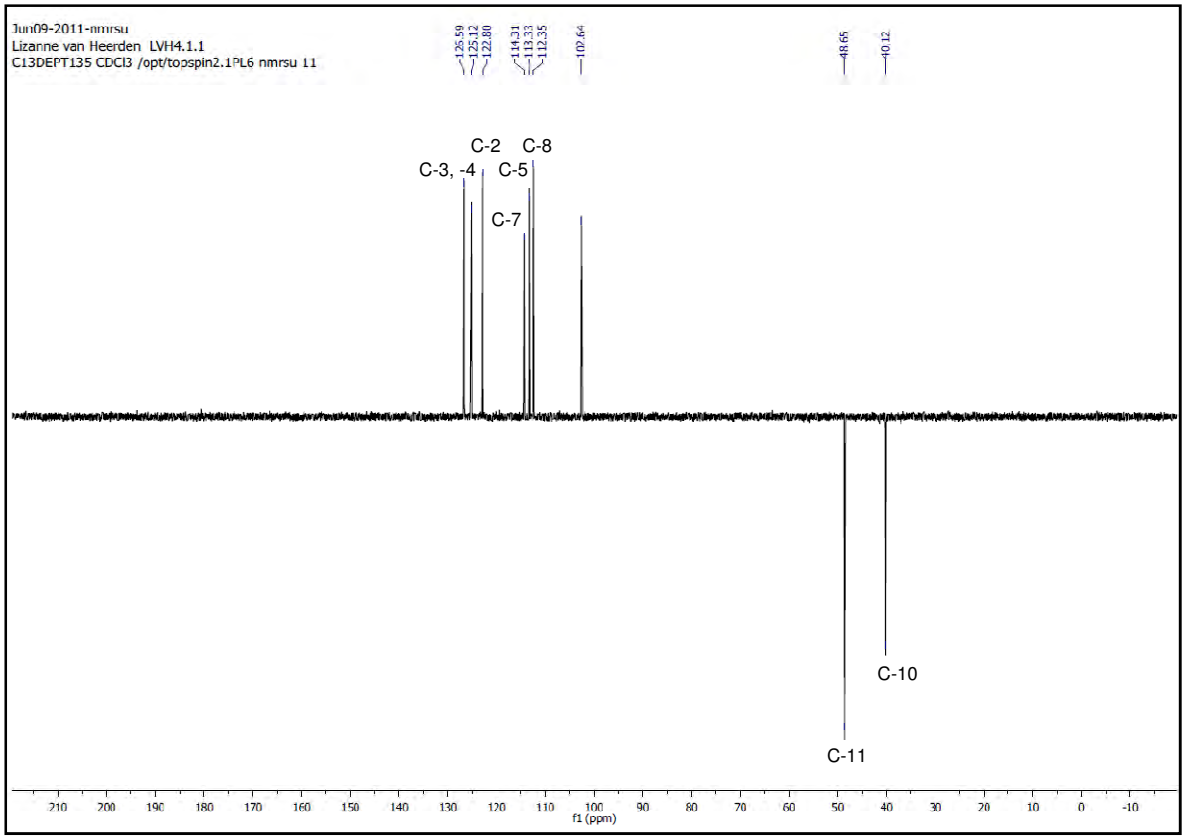
Spectrum 49: ^{1}H NMR of compound 16



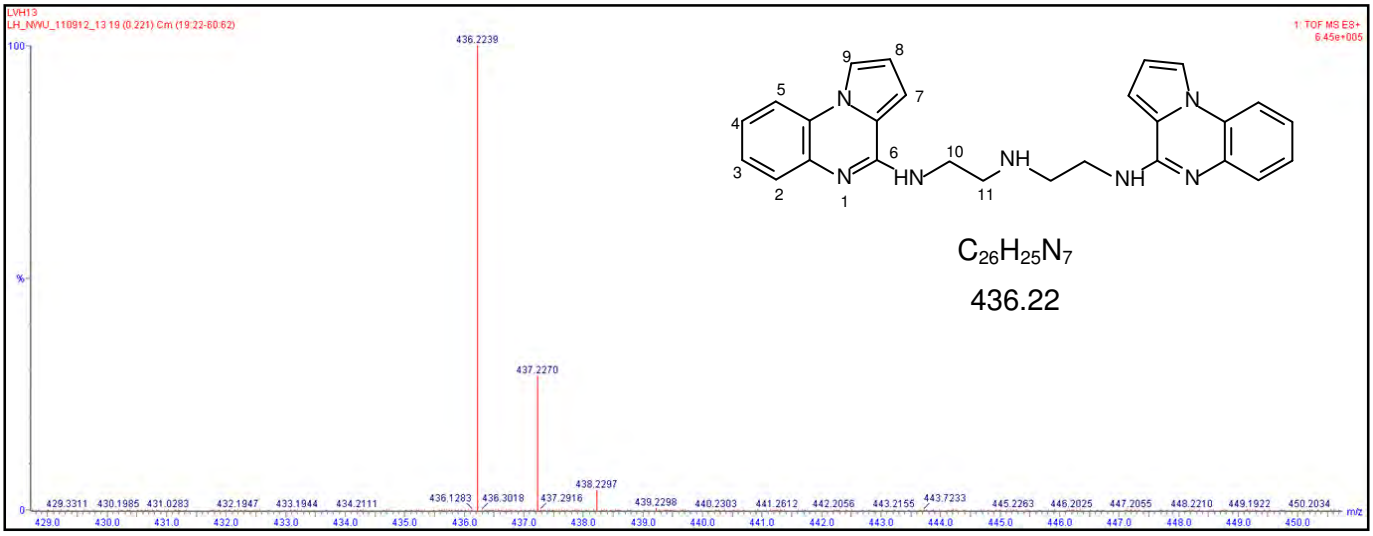
Spectrum 50 ^{13}C NMR of compound 16



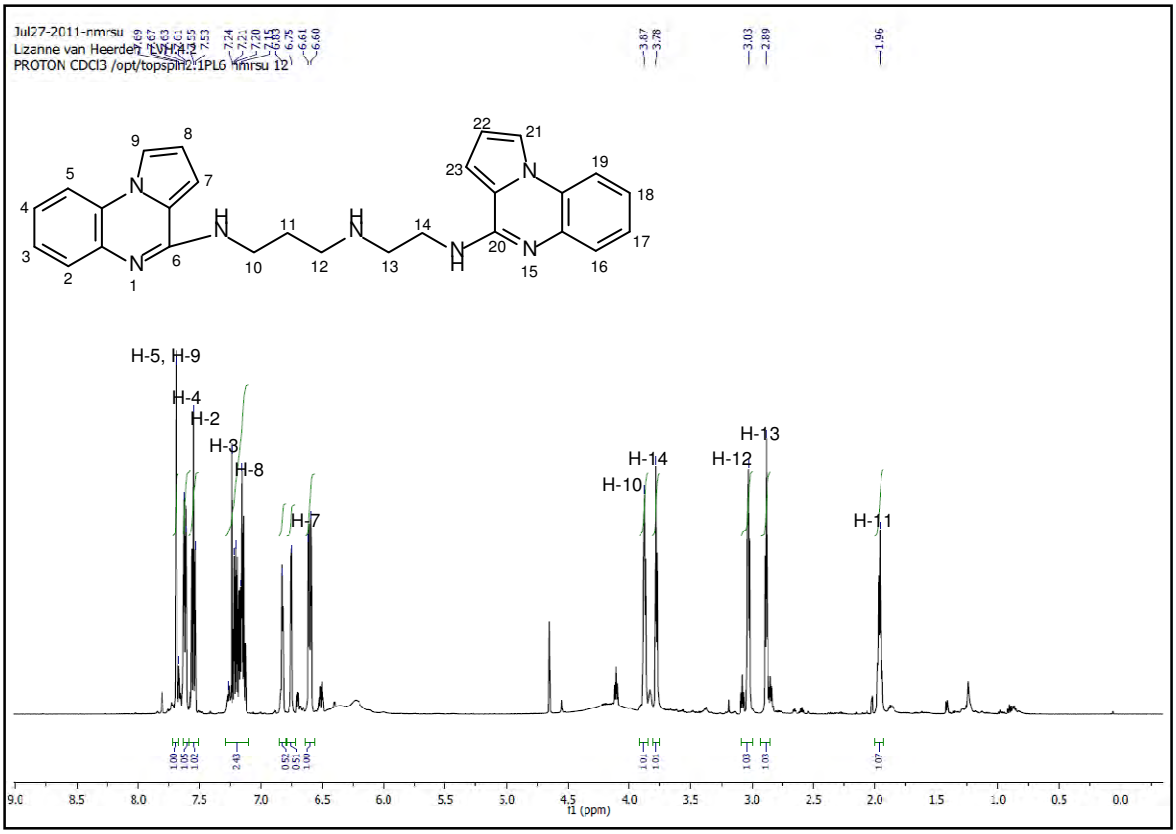
Spectrum 51: DEPT 135 NMR of compound 16



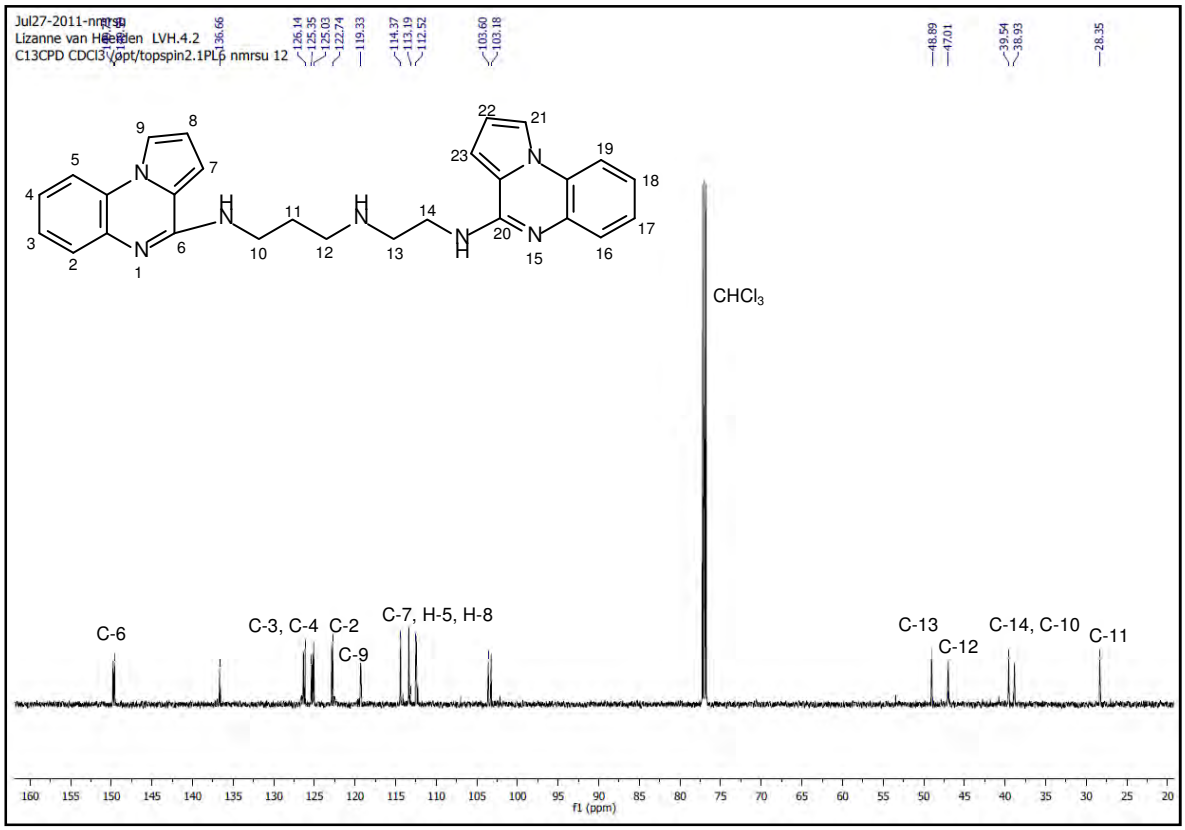
Spectrum 52: MS ES+ of compound 16



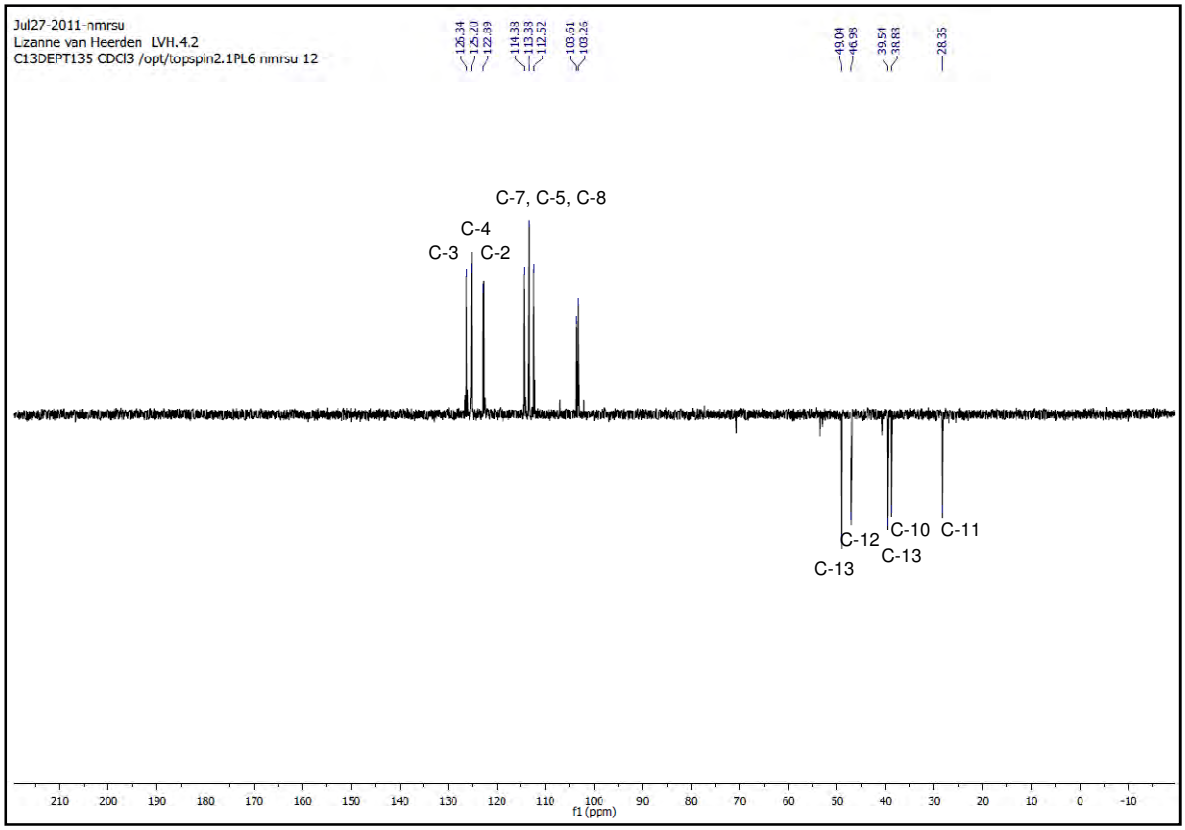
Spectrum 53: ^{1}H NMR of compound 17



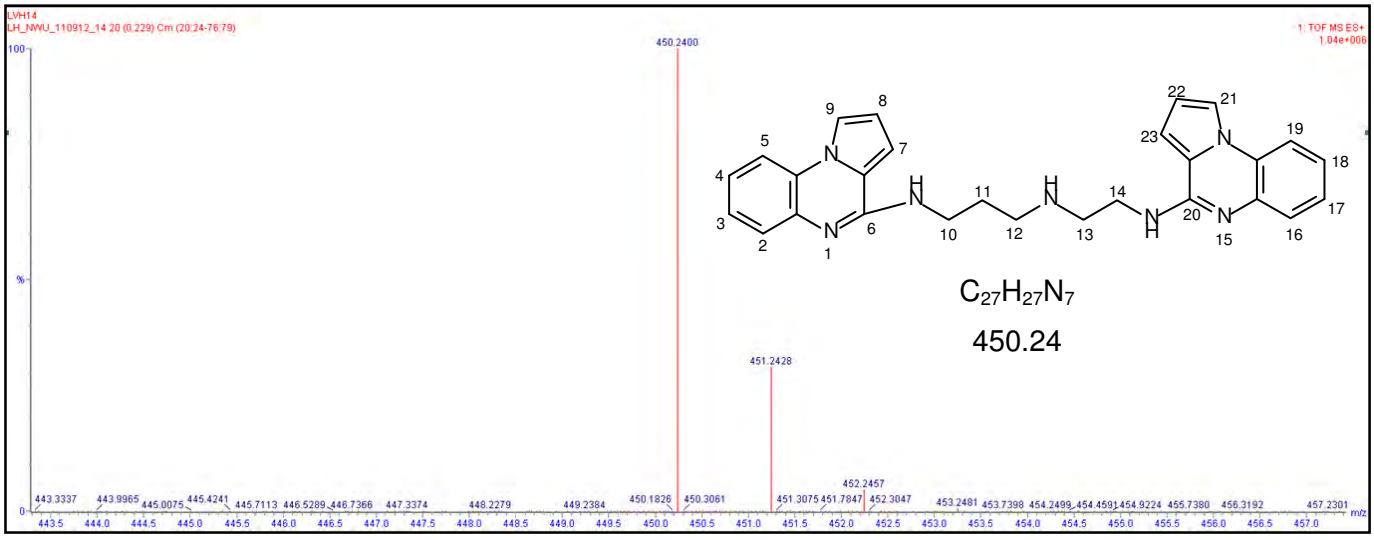
Spectrum 54: ^{13}C NMR of compound 17



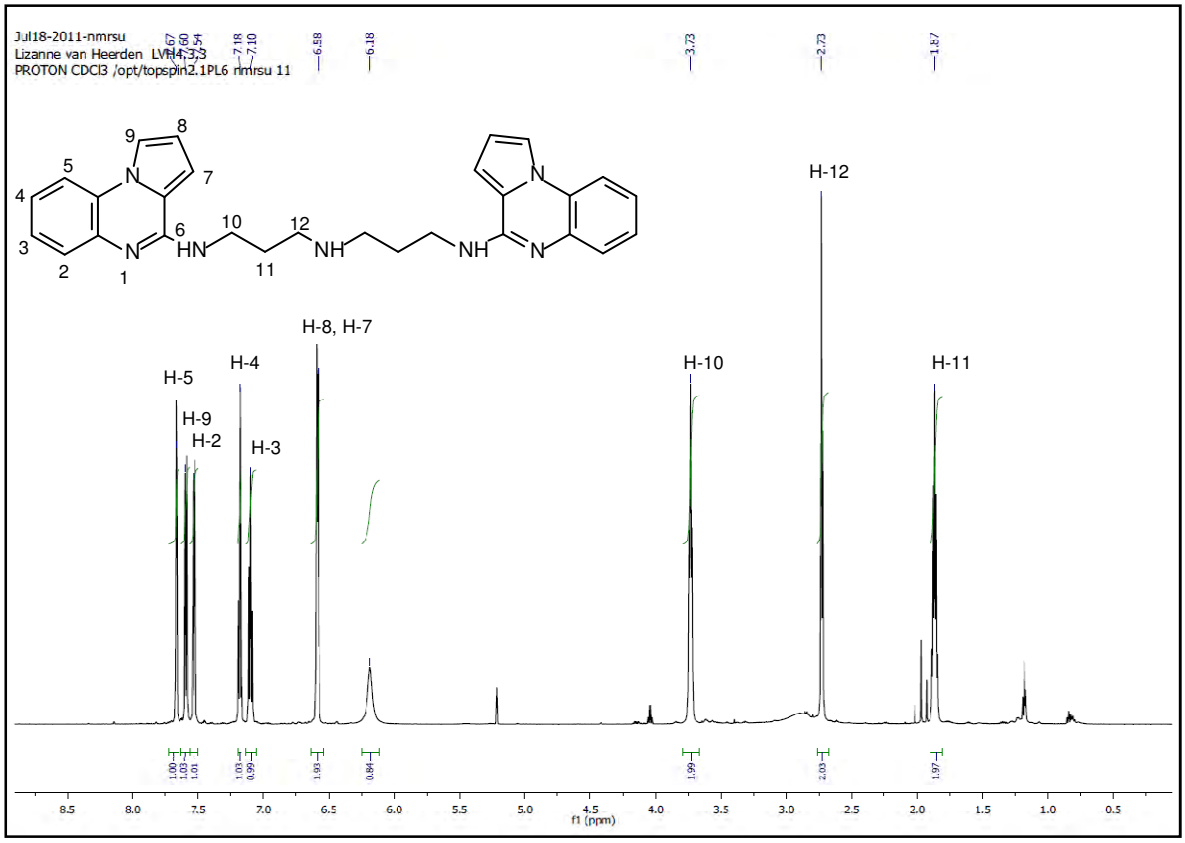
Spectrum 55: DEPT 135 NMR of compound 17



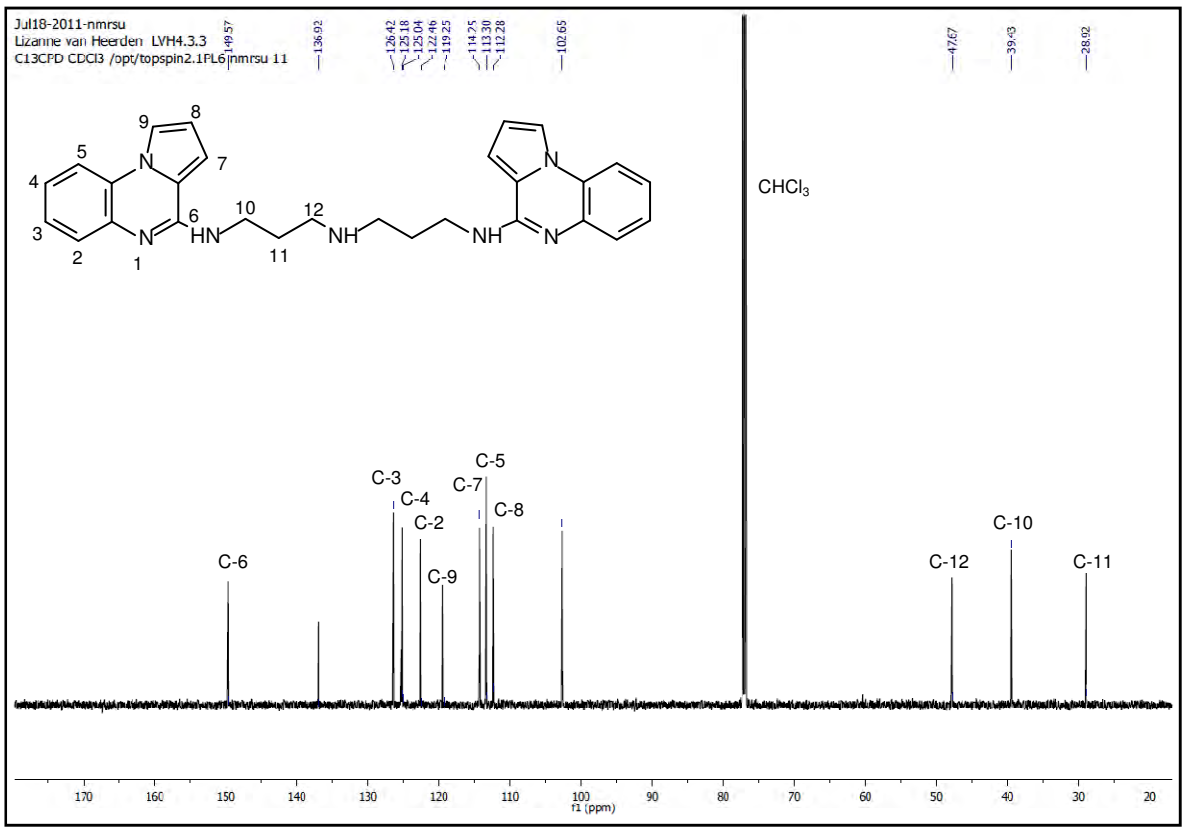
Spectrum 56: MS ES+ of compound 17



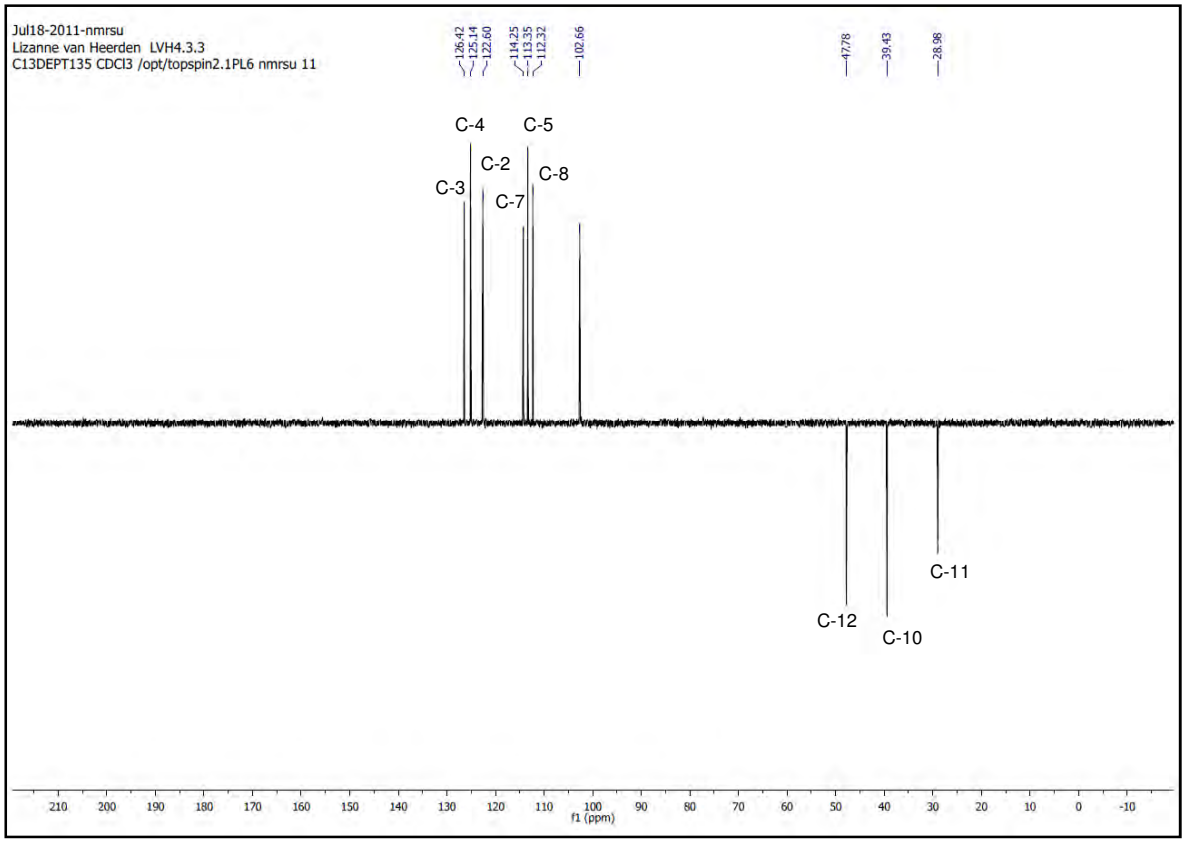
Spectrum 57: ^{1}H NMR of compound 18



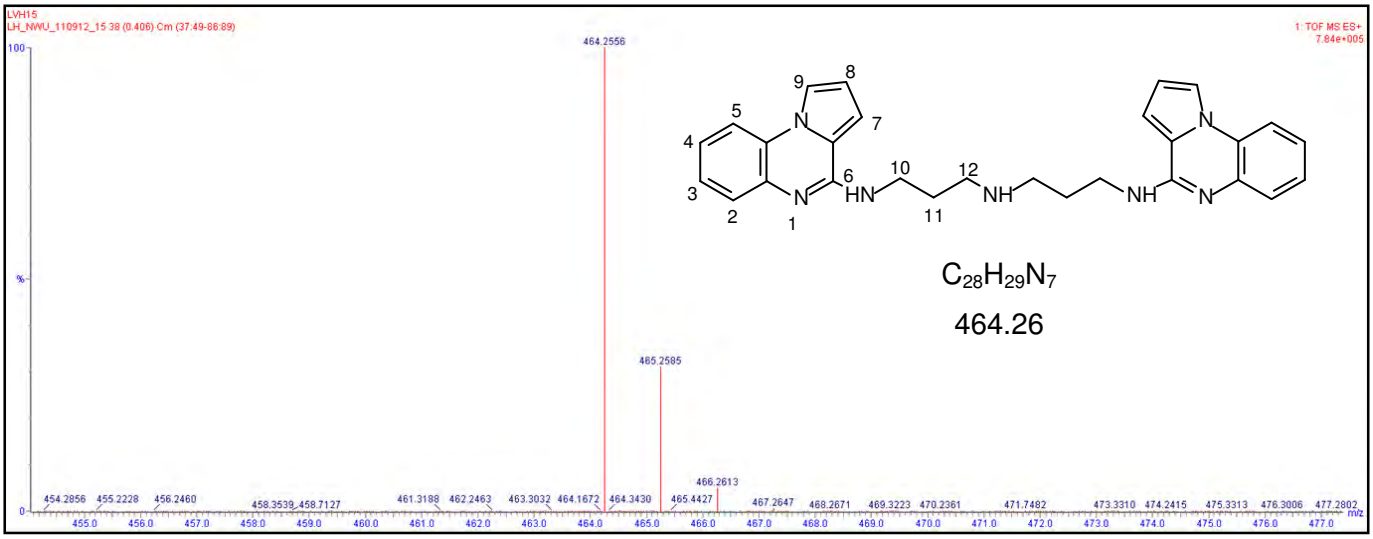
Spectrum 58: ^{13}C NMR of compound 18



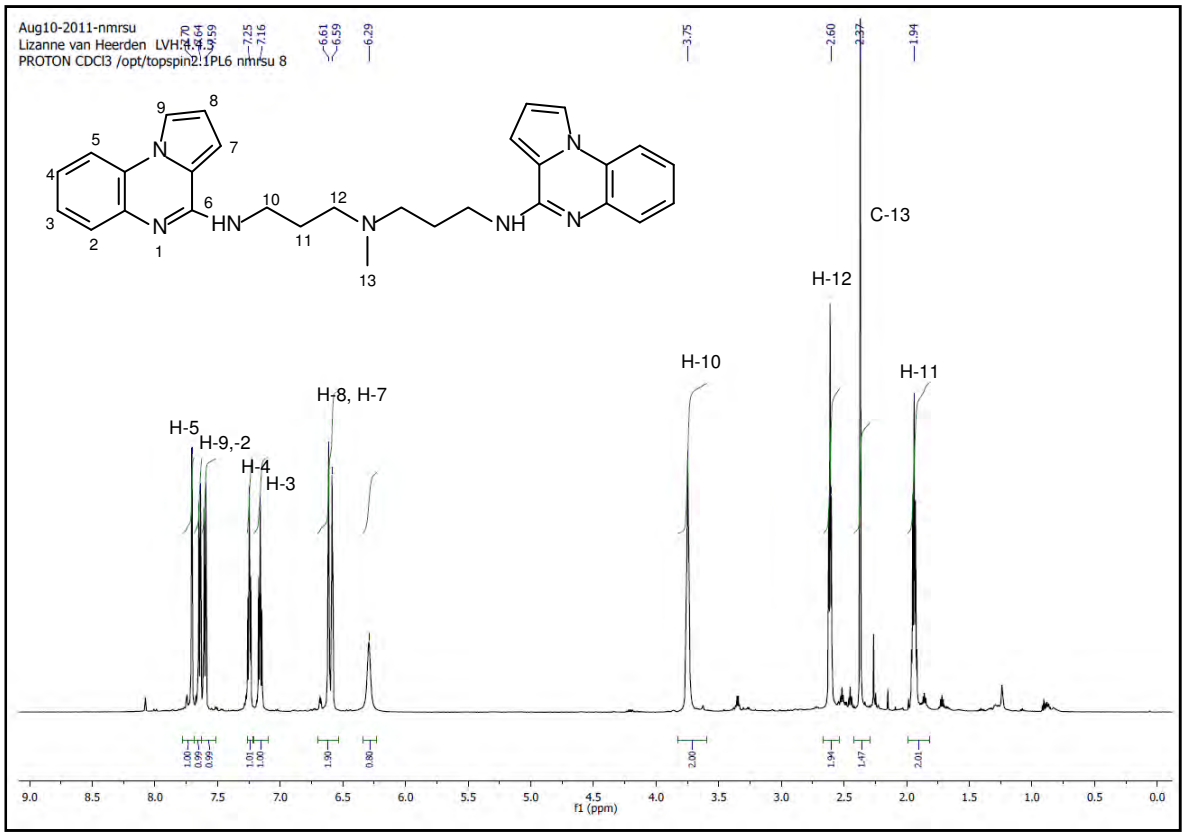
Spectrum 59: DEPT 135 NMR of compound 18



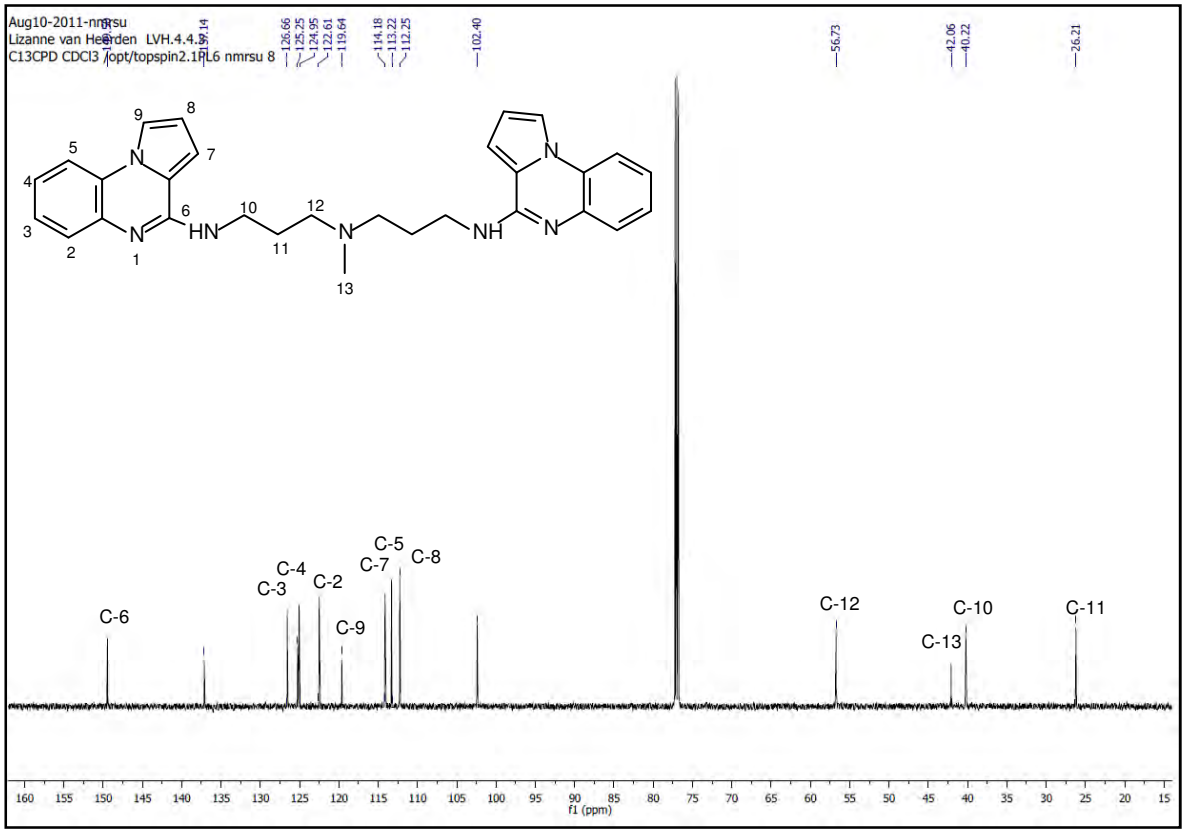
Spectrum 60: MS ES+ of compound 18



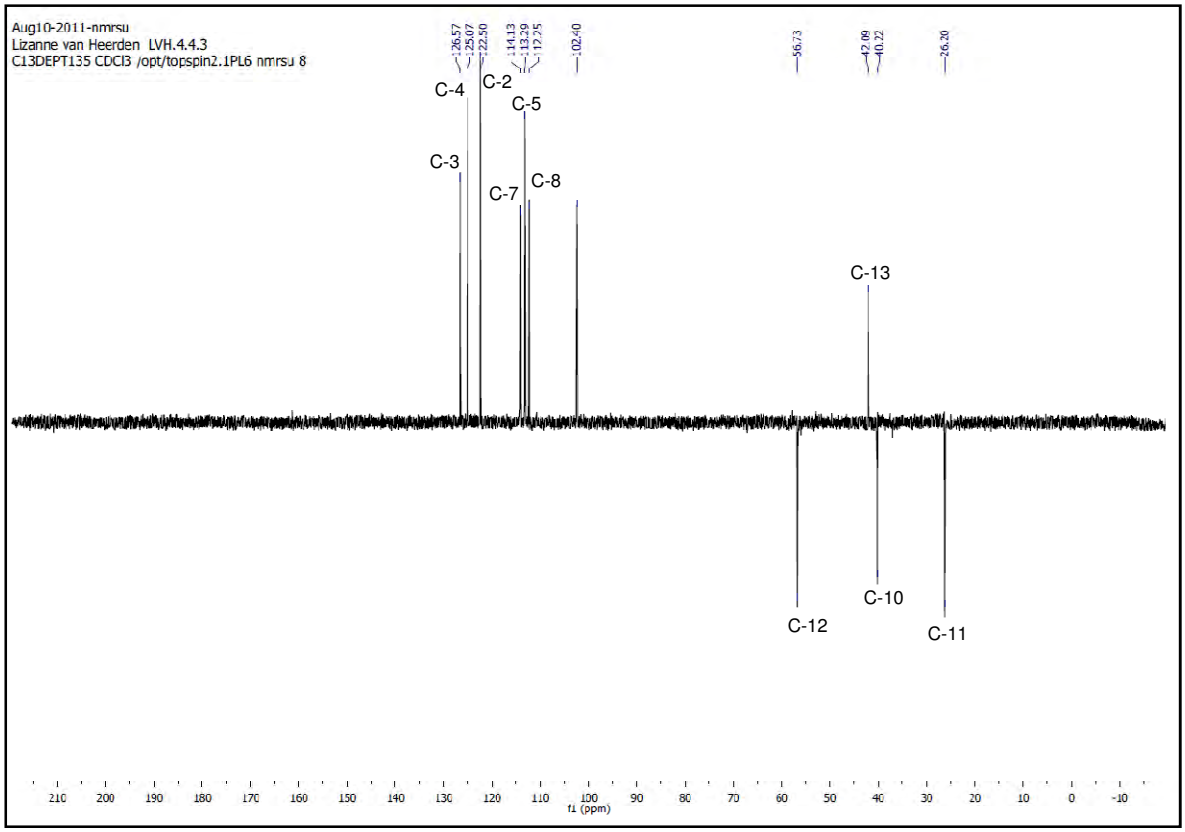
Spectrum 61: ^{1}H NMR of compound 19



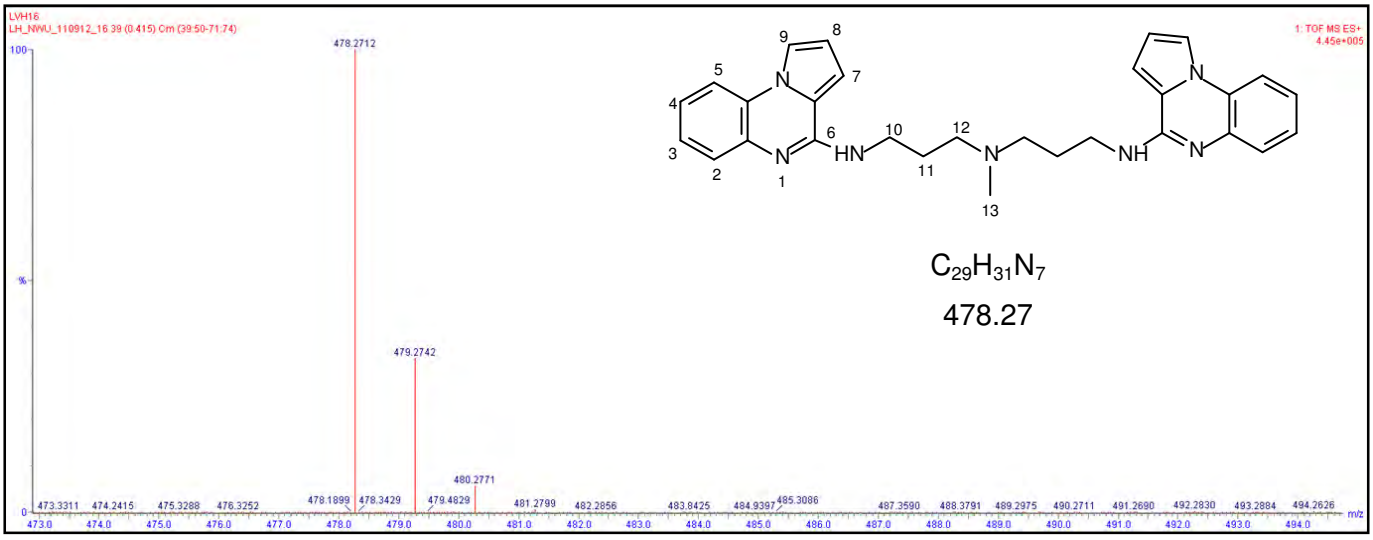
Spectrum 62: ^{13}C NMR of compound 19



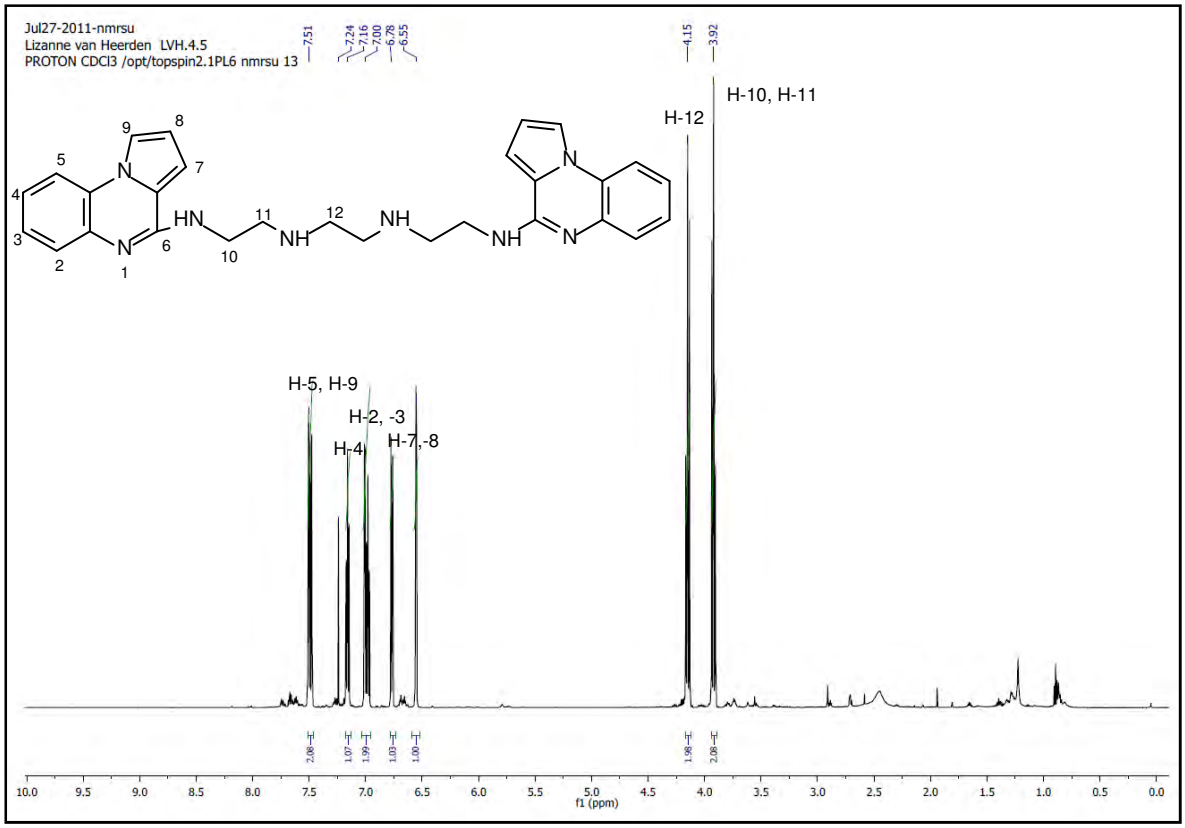
Spectrum 63: DEPT 135 NMR of compound 19



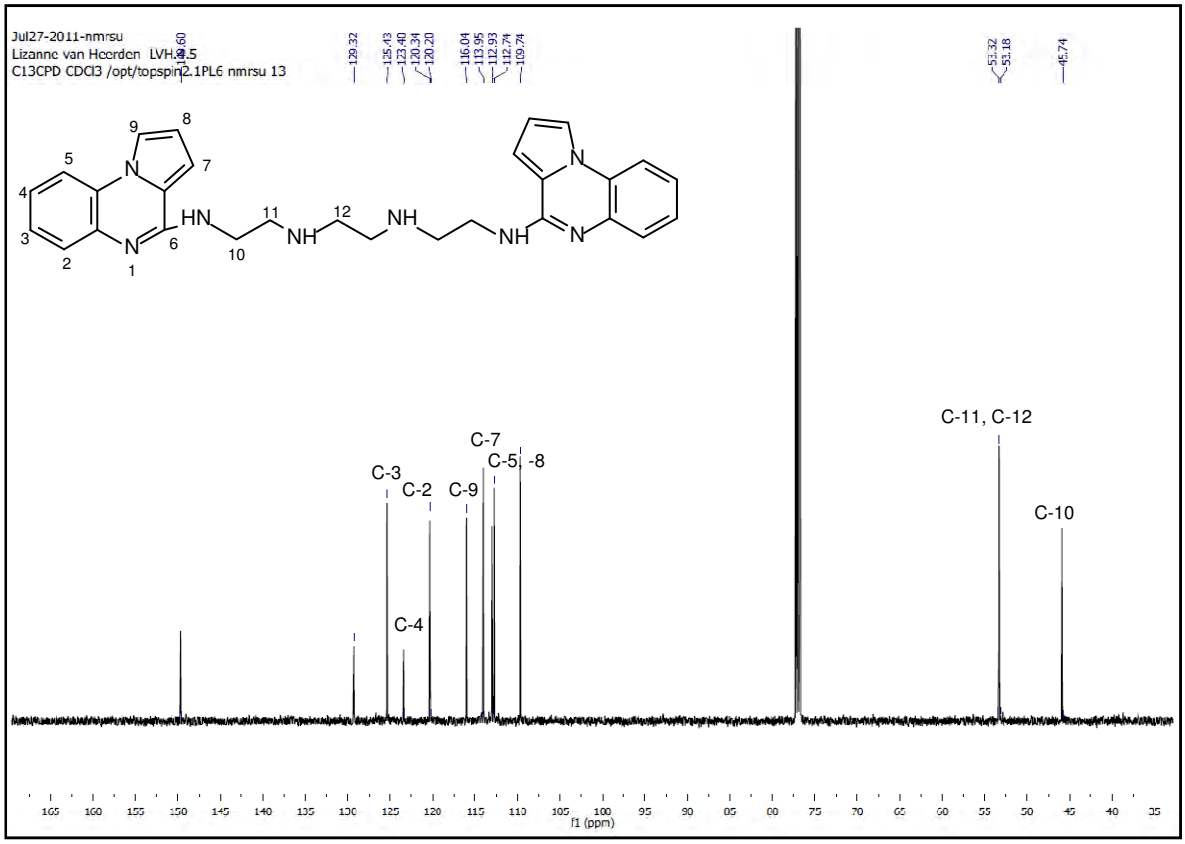
Spectrum 64: MS ES+ of compound 19



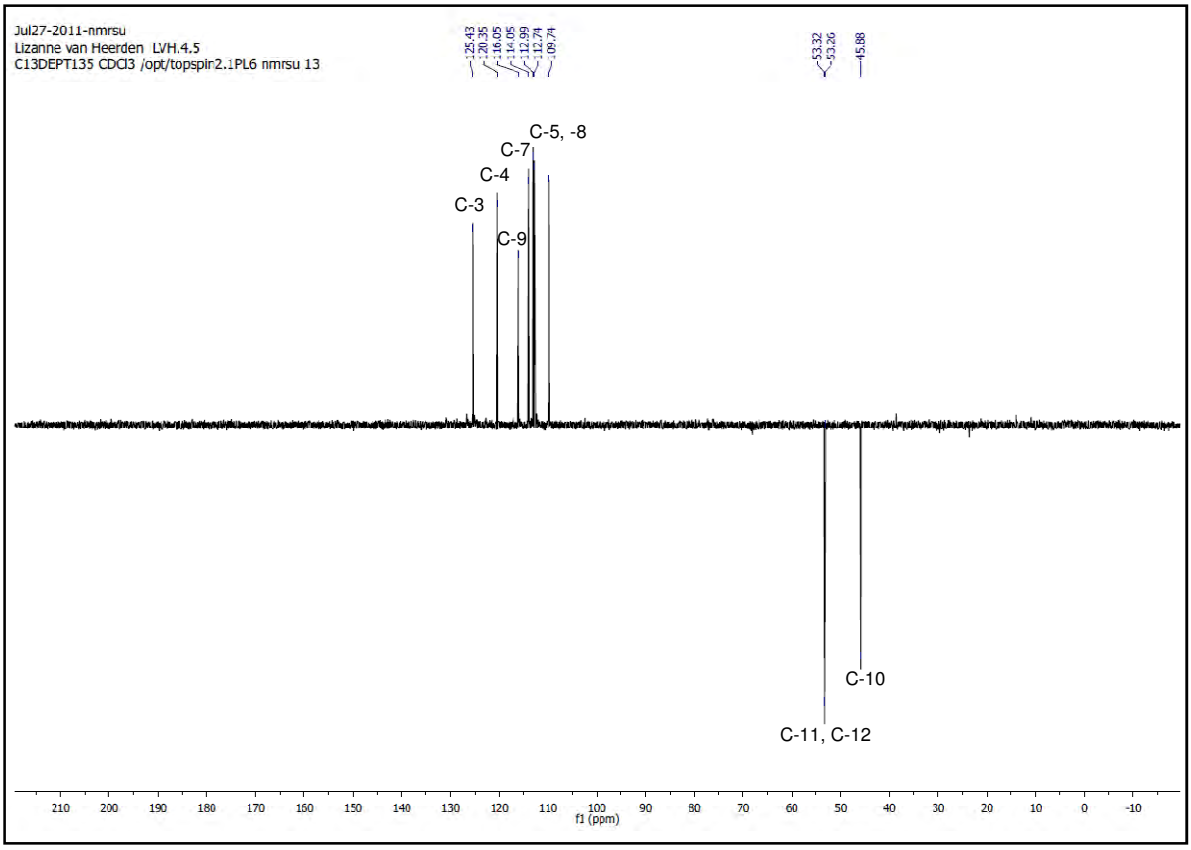
Spectrum 65: ^{1}H NMR of compound 20



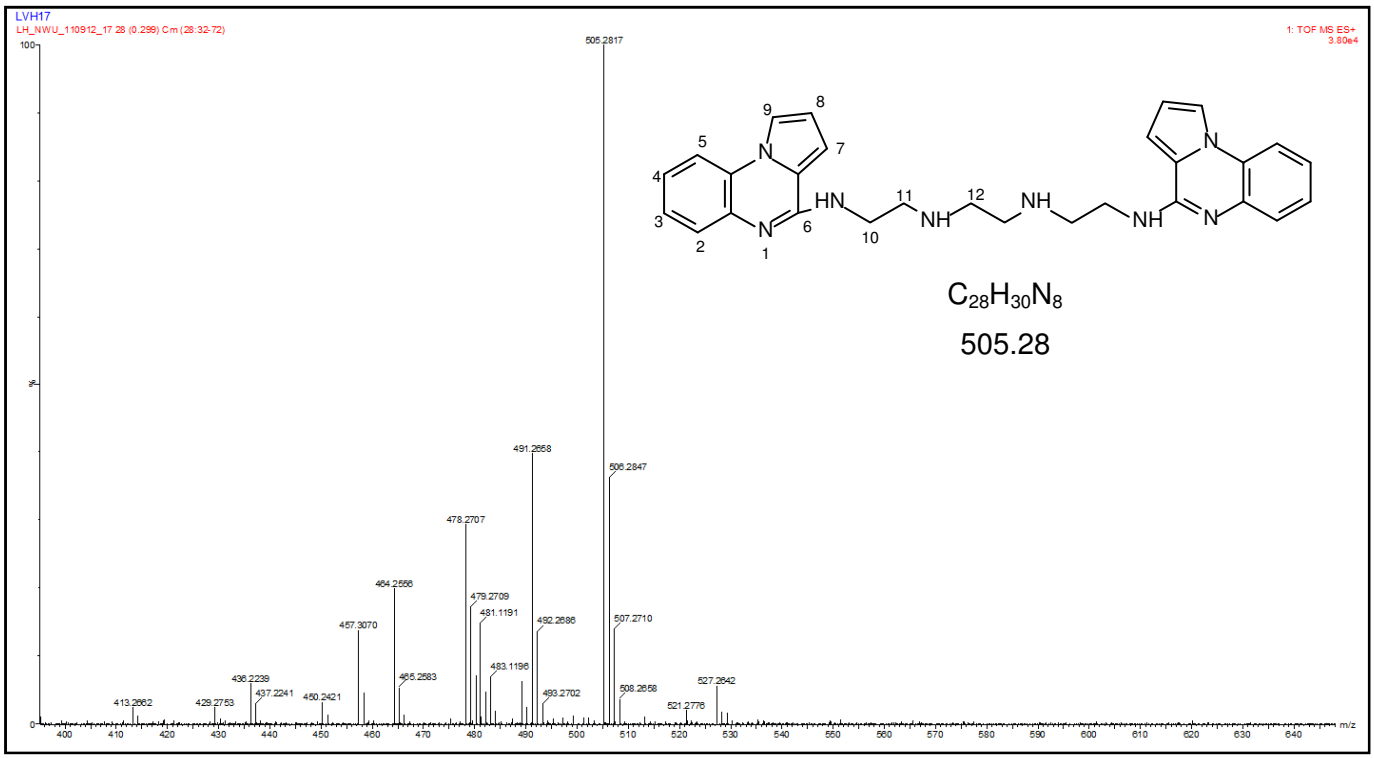
Spectrum 66: ^{13}C NMR of compound 20



Spectrum 67: DEPT 135 NMR of compound 20



Spectrum 68: MS ES+ of compound 20



Appenix B: Guide for Authors

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