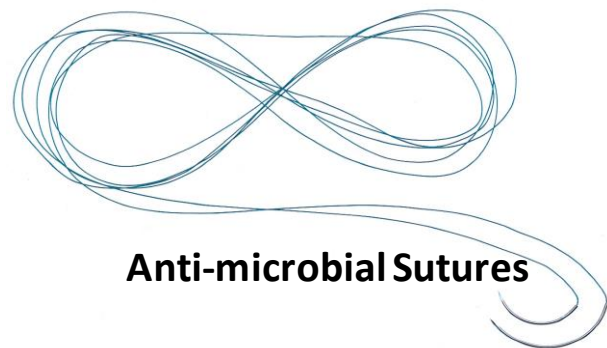
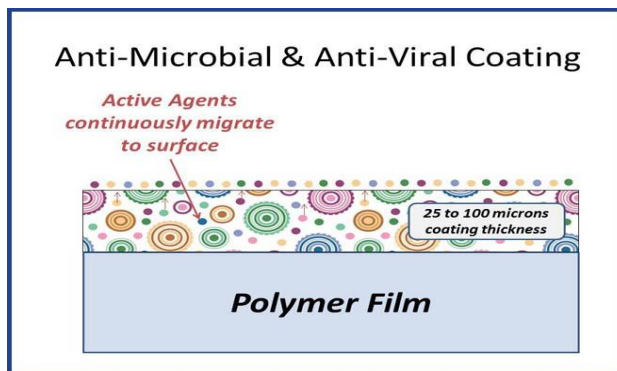


Bezwada Biomedical, LLC

Functionalized Anti-Microbial Compounds for Controlled Release Applications



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Functionalized Anti-Microbials for Controlled Release Applications

Indofine Chemicals is pleased to provide a portfolio of functionalized antimicrobial compounds. These functionalized anti-microbial compounds are prepared by functionalizing anti-microbial compounds such as Triclosan, Capsaicin, Chloroxylenol with safe and biocompatible molecules such as glycolic acid, lactic acid, p-dioxanone and caprolactone. This functionalization enhances the native value of anti-microbial compound and allows for the controlled release of anti-microbial compounds at the site of action over desired time-period. Furthermore, these functionalized anti-microbial compounds are hydrolysable and have improved bioavailability, efficacy. They are anticipated to degrade into safe and biocompatible molecules along with the active anti-microbial ingredient upon hydrolytic degradation. These antimicrobial compounds will provide extended anti-microbial properties to the substrate when incorporated in a bulk material or applied as a part of a coating. These functionalized anti-microbial compounds have potential applications in the same or similar areas as the non-functionalized anti-microbial compounds since the compounds retain the innate properties of the anti-microbial compound.

We are also working on functionalizing a number of natural anti-microbial compounds belonging to the class of flavonoids, polyphenols, catechins, alkaloids, coumarins and tannins. These will be available for commercialization once we have completed the studies.

Antimicrobial compounds are substances or mixture of substances used to destroy or suppress the growth of harmful microorganisms whether bacteria, viruses, or fungi on inanimate objects and surfaces.

Antimicrobial compounds are used in a wide variety of applications. These applications include consumer product, agricultural, food, cosmetic and medical device applications. A large number of commercial products use a number of these antimicrobial compounds. Some of these products include

- Soaps and hand-washes
- Laundry detergents and softeners
- Plastics (e.g. toys, cutting boards and kitchen utensils)
- Implantable and non-implantable medical devices
- Surgical scrubs & Hospital disinfectants
- Cosmetics and shaving creams
- Beddings and trash bags
- Acne treatment products
- Hair conditioners
- Pesticides

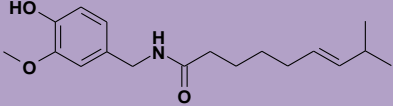
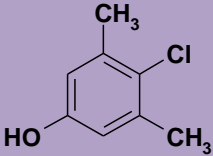
- Hot tubs and plastic lawn furniture

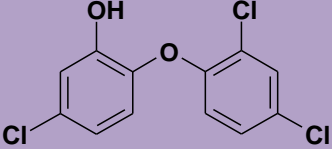
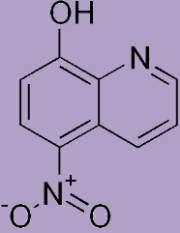
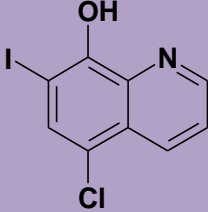
Antimicrobial compounds are either registered with EPA or are regulated by FDA depending upon its intended use and application. If an antimicrobial product is intended for use in the human body, it falls under the jurisdiction of FDA, rather than EPA. FDA categorizes antimicrobial products based on use and product claims. If a product makes a health related claim, such as “kills germs” it is registered as a drug by FDA. If a product makes no claim at all or if its claims are cosmetic, such as “fights odors” or “improves skin”, it is registered as a cosmetic. All uses not applied to the human body (bathroom and kitchen cleaners, hospital disinfectant), that make pesticidal claims, such as “Kills bacteria and mildew” are regulated by EPA as pesticides.

Antimicrobial compounds can be broadly classified as natural or synthetic. Alcohol (ethanol or isopropanol), chlorine bleach, hydrogen peroxide, quaternary ammonium chlorides and chlorinated phenolics are examples of synthetic antimicrobials that are used in a variety of applications. Similarly, a large number of compounds extracted from medicinal plants have antimicrobial properties. These include compounds from the class of Coumarins, Tannins, Alkaloids, Quinones, Terpenoids and Flavonoids.

The table below describes the properties of five anti-microbial compounds which have been functionalized and presented in this catalog. These functionalized anti-microbial compounds will provide extended anti-microbial properties to the substrates when incorporated in bulk or applied as a part of the coating. Furthermore, they are anticipated to release the active anti-microbial ingredient along with safe and biocompatible molecules such as lactic and glycolic acid upon hydrolysis. They can be used in a variety of biomedical applications. Some examples of these biomedical applications include the following.

- Anti-microbial surgical sutures
- Anti-microbial surgical scrubs and drapes
- Anti-microbial catheters to prevent Catheter related Blood Stream Infection (CRBSI)
- Anti-microbial coating on medical devices
- Anti-microbial solutions and sprays to prevent wound infection
- Antimicrobial non-woven and woven fabrics
- Anti-microbial and pain relieving gels and ointments

Name	Antimicrobial Activity Description
<p style="text-align: center;">Capsaicin</p> 	<p>Capsaicin is a biologically active phenolic that is the active component of cayenne pepper. Capsaicin is an amide of vanillylamine and C8 to C13 branched fatty acids. It is known to have anti-inflammatory, anti-bacterial, anti-fungal and pain relieving properties. It is found to be active both against gram positive and gram negative bacteria. The plain and heated extracts of different species of capsicum were found to exhibit varying degrees of inhibition against <i>Bacillus cereus</i>, <i>Bacillus subtilis</i>, <i>Clostridium sporogenes</i>, <i>Clostridium tetani</i>, and <i>Streptococcus pyogenes</i>¹. Topical application of capsaicin stimulates and blocks small pain fibers by depleting them of the neurotransmitter that transmit impulses. This reduces or abolishes the transmission of painful stimuli leading to reduced pain sensation². In addition capsaicin has been recently reported to show cholesterol lowering effect. Furthermore capsaicin also prevents oxidative stress by increasing the blood flow as well as energy expenditure³.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Cichewicz RH, Thorpe PA J Ethnopharmacol. 1996 Jun; 52(2):61-70 2. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. Patent No. 20090076174. 3. Shubha MC. Appl Physiol Nutr Metab. 2011 Apr; 36(2):201-9.
<p style="text-align: center;">Chloroxylenol</p> 	<p>Chloroxylenol is an antimicrobial compound used to control bacteria, algae and fungi. Chloroxylenol preparation containing ethylenediamine tetraacetic acid has been found to be effective against both gram positive and gram negative bacteria¹. It exhibits its antibacterial action by denaturation of proteins and inactivation of enzymes in the microorganisms resulting in altered permeability of cell membrane that could result in the uncoupling of oxidative phosphorylation, inhibition of active transport, and loss of pool metabolites due to cytoplasmic membrane damage disrupting cell membrane potentials²</p> <p>References:</p> <ol style="list-style-type: none"> 1. Journal of Applied Microbiology. 1977; 43 (2): 253–260 2. American Journal of Infection Control 1998 16 (4): 173–177

<p style="text-align: center;">Triclosan</p> 	<p>Triclosan is a chlorinated aromatic compound containing ether and phenol group. The anti-bacterial property of Triclosan has led to its widespread use in a number of medical devices and consumer product applications. It possess reasonable activity against mycobacterial and <i>Candida</i> spp. but has little activity against filamentous fungi. Mechanism of Action: Triclosan penetrates bacterial cells and disrupts cytoplasmic membrane and synthesis of RNA, fatty acids, and proteins.</p>
<p style="text-align: center;">Nitroxoline</p> 	<p>Nitroxoline, derivative of 8-oxyquinolines is an antimicrobial drug with broad spectrum of antibacterial activity. It has also shown in-vitro anti-fungal activities¹. Nitroxoline actively inhibits the synthesis of bacterial DNA. It is found to be active against gram-positive and gram-negative microorganisms. It is effective against urinary tract infections. It is commercially sold under the tradename of Nicene[®]-N as a urinary antibacterial agent active against susceptible gram-positive and gram-negative organisms commonly found in urinary tract infections. It was recently discovered that nitroxoline has anti-angiogenic properties, which could make it useful as an anti-cancer drug².</p> <p>References:</p> <ol style="list-style-type: none"> 1. Francis O'Grady, Barbara Smith. <i>The Journal of Pathology and Bacteriology</i>. 1966. 92 (1): 43–48 2. Joong S S <i>et al.</i> <i>J Natl Cancer Inst.</i> 2010. 102 (24): 1855–1873.
<p style="text-align: center;">Clioquinol</p> 	<p>Clioquinol is used as antibacterial and antifungal drug. It is a member of family of drugs called hydroxyquinolines which inhibit certain enzymes related to DNA replication. These drugs have been found to be active against both viral and protozoal infections¹. It is administered orally in the treatment of amebic dysentery. Being an anti-infective, it is used in treatment of gynecological infections, dermatological and protozoal diseases.</p> <p>Reference:</p> <ol style="list-style-type: none"> 1. Rohde W <i>et al.</i> <i>Antimicrob. Agents Chemother.</i> 1976 10 (2): 234–40.

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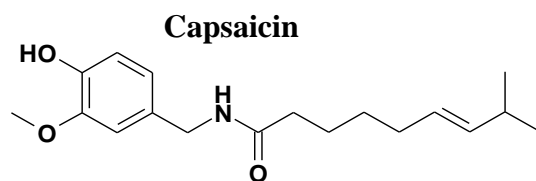
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Capsaicin is a biologically active phenolic that is the active component of cayenne pepper. Capsaicin is an amide of vanillylamine and C8 to C13 branched fatty acids. It is known to have anti-inflammatory, anti-bacterial, anti-fungal and pain relieving properties. It is found to be active both against gram positive and gram negative bacteria. The plain and heated extracts of different species of capsicum were found to exhibit varying degrees of inhibition against *Bacillus cereus*, *Bacillus subtilis*, *Clostridium sporogenes*, *Clostridium tetani*, and *Streptococcus pyogenes*¹. Topical application of capsaicin stimulates and blocks small pain fibres by depleting them of the neurotransmitter that mediate impulses. This reduces or abolishes the transmission of painful stimuli leading to reduced pain sensation². In addition capsaicin has been recently reported to show cholesterol lowering effect. Furthermore capsaicin also prevents oxidative stress by increasing the blood flow as well as energy expenditure³.

Wide spectrum therapeutic potential of this compound motivated us to enhance its native value by functionalizing it with safe and biocompatible molecules such as glycolic acid, lactic acid, caprolactone and p-dioxanone. These molecules are the key components of commercially available medical devices. This functionalization enhances the native value of Capsaicin and allows for the controlled release of Capsaicin at the site of action over desired time period along with increased solubility. Furthermore, these hydrolysable Capsaicin compounds have improved bioavailability, improved efficacy and are also anticipated to degrade into safe and biocompatible molecules. This functionalization is expected to enhance the native value, solubility and bioavailability of Capsaicin along with controlled degradation profiles.

Potential Applications of Functionalized capsaicin molecules shown below include Topical ointments to reduce pain and inflammation and anti-microbial sprays.

References:

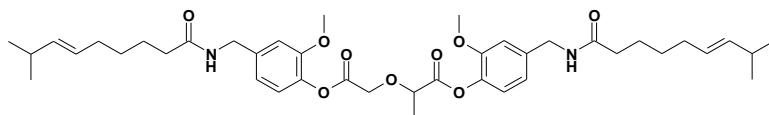
4. Cichewicz RH, Thorpe PA J Ethnopharmacol. 1996 Jun; 52(2):61-70
5. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. Patent Publication No. 20090076174.
6. Shubha MC. Appl Physiol Nutr Metab. 2011 Apr; 36(2):201-9.
7. Lee CY et al. Phytother Res. 2003 May; 17(5):454-8.
8. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent No.8, 163, 806.
9. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent Publication No.8, 053,591.
10. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent Publication No.8, 026,285.
11. Bezwada, Rao S. Functionalized drugs and polymers derived therefrom. US Patent Publication No.7, 691,364.
12. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent Publication No. 20120095114.
13. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent Publication No.20120010284.
14. Bezwada, Rao S. Functionalized drugs and polymers therefrom. US Patent Publication No.20100152272.
15. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent Publication No.20090105352.
16. Bezwada, Rao S. Functionalized drugs and polymers derived therefrom. US Patent Publication No.20060172983.

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19-2120 2-{2-Methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenoxy-carbonylmethoxy}-propionic acid 2-methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenyl ester

C₄₁H₅₈N₂O₉

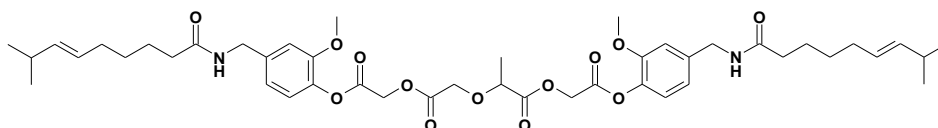
MW 722.93



19-2121 2-{2-Methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenoxy-carbonylmethoxy}-propionic acid 2-methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenyl ester

C₄₁H₅₈N₂O₉

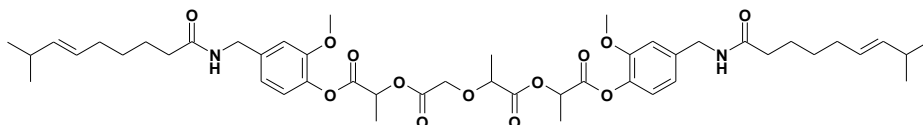
MW 722.93



19-2122 2-(1-{2-Methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenoxy-carbonyl}-ethoxycarbonylmethoxy)-propionic acid 1-{2-methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenoxy-carbonyl}-ethyl ester

C₄₇H₆₆N₂O₁₃

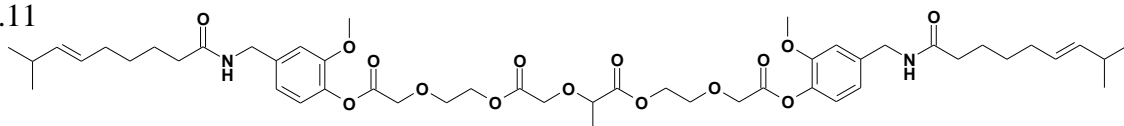
MW 867.06



19-2123 2-(2-{2-Methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenoxy-carbonylmethoxy}-ethoxycarbonylmethoxy)-propionic acid 2-{2-methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenoxy-carbonylmethoxy}-ethyl ester

C₄₉H₇₀N₂O₁₅

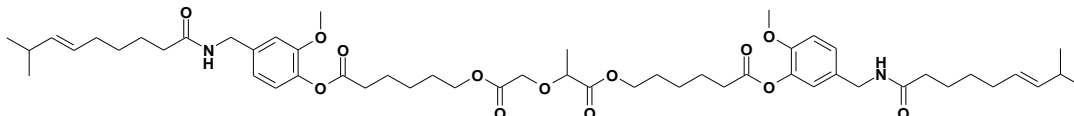
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19-2124 6-[2-(4-{2-Methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenoxy-carbonyl};)-butoxycarbonylmethoxy)-propionyloxy]-hexanoic acid 2-methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenyl ester

C₅₂H₇₆N₂O₁₂

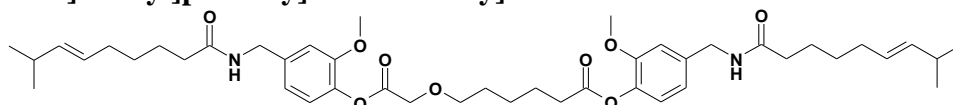
MW 937.19



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C₄₄H₆₄N₂O₉

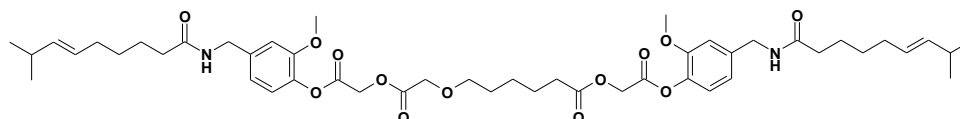
MW 765.01



19-2126 [2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethyl] 6-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]-2-oxo-ethoxy]hexanoate

C₄₈H₆₈N₂O₁₃

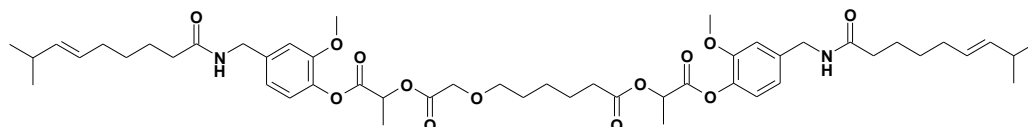
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C₅₀H₇₂N₂O₁₃

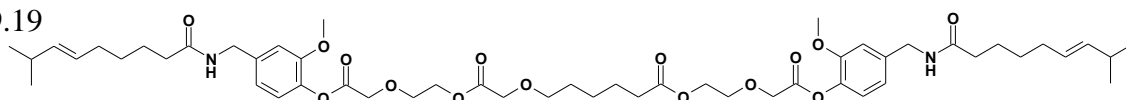
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C₅₂H₇₆N₂O₁₅

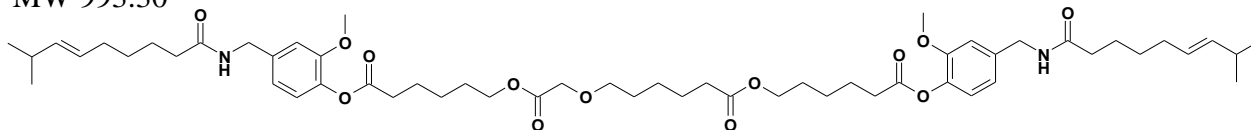
MW 969.19



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C₅₆H₈₄N₂O₁₃

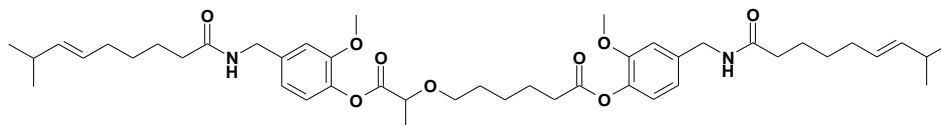
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C₄₅H₆₆N₂O₉

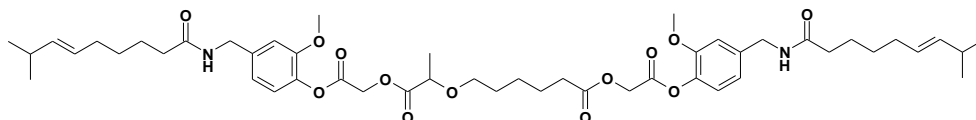
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C₄₉H₇₀N₂O₁₃

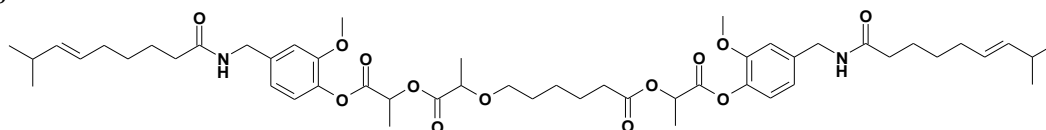
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C₅₁H₇₄N₂O₁₃

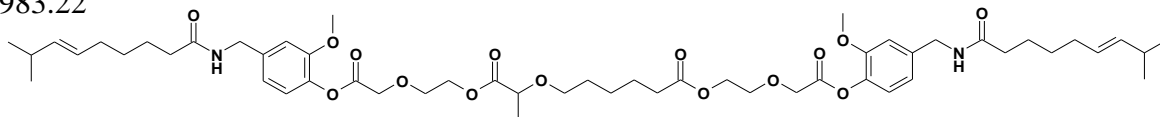
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C₅₃H₇₈N₂O₁₅

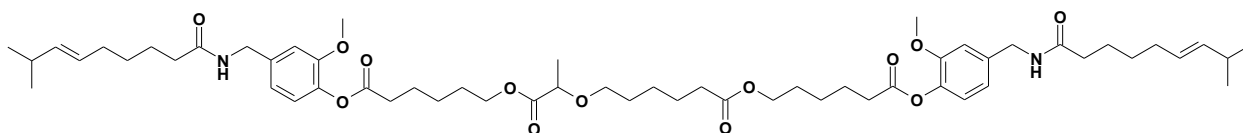
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C₅₇H₈₆N₂O₁₃

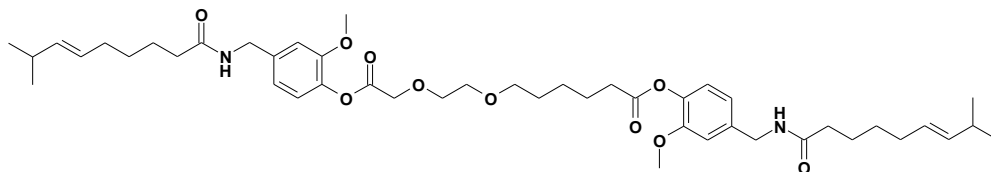
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C₄₆H₆₈N₂O₁₀

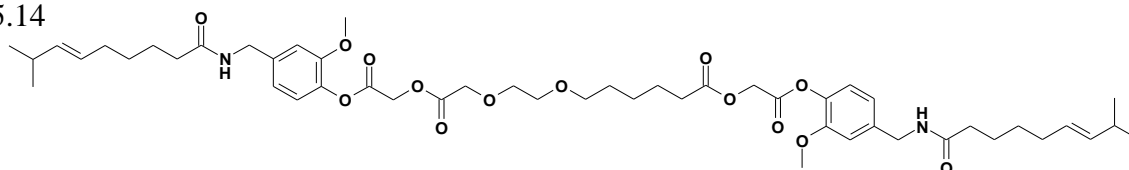
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C₅₀H₇₂N₂O₁₄

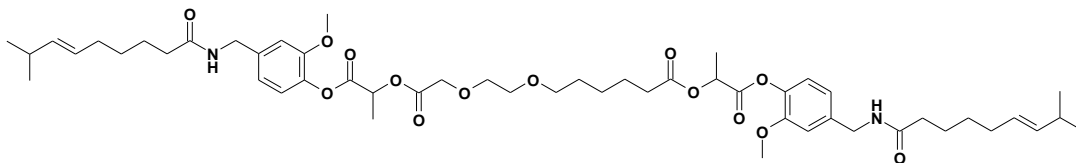
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19-2137 [2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-1-methyl-2-oxo-ethyl] 6-[2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-1-methyl-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]hexanoate

C₅₂H₇₆N₂O₁₄

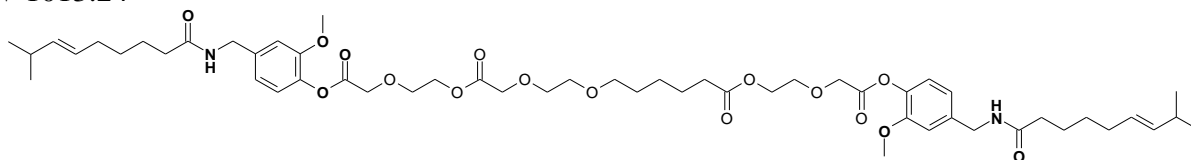
MW 953.19



19-2138 2-[2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]ethyl 6-[2-[2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]ethoxy]hexanoate

C₅₄H₈₀N₂O₁₆

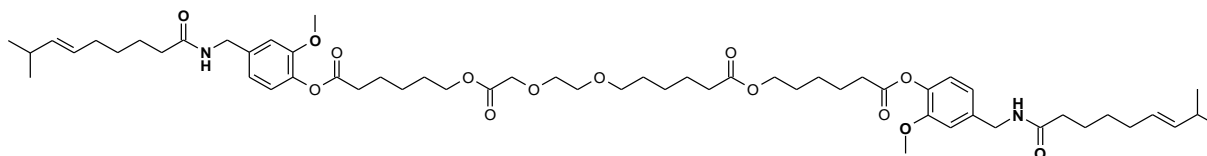
MW 1013.24



19-2139 [6-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-6-oxo-hexyl] 6-[2-[2-[6-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-6-oxo-hexoxy]-2-oxo-ethoxy]ethoxy]hexanoate

C₅₈H₈₈N₂O₁₄

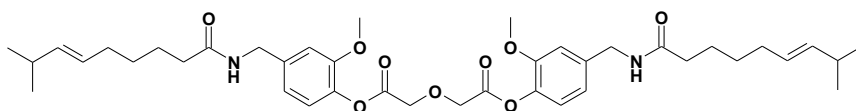
MW 1037.35



19-2140 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]acetate

C₄₀H₅₆N₂O₉

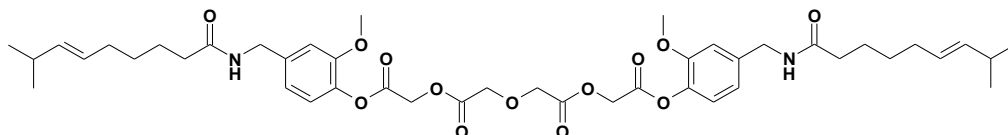
MW 708.88



19-2141 [2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethyl] 2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]-2-oxo-ethoxy]acetate

C₄₄H₆₀N₂O₁₃

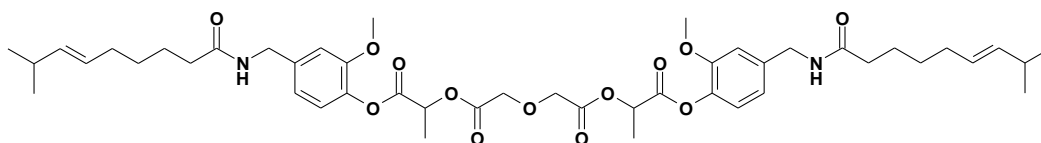
MW 824.97



19-2142 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 2-[2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-1-methyl-2-oxo-ethoxy]-2-oxo-ethoxy]acetyl]oxypropanoate

C₄₆H₆₄N₂O₁₃

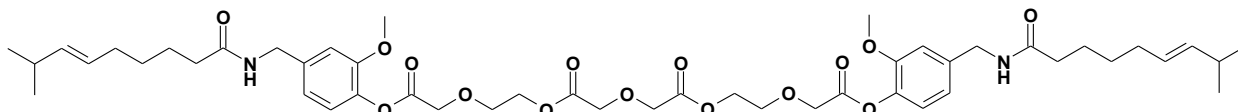
MW 853.03



19-2143 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 2-[2-[2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]acetyl]oxyethoxy]acetate

C₄₈H₆₈N₂O₁₅

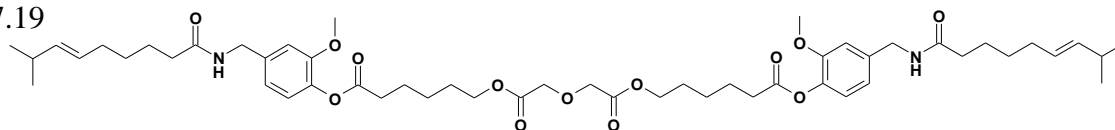
MW 913.08



19-2144 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 6-[2-[2-[5-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-5-oxo-pentoxy]-2-oxo-ethoxy]acetyl]oxyhexanoate

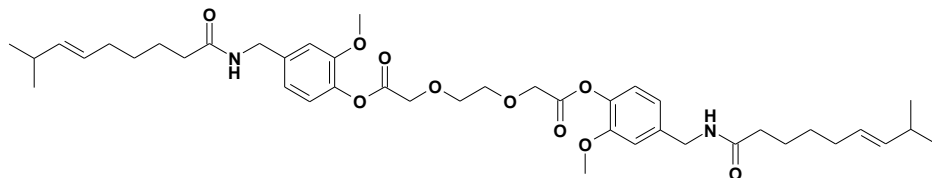
C₅₂H₇₆N₂O₁₃

MW 937.19



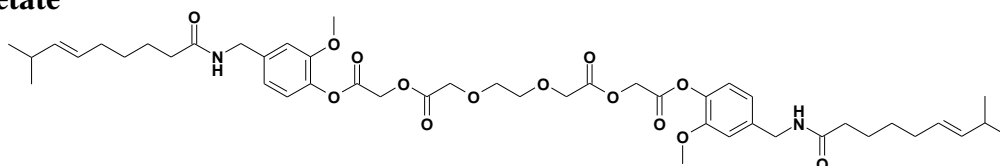
19-2145 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]ethoxy]acetate

C₄₂H₆₀N₂O₁₀
MW 752.93



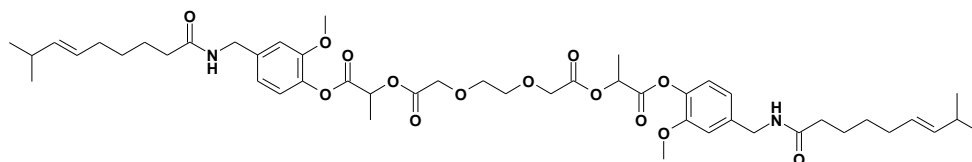
19-2146 [2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethyl] 2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]acetate

C₄₆H₆₄N₂O₁₄
MW 869.03



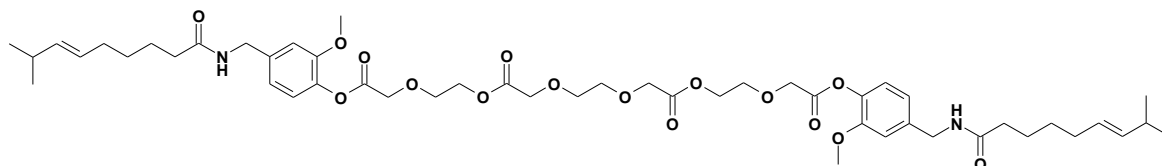
19-2147 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 2-[2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-1-methyl-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]acetyl]oxypropanoate

C₄₈H₆₈N₂O₁₄
MW 897.08



19-2148 2-[2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]ethyl 2-[2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]ethoxy]acetate

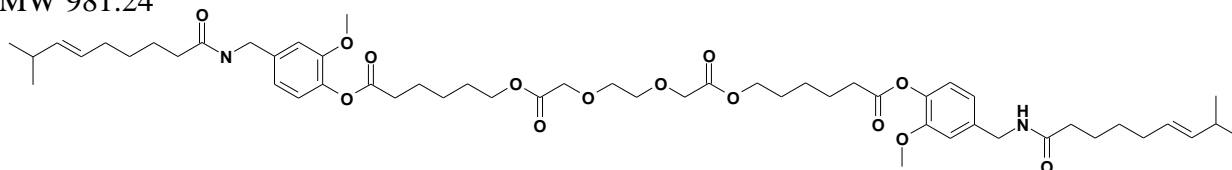
C₅₀H₇₂N₂O₁₆
MW 957.14



19-2149 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 6-[2-[2-[2-[5-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-5-oxo-pentoxy]-2-oxo-ethoxy]ethoxy]acetyl]oxyhexanoate

C₅₄H₈₀N₂O₁₄

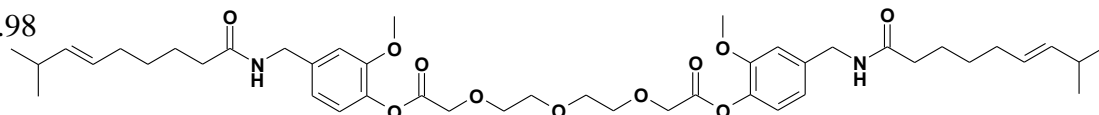
MW 981.24



19-2150 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 2-[2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetate

C₄₄H₆₄N₂O₁₁

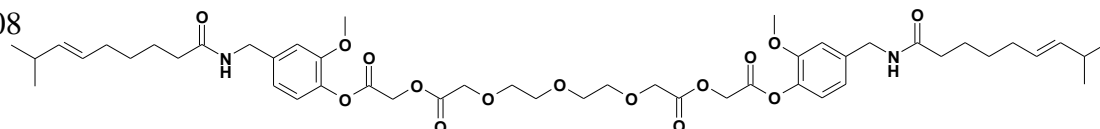
MW 796.98



19-2151 [2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethyl] 2-[2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetate

C₄₈H₆₈N₂O₁₅

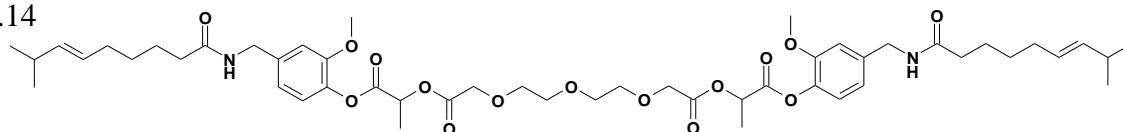
MW 913.08



19-2152 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 2-[2-[2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-1-methyl-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetyl]oxypropanoate

C₅₀H₇₂N₂O₁₅

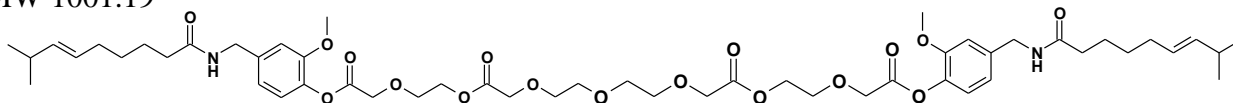
MW 941.14



19-2153 2-[2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]ethyl 2-[2-[2-[2-[2-[2-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetate

C₅₂H₇₆N₂O₁₇

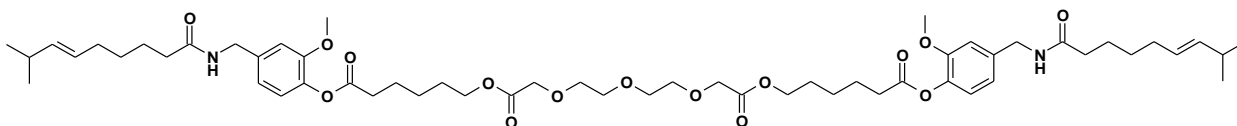
MW 1001.19



19-2154 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 6-[2-[2-[2-[2-[6-[2-methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-6-oxo-hexoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetyl]oxyhexanoate

C₅₆H₈₄N₂O₁₅

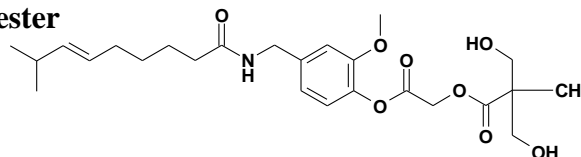
MW 1025.30



19-2155 3-Hydroxy-2-hydroxymethyl-2-methylpropionic acid 2-methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenoxy carbonylmethyl ester

C₂₅H₃₇NO₈

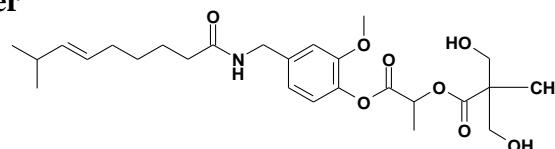
MW 479.5



19-2156 3-Hydroxy-2-hydroxymethyl-2-methyl-propionic acid 1-{2-methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenoxy carbonyl}-ethyl ester

C₂₆H₃₉NO₈

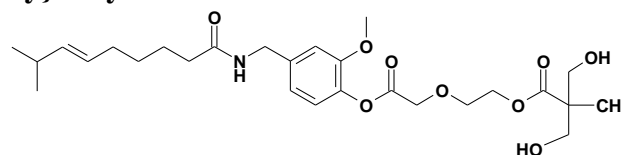
MW 493.60



19-2157 3-Hydroxy-2-hydroxymethyl-2-methylpropionic acid 2-{2-methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenoxy carbonyl methoxy}-ethyl ester

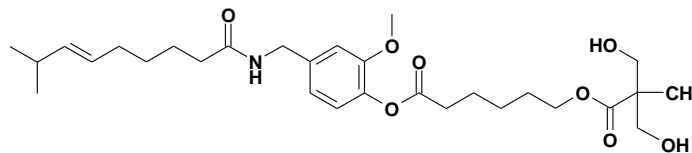
C₂₇H₄₁NO₉

MW 523.63



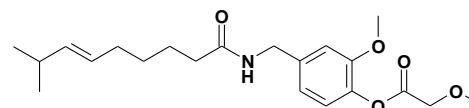
19-2158 6-(3-Hydroxy-2-hydroxymethyl-2-methyl-propionyloxy)-hexanoic acid 2-methoxy-4-[(8-methyl-non-6-enoylamino)-methyl]-phenyl ester

C₂₉H₄₅NO₈
MW 535.68



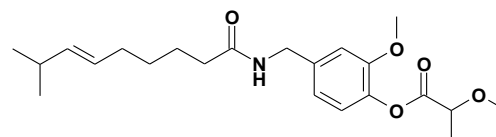
19-2520 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 2-methoxyacetate

C₂₁H₃₁NO₅
MW 377.47



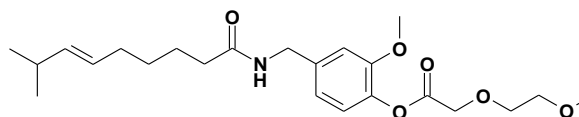
19-2521 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 2-methoxypropanoate

C₂₂H₃₃NO₅
MW 391.50



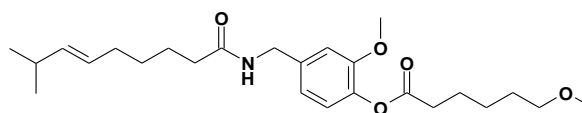
19-2522 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 2-(2-methoxyethoxy)acetate

C₂₃H₃₅NO₆
MW 421.53



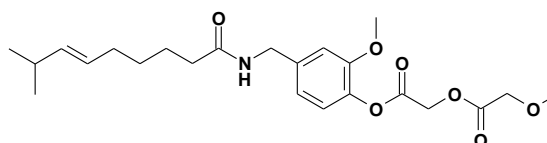
19-2523 [2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenyl] 6-methoxyhexanoate

C₂₅H₃₉NO₅
MW 433.58



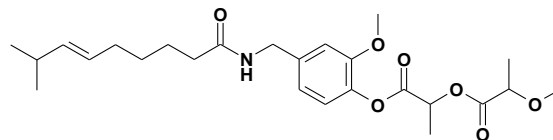
19-2524 [2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethyl] 2-methoxyacetate

C₂₃H₃₃NO₇
MW 435.51



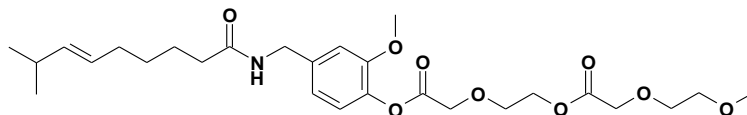
19-2525 [2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-1-methyl-2-oxo-ethyl] 2-methoxypropanoate

C₂₅H₃₇NO₇
MW 463.56



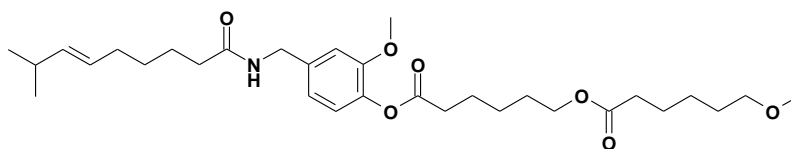
19-2526 2-[2-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-2-oxo-ethoxy]ethyl 2-(2-methoxyethoxy)acetate

C₂₇H₄₁NO₉
MW 523.62

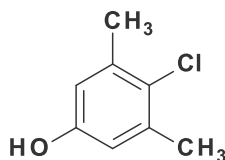


19-2527 [6-[2-Methoxy-4-[[[(E)-8-methylnon-6-enoyl]amino]methyl]phenoxy]-6-oxo-hexyl] 6-methoxyhexanoate

C₃₁H₄₉NO₇
MW 547.71



Chloroxylenol



Chloroxylenol is an antimicrobial compound used to control bacteria, algae and fungi.. Chloroxylenol preparation containing ethylenediamine tetraacetic acid has been found to be effective against both gram positive and gram negative bacteria¹. It exhibits its antibacterial action by denaturation of proteins and inactivation of enzymes in the microorganisms resulting in altered permeability of cell membrane that could result in the uncoupling of oxidative phosphorylation, inhibition of active transport, and loss of pool metabolites due to cytoplasmic membrane damage disrupting cell membrane potentials²

Wide spectrum anti-microbial potential of this compound motivated us to enhance its native value by functionalizing it with safe and biocompatible molecules such as glycolic acid, lactic acid, caprolactone and p-dioxanone. These molecules are the key components of commercially available medical devices. This functionalization enhances the native value of Chloroxylenol and allows for the controlled release of Chloroxylenol at the site of action over desired time period along with increased solubility. Furthermore, these hydrolysable Chloroxylenol compounds have improved bioavailability, improved efficacy and are also anticipated to degrade into safe and biocompatible molecules. This functionalization is expected to enhance the native value, solubility and bioavailability of chloroxylenol along with controlled degradation profiles.

Potential applications of functionalized chloroxylenol molecules shown below includes (a) broad spectrum antimicrobial in disinfectants, antiseptics, and soaps (b) topical antiseptic for skin and mucous membranes (c) antimicrobial in cosmetic formulations and (d) as fungicide for adhesives, paints, textiles, paper products, and polishes.

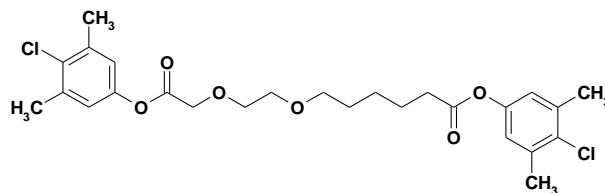
Reference:

3. Journal of Applied Microbiology.1977; 43 (2): 253–260
4. American Journal of Infection Control 1998 16 (4): 173–177
5. Bezwada, Rao S.Controlled release of biologically active compounds from multi-armed oligomers. US Patent Publication No. 20090076174.
6. Bezwada, Rao S.Controlled release of biologically active compounds from multi-armed oligomers.US Patent No.8, 163, 806.
7. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent No.8, 053,591.
8. Bezwada, Rao S.Controlled release of biologically active compounds from multi-armed oligomers. US Patent No.8, 026,285.
9. Bezwada, Rao S. Functionalized drugs and polymers derived therefrom. US Patent No.7, 691,364.
10. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent Publication No. 20120095114.
11. Bezwada, Rao S.Controlled release of biologically active compounds from multi-armed oligomers. US Patent Publication No.20120010284.
12. Bezwada, Rao S. Functionalized drugs and polymers therefrom. US Patent Publication No.20100152272.
13. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release.US Patent Publication No.20090105352.
14. Bezwada, Rao S. Functionalized drugs and polymers derived therefrom.US Patent Publication No.20060172983.

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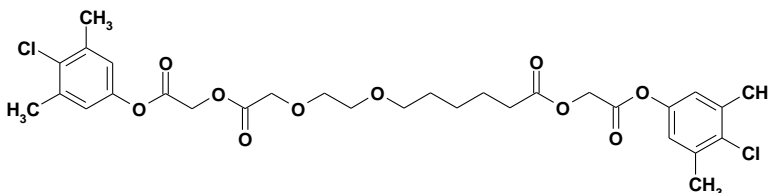
19-2159 6-[2-(4-Chloro-3,5-dimethyl-phenoxy)carbonylmethoxy]-ethoxy]-hexanoic acid 4-chloro-3,5-dimethyl-phenyl ester

$C_{26}H_{32}Cl_2O_6$
MW 511.45



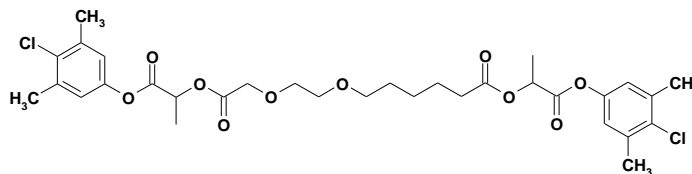
19-2160 6-[2-(4-Chloro-3,5-dimethyl-phenoxy)carbonylmethoxycarbonylmethoxy]-ethoxy]-hexanoic acid 4-chloro-3,5-dimethyl-phenoxy carbonylmethyl ester

$C_{30}H_{36}Cl_2O_{10}$
627.52



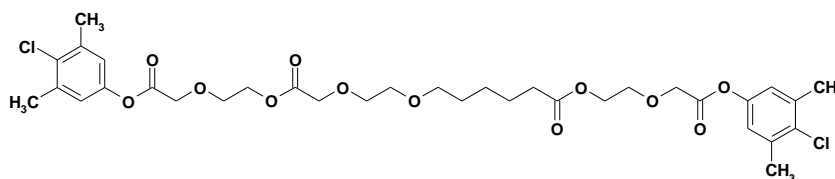
19-2161 6-{2-[1-(4-Chloro-3,5-dimethyl-phenoxy)carbonyl]-ethoxycarbonylmethoxy}-ethoxy}-hexanoic acid 1-(4-chloro 3,5-dimethyl-phenoxy)carbonyl-ethyl ester

$C_{32}H_{40}Cl_2O_{10}$
655.58



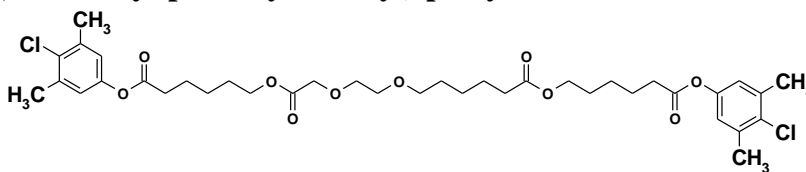
19-2162 6-{2-[2-(4-Chloro-3,5-dimethyl-phenoxy)carbonylmethoxy]-ethoxycarbonylmethoxy}-ethoxy}-hexanoic acid 2-(4-chloro-3,5-dimethyl-phenoxy)carbonyl-ethyl ester

$C_{34}H_{44}Cl_2O_{12}$
715.63



19-2163 6-[2-[5-(4-Chloro-3,5-dimethyl-phenoxy)carbonyl]-pentyloxycarbonylmethoxy]-ethoxy}-hexanoic acid 5-(4-chloro-3,5-dimethyl-phenoxy)carbonyl-pentyl ester

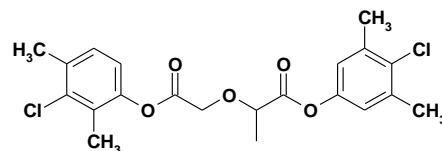
$C_{38}H_{52}Cl_2O_{10}$
739.74



19-2164 2-(3-Chloro-2,4-dimethyl-phenoxy-carbonylmethoxy)-propionic acid 4-chloro-3,5-dimethyl-phenyl ester

C₂₁H₂₂Cl₂O₅

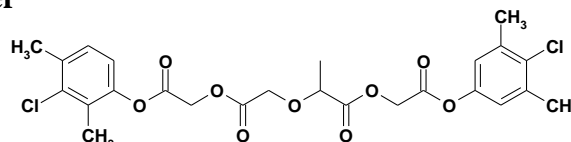
425.31



19-2165 2-(3-Chloro-2,4-dimethyl-phenoxy-carbonylmethoxycarbonylmethoxy)-propionic acid 4-chloro-3,5-dimethyl-phenoxy-carbonylmethyl ester

C₂₅H₂₆Cl₂O₉

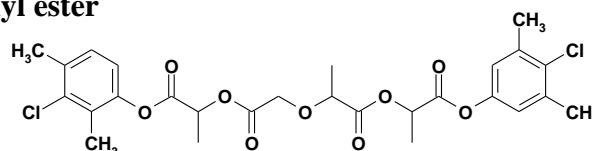
541.39



19-2166 2-[1-(3-Chloro-2,4-dimethyl-phenoxy-carbonyl)-ethoxycarbonylmethoxy]-propionic acid 1-(4-chloro-3,5-dimethyl-phenoxy-carbonyl)-ethyl ester

C₂₇H₃₀Cl₂O₉

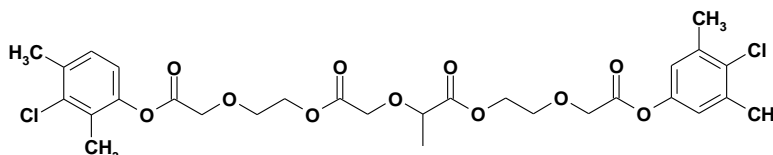
569.44



19-2167 2-[2-(3-Chloro-2,4-dimethyl-phenoxy-carbonylmethoxy)-ethoxycarbonylmethoxy]-propionic acid 2-(4-chloro-3,5-dimethyl-phenoxy-carbonylmethoxy)-ethyl ester

C₂₉H₃₄Cl₂O₁₁

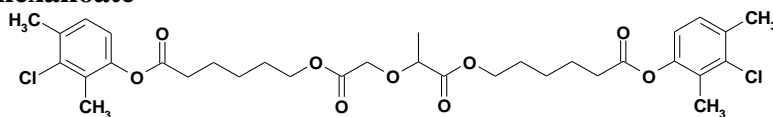
MW 629.49



19-2168 (3-Chloro-2,4-dimethyl-phenyl) 6-[2-[2-[6-(3-chloro-2,4-dimethyl-phenoxy)-6-oxo-hexoxy]-1-methyl-2-oxo-ethoxy]acetyl]-oxyhexanoate

C₃₃H₄₂Cl₂O₉

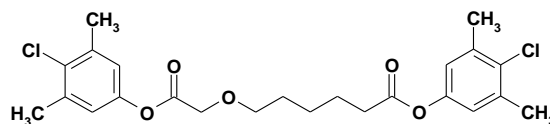
MW 653.59



19-2169 6-(4-Chloro-3,5-dimethyl-phenoxy-carbonylmethoxy)-hexanoic acid 4-chloro-3,5-dimethyl-phenyl ester

C₂₄H₂₈Cl₂O₅

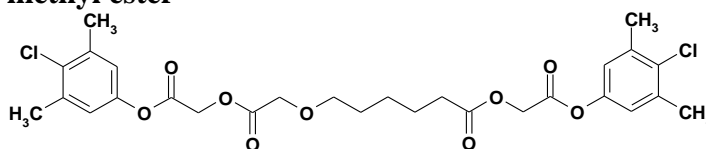
467.39



19-2170 6-(4-Chloro-3,5-dimethyl-phenoxy-carbonylmethoxycarbonylmethoxy)-hexanoic acid 4-chloro-3,5-dimethyl-phenoxy-carbonyl methyl ester

C₂₈H₃₂Cl₂O₉

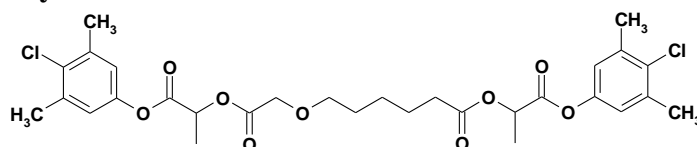
MW 583.47



19-2171 6-[1-(4-Chloro-3,5-dimethyl-phenoxy-carbonyl)-ethoxycarbonylmethoxy]-hexanoic acid 1-(4-chloro-3,5-dimethyl-phenoxy-carbonyl)-ethyl ester

C₃₀H₃₆Cl₂O₉

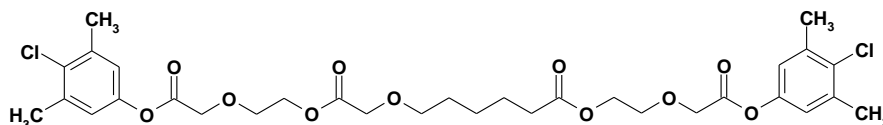
MW 611.52



19-2172 6-[2-(4-Chloro-3,5-dimethyl-phenoxy-carbonylmethoxy)-ethoxycarbonylmethoxy]-hexanoic acid 2-(4-chloro-3,5-dimethyl-phenoxy-carbonylmethoxy)-ethyl ester

C₃₂H₄₀Cl₂O₁₁

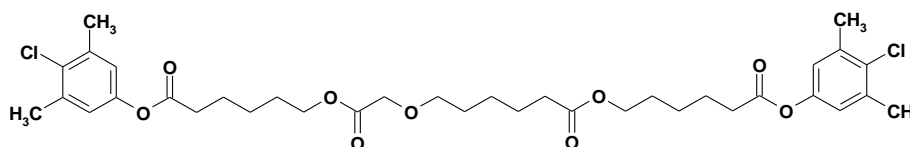
MW 671.58



19-2173 6-[5-(4-Chloro-3,5-dimethyl-phenoxy-carbonyl)-pentyloxycarbonylmethoxy]-hexanoic acid 5-(4-chloro-3,5-dimethyl-phenoxy-carbonyl)-pentyl ester

C₃₆H₄₈Cl₂O₉

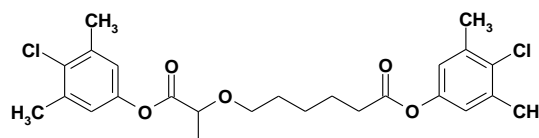
MW 695.68



19-2174 6-[1-(4-Chloro-3,5-dimethyl-phenoxy-carbonyl)-ethoxy]-hexanoic acid 4-chloro-3,5-dimethyl-phenyl ester

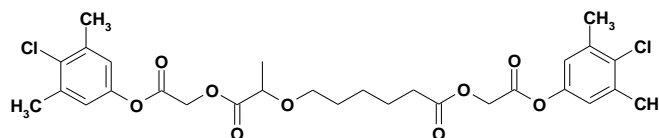
C₂₅H₃₀Cl₂O₅

MW 481.42



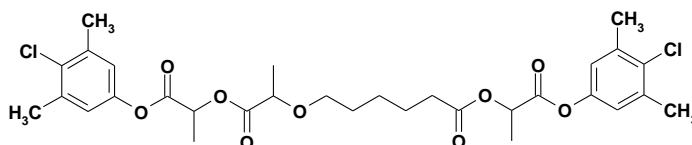
19-2175 6-[1-(4-Chloro-3,5-dimethyl-phenoxy-carbonyl-methoxy-carbonyl)-ethoxy]-hexanoic acid 4-chloro-3,5-dimethyl-phenoxy-carbonyl-methyl ester

C₂₉H₃₄Cl₂O₉
MW 597.49



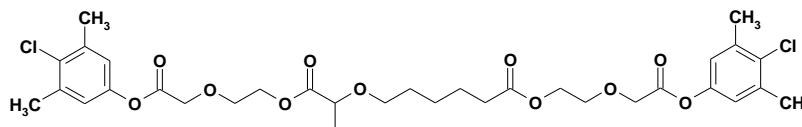
19-2176 6-{1-[1-(4-Chloro-3,5-dimethyl-phenoxy-carbonyl)-ethoxy-carbonyl]-ethoxy}-hexanoic acid 1-(4-chloro-3,5-dimethyl-phenoxy-carbonyl)-ethyl ester

C₃₁H₃₈Cl₂O₉
MW 625.55



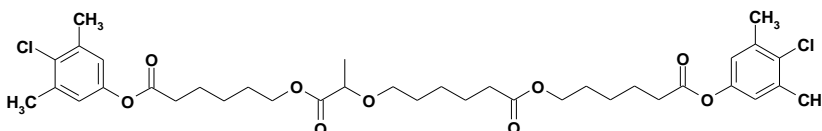
19-2177 6-[1-[2-(4-Chloro-3,5-dimethyl-phenoxy-carbonyl-methoxy)-ethoxy-carbonyl]-ethoxy]-hexanoic acid 2-(4-chloro-3,5-dimethyl-phenoxy-carbonyl-methoxy)-ethyl ester

C₃₃H₄₂Cl₂O₁₁
MW 685.60



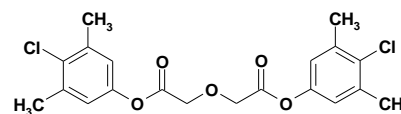
19-2178 6-[1-[5-(4-Chloro-3,5-dimethyl-phenoxy-carbonyl)-pentyloxy-carbonyl]-ethoxy]-hexanoic acid 5-(4-chloro-3,5-dimethyl-phenoxy-carbonyl)-pentyl ester

C₃₇H₅₀Cl₂O₉
MW 709.71



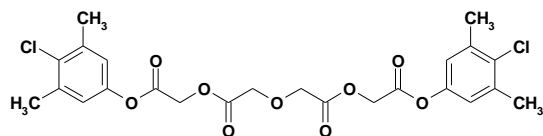
19-2179 (4-Chloro-3,5-dimethyl-phenoxy-carbonyl-methoxy)-acetic acid 4-chloro-3,5-dimethyl phenyl ester

C₂₀H₂₀Cl₂O₅
MW 411.29



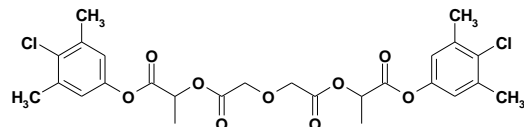
19-2180 (4-Chloro-3,5-dimethyl-phenoxy-carbonylmethoxycarbonylmethoxy)-acetic acid 4-chloro-3,5-dimethyl-phenoxy-carbonylmethyl ester

C₂₄H₂₄Cl₂O₉
MW 527.36



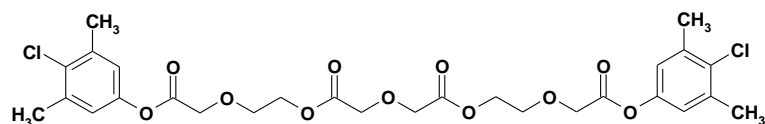
19-2181 2-{2-[1-(4-Chloro-3,5-dimethyl-phenoxy-carbonyl)-ethoxycarbonylmethoxy]-acetoxy}-propionic acid 4-chloro-3,5-dimethyl-phenyl ester

C₂₆H₂₈Cl₂O₉
MW 555.41



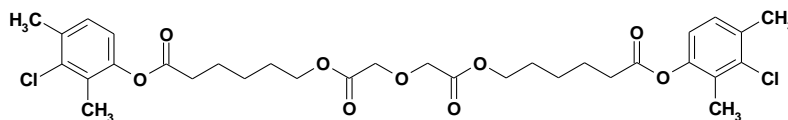
19-2182 (2-{2-[2-(4-Chloro-3,5-dimethyl-phenoxy-carbonylmethoxy)-ethoxycarbonylmethoxy]-acetoxy}-ethoxy)-acetic acid 4-chloro-3,5-dimethyl-phenyl ester

C₂₈H₃₂Cl₂O₁₁
MW 615.47



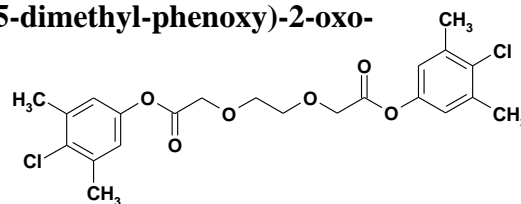
19-2183 (3-Chloro-2,4-dimethyl-phenyl) 6-[2-[2-[6-(3-chloro-2,4-dimethyl-phenoxy)-6-oxo-hexoxy]-2-oxo-ethoxy]acetyl]oxyhexanoate

C₃₂H₄₀Cl₂O₉
MW 639.56



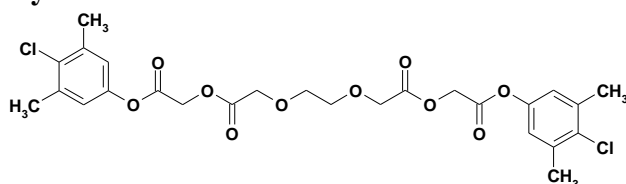
19-2184 (4-Chloro-3,5-dimethyl-phenyl) 2-[2-[2-(4-chloro-3,5-dimethyl-phenoxy)-2-oxo-ethoxy]ethoxy]acetate

C₂₂H₂₄Cl₂O₆
MW 455.33



19-2185 [2-(4-Chloro-3,5-dimethyl-phenoxy-carbonylmethoxycarbonylmethoxy)-ethoxy]-acetic acid 4-chloro-3,5 dimethyl-phenoxy-carbonylmethyl ester

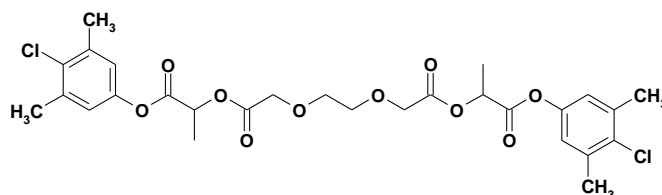
C₂₆H₂₈Cl₂O₁₀
MW 571.41



19-2186 2-(2-{2-[1-(4-Chloro-3,5-dimethyl-phenoxy)carbonyl]ethoxycarbonylmethoxy}-ethoxy)-acetoxy)-propionic acid 4-chloro-3,5-dimethyl-phenyl ester

$C_{28}H_{32}Cl_2O_{10}$

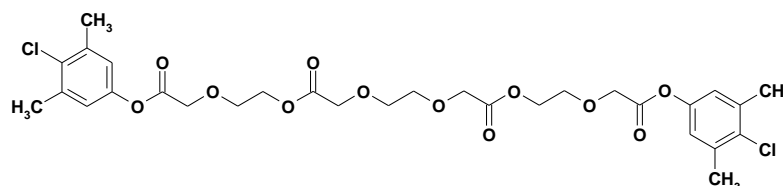
599.47



19-2187 [2-(2-{2-[2-(4-Chloro-3,5-dimethyl-phenoxy)carbonylmethoxy]-ethoxycarbonylmethoxy}-ethoxy)-acetoxy]-ethoxy]-acetic acid 4-chloro-3,5-dimethyl-phenyl ester

$C_{30}H_{36}Cl_2O_{12}$

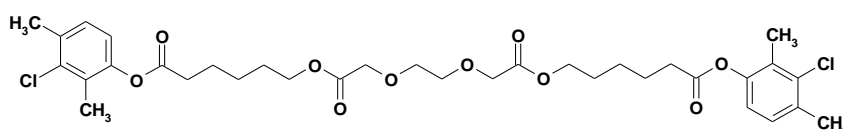
MW 659.52



19-2188 (3-Chloro-2,4-dimethyl-phenyl) 6-[2-[2-[2-[6-(3-chloro-2,4-dimethyl-phenoxy)-6-oxo-hexoxy]-2-oxo-ethoxy]ethoxy]acetyl]oxyhexanoate

$C_{34}H_{44}Cl_2O_{10}$

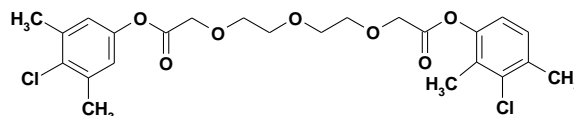
683.61



19-2189 (3-Chloro-2,4-dimethyl-phenyl) 2-[2-[2-[2-(4-chloro-3,5-dimethyl-phenoxy)-2-oxo-ethoxy]ethoxy]ethoxy]acetate

$C_{24}H_{28}Cl_2O_7$

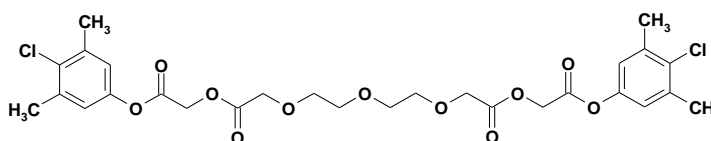
MW 499.38



19-2190 {2-[2-(4-Chloro-3,5-dimethyl-phenoxy)carbonylmethoxycarbonylmethoxy]-ethoxy}-acetic acid 4-chloro-3,5-dimethyl-phenyl ester

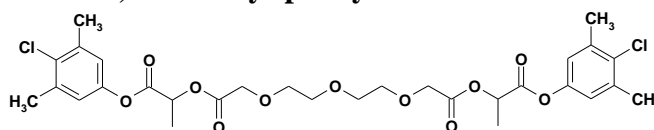
$C_{28}H_{32}Cl_2O_{11}$

MW 615.47



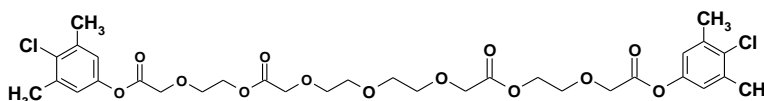
19-2191 2-[2-(2-{2-[1-(4-Chloro-3,5-dimethyl-phenoxy)carbonyl]-ethoxycarbonylmethoxy]-ethoxy}ethoxy)-acetoxy]-propionic acid 4-chloro-3,5-dimethyl-phenyl ester

C₃₀H₃₆Cl₂O₁₁
643.52



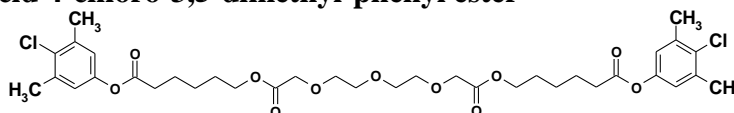
19-2192 (2-{2-[2-(4-Chloro-3,5-dimethyl-phenoxy)carbonylmethoxy]-ethoxy}-ethoxy)-acetic acid 2-(4-chloro-3,5-dimethyl-phenoxy)ethyl ester

C₃₂H₄₀Cl₂O₁₃
MW 703.57



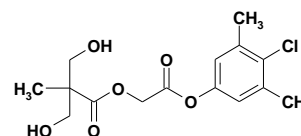
19-2193 6-[2-(2-{2-[5-(4-Chloro-3,5-dimethyl-phenoxy)carbonyl]-pentyloxycarbonylmethoxy]-ethoxy}-ethoxy)-acetoxy]-hexanoic acid 4-chloro-3,5-dimethyl-phenyl ester

C₃₆H₄₈Cl₂O₁₁
MW 727.68



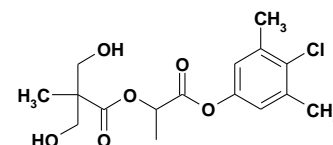
19-2194 [2-(4-Chloro-3,5-dimethyl-phenoxy)-2-oxo-ethyl] 3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoate

C₁₅H₁₉ClO₆
MW 330.76



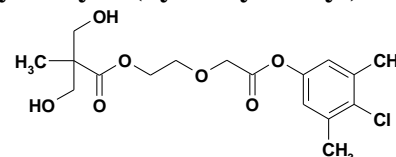
19-2195 [2-(4-Chloro-3,5-dimethyl-phenoxy)-1-methyl-2-oxo-ethyl] 3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoate

C₁₆H₂₁ClO₆
MW 344.79



19-2196 2-[2-(4-Chloro-3,5-dimethyl-phenoxy)-2-oxo-ethoxy]ethyl 3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoate

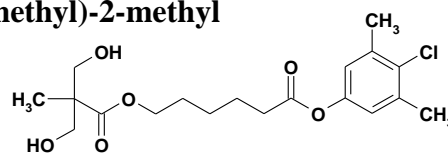
C₁₇H₂₃ClO₇
MW 374.81



19-2197 (4-Chloro-3,5-dimethyl-phenyl) 6-[3-hydroxy-2-(hydroxymethyl)-2-methyl
propanoyl]oxyhexanoate

C₁₉H₂₇ClO₆

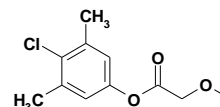
MW 386.87



19-2528 (4-Chloro-3,5-dimethyl-phenyl) 2-methoxyacetate

C₁₁H₁₃ClO₃

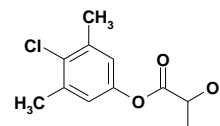
MW 228.67



19-2529 (4-Chloro-3,5-dimethyl-phenyl) 2-methoxypropanoate

C₁₂H₁₅ClO₃

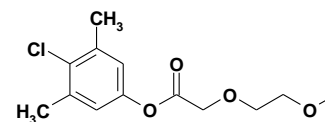
MW 242.70



19-2530 (4-Chloro-3,5-dimethyl-phenyl) 2-(2-methoxyethoxy)acetate

C₁₃H₁₇ClO₄

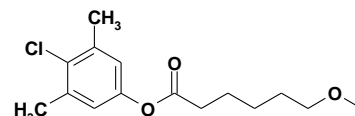
MW 272.72



19-2531 (4-Chloro-3,5-dimethyl-phenyl) 6-methoxyhexanoate

C₁₅H₂₁ClO₃

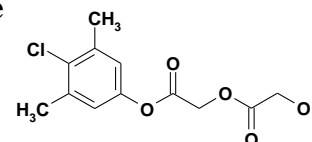
MW 284.78



19-2532 [2-(4-Chloro-3,5-dimethyl-phenoxy)-2-oxo-ethyl] 2-methoxyacetate

C₁₃H₁₅ClO₅

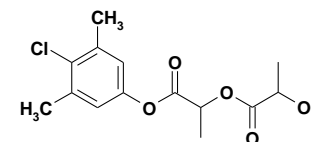
MW 286.7



19-2533 [2-(4-Chloro-3,5-dimethyl-phenoxy)-1-methyl-2-oxo-ethyl] 2-methoxypropanoate

C₁₅H₁₉ClO₅

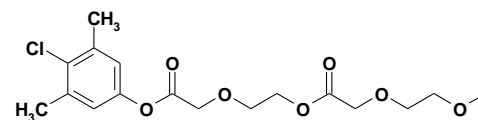
MW 314.76



19-2534 2-[2-(4-Chloro-3,5-dimethyl-phenoxy)-2-oxo-ethoxy]ethyl 2-(2-methoxyethoxy)acetate

C₁₇H₂₃ClO₇

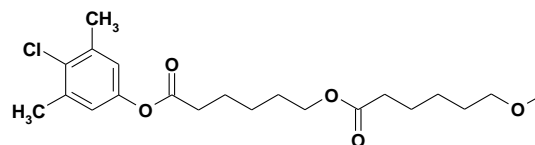
MW 374.81



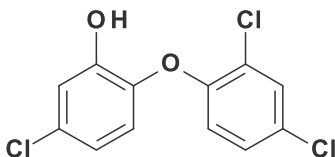
19-2535 7-(4-Chloro-3,5-dimethyl-phenyl) O1-(5-methoxypentyl) heptanedioate

C₂₁H₃₁ClO₅

MW 398.92



Triclosan



Triclosan is a chlorinated aromatic compound containing ether and phenol group. The anti-bacterial property of Triclosan has led to its widespread use in a number of medical devices and consumer product applications. Besides being used in soaps, cleaning agent formulations, anti-microbial fabrics and other consumer articles, where it has been shown to be effective in reducing and controlling bacterial contamination on hands and treated articles, formulations containing Triclosan have also been used in a number of medical devices including sutures incorporated for extended anti-microbial activity. More recently, showering or bathing with 2% Triclosan has become a recommended regime for the decolonization of patients whose skin is carrying methicillin resistant *staphylococcus aureus* (MRSA) following the successful control of MRSA outbreaks in several clinical settings.

In spite of its widespread applications and beneficial anti-microbial properties, the limited solubility of Triclosan and related compounds in water renders them non-hydrolysable. This reduces their circulation time and hence efficacy at the site of action. Furthermore, it is very difficult to polymerize Triclosan in its phenolic form. This prevents the beneficial attributes of Triclosan and Triclosan containing compounds from being used to their full potential. Hence, it is desirable to enhance the native value of Triclosan by, for example, providing functionalized Triclosan and Triclosan containing compounds with a specific controlled degradation profile or range, enabling controlled release of Triclosan over an extended period of time while retaining its inherent antimicrobial activity.

In order to enhance the native value of Triclosan while retaining its anti-microbial properties, we have developed functionalized triclosan compounds. These hydrolysable Triclosan compounds were prepared by functionalization of Triclosan with safe and biocompatible molecules such as glycolic acid, lactic acid, p-dioxanone, and/or caprolactone monomers. These monomers are the key components of a majority of absorbable medical devices. This functionalization enhances the native value of Triclosan and allows for the controlled release of Triclosan at the site of action over desired time period along with increased solubility. Furthermore, these hydrolysable Triclosan compounds have improved bioavailability, improved efficacy and are also anticipated to degrade into safe and biocompatible molecules. Moreover, these compounds will provide extended antimicrobial properties to the substrate when incorporated in a bulk material or applied as part of a coating.

These functionalized hydrolysable Triclosan compounds shown below have potential applications in the same or similar areas as the non-functionalized Triclosan compounds, since the compounds retain the innate properties of the active Triclosan. Hence, they may find applications as anti-microbial agents, medical device coatings, cosmetics and controlled release applications, surgical sutures and implantable medical devices.

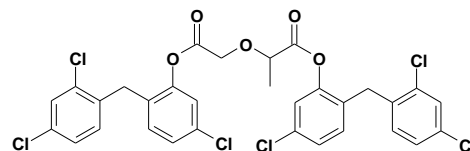
Reference:

1. Bezwada, Rao S Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent No. 8, 026,285.
2. Bezwada, Rao S Functionalized Biodegradable Triclosan Macromers for Controlled Release Applications, 2008 Society for Biomaterials Meeting on Translational Research, September 11-13, Atlanta, GA.
3. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent Publication No. 20090076174.
4. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent No.8, 163, 806.
5. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent No.8, 026,285.
6. Bezwada, Rao S. Functionalized drugs and polymers derived therefrom. US Patent No.7, 691,364.
7. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent Publication No. 20120095114.
8. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent Publication No.20120010284.
9. Bezwada, Rao S. Functionalized drugs and polymers therefrom. US Patent Publication No. 20100152272.
10. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent Publication No.20090105352.
11. Bezwada, Rao S. Functionalized drugs and polymers derived therefrom. US Patent Publication No.20060172983.

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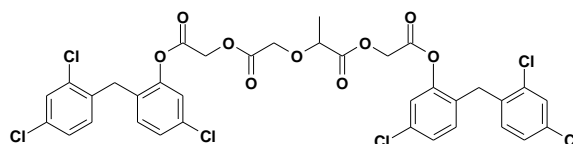
19-2198 2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxy]-propionic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester

C₃₁H₂₂Cl₆O₅
687.24



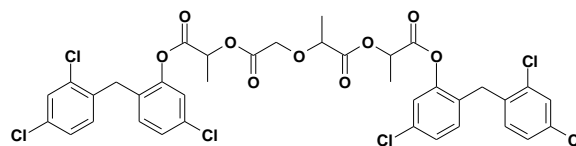
19-2199 2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxycarbonylmethoxy]-propionic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl methyl ester

C₃₅H₂₆Cl₆O₉
MW 803.31



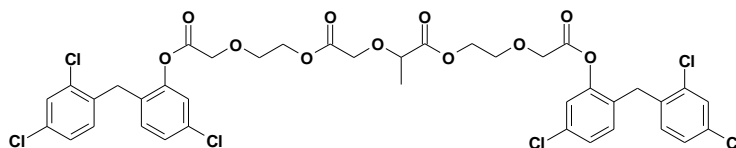
19-2200 2-[1-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]-ethoxycarbonylmethoxy]-propionic acid 1-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]-ethyl ester

C₃₇H₃₀Cl₆O₉
MW 831.36



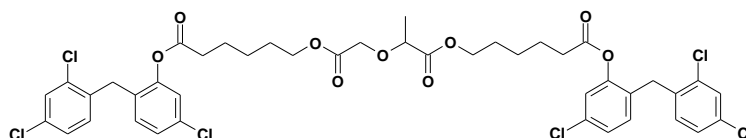
19-2201 2-{2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxy]-ethoxycarbonylmethoxy}-propionic acid 2-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxy]-ethyl ester

C₃₉H₃₄Cl₆O₁₁
MW 891.42



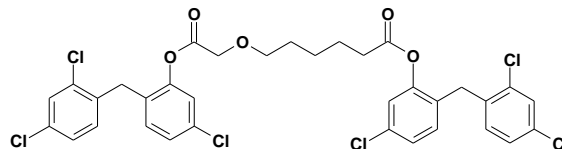
19-2202 [5-Chloro-2-[(2,4-dichlorophenyl)methyl]phenyl] 6-[2-[2-[6-[5-chloro-2-[(2,4-dichlorophenyl)methyl]phenoxy]-6-oxo-hexoxy]-1-methyl-2-oxo-ethoxy]acetyl]oxyhexanoate

C₄₃H₄₂Cl₆O₉
MW 915.51



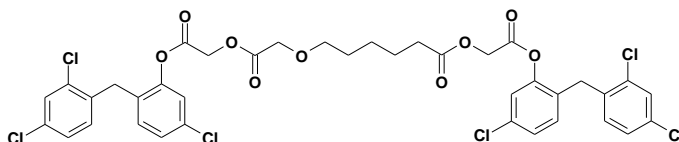
19-2203 6-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxy]-hexanoic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester

C₃₄H₂₈Cl₆O₅
MW 729.32



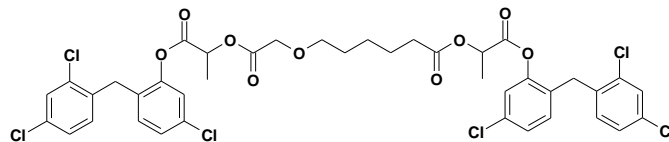
19-2204 6-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxycarbonylmethoxy]-hexanoic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethyl ester

C₃₈H₃₂Cl₆O₉
MW 845.39



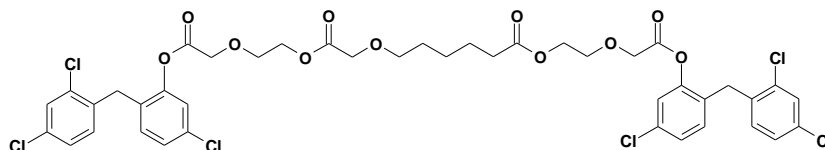
19-2205 6-[1-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]-ethoxycarbonylmethoxy]-hexanoic acid 1-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]-ethyl ester

C₄₀H₃₆Cl₆O₉
MW 873.45



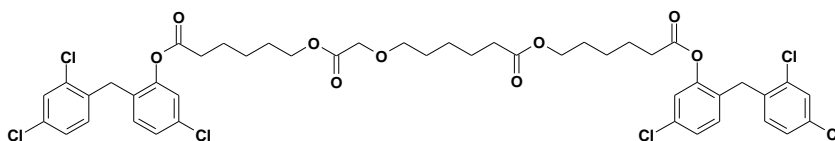
19-2206 6-{2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxy]-ethoxycarbonylmethoxy}-hexanoic acid 2-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxy]-ethyl ester

C₄₂H₄₀Cl₆O₁₁
MW 933.50



19-2207 6-[5-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]-pentyloxycarbonylmethoxy]-hexanoic acid 5-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]-pentyl ester

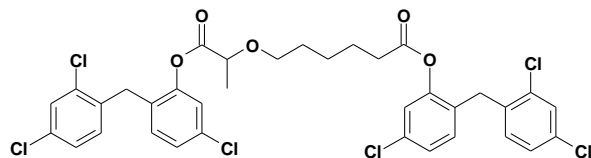
C₄₆H₄₈Cl₆O₉
MW 957.61



19-2208 6-{1-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]-ethoxy}-hexanoic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester

C₃₅H₃₀Cl₆O₅

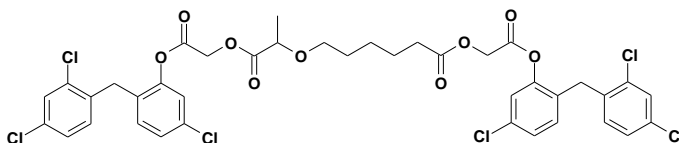
MW 743.34



19-2209 6-{1-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxy-carbonyl]-ethoxy}-hexanoic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethyl ester

C₃₉H₃₄Cl₆O₉

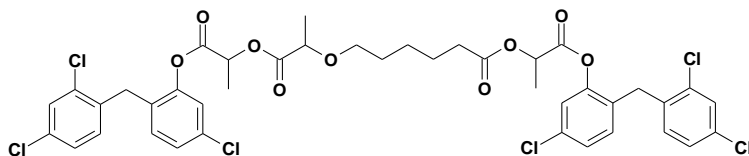
859.42



19-2210 6-(1-{1-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]ethoxy-carbonyl}-ethoxy)-hexanoic acid 1-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]-ethyl ester

C₄₁H₃₈Cl₆O₉

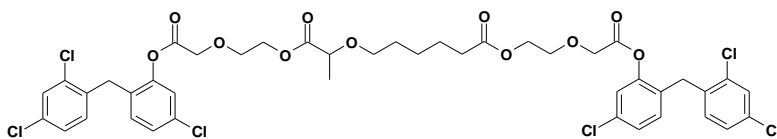
MW 887.47



19-2211 6-(1-{2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxy]-ethoxy-carbonyl}-ethoxy)-hexanoic acid 1-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonylmethoxy]-ethyl ester

C₄₃H₄₂Cl₆O₁₁

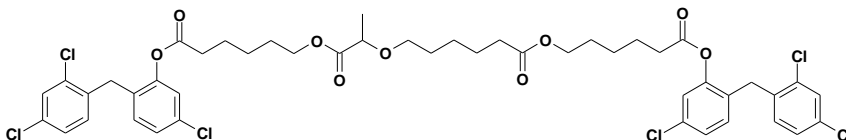
MW 947.53



19-2212 6-(1-{5-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]-pentyloxy-carbonyl}-ethoxy)-hexanoic acid 5-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy-carbonyl]-pentyl ester

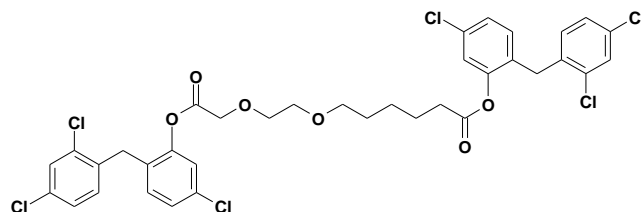
C₄₇H₅₀Cl₆O₉

MW 971.64



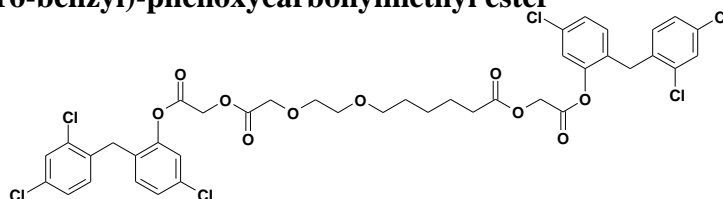
19-2213 6-{2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxy}-ethoxy}-hexanoic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester

$C_{36}H_{32}Cl_6O_6$
MW 773.37



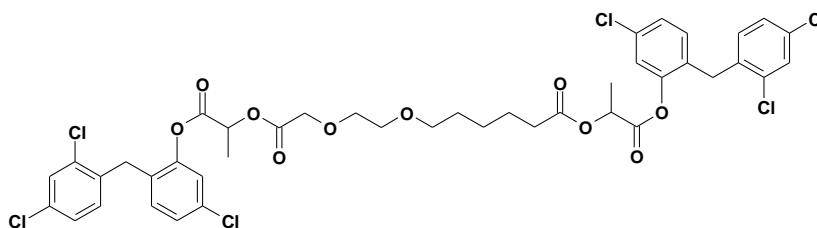
19-2214 6-{2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxycarbonylmethoxy}-ethoxy}-hexanoic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenoxy carbonylmethyl ester

$C_{40}H_{36}Cl_6O_{10}$
MW 889.44



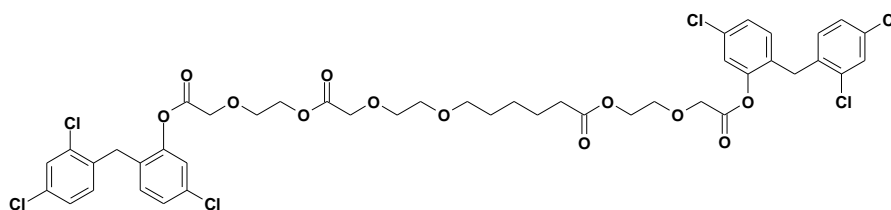
19-2215 6-(2-{1-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonyl}-ethoxycarbonylmethoxy}-ethoxy)-hexanoic acid 1-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy]ethyl ester

$C_{42}H_{40}Cl_6O_{10}$
MW 917.50



19-2216 6-(2-{2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxy}-ethoxycarbonylmethoxy}-ethoxy)-hexanoic acid 2-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxy-ethyl ester

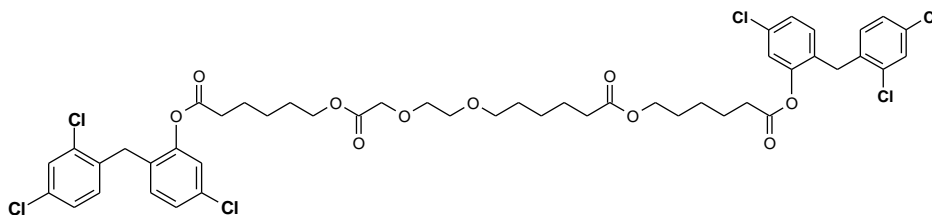
$C_{44}H_{44}Cl_6O_{12}$
MW 977.55



19-2217 6-(2-{5-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonyl}-pentyloxycarbonylmethoxy)-ethoxy)-hexanoic acid 5-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonyl-pentyl ester

C₄₈H₅₂Cl₆O₁₀

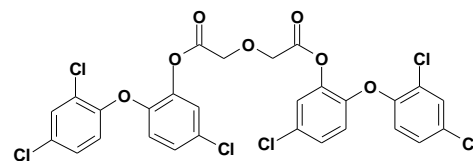
1001.66



19-2218 2-[2-[5-chloro-2-(2,4-dichlorophenoxy)phenoxy]-2-oxo-ethoxy]acetic acid; 2,4-dichloro-1-(4-chloro-2-methyl-phenoxy)benzene

C₂₉H₂₀Cl₆O₇

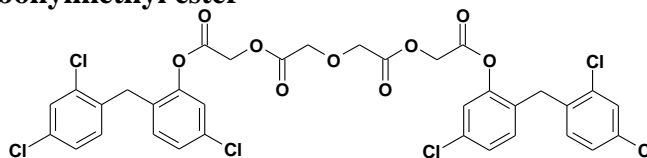
MW 693.18



19-2219 [5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxycarbonylmethoxy]-acetic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethyl ester

C₃₄H₂₄Cl₆O₉

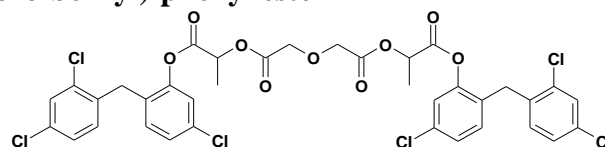
MW 789.28



19-2220 2-(2-{1-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonyl}-ethoxycarbonylmethoxy)-acetoxy)-propionic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester

C₃₆H₂₈Cl₆O₉

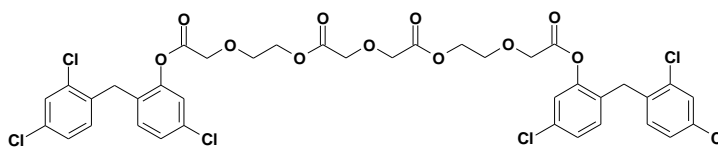
817.34



19-2221 [2-(2-{2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxy}-ethoxycarbonylmethoxy)-acetoxy)-ethoxy]-acetic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester

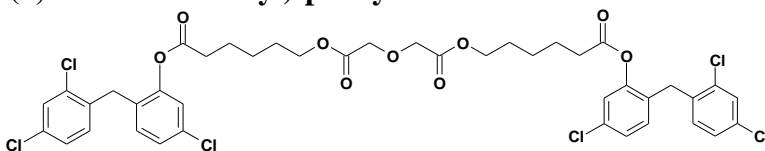
C₃₈H₃₂Cl₆O₁₁

MW 877.39



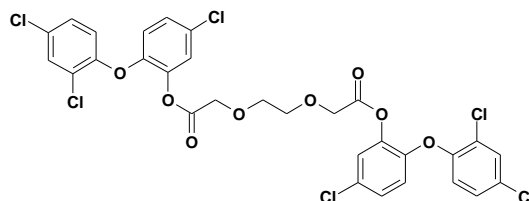
19-2222 6-(2-{5-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonyl}-pentyloxycarbonylmethoxy)-acetoxy)-hexanoic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester

C₄₂H₄₀Cl₆O₉
MW 901.50



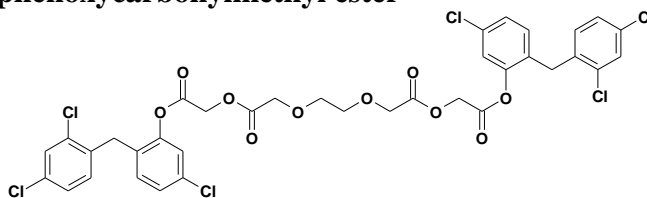
19-2223 [5-Chloro-2-(2,4-dichlorophenoxy)-phenyl]-2-[2-[2-[5-chloro-2-(2,4-dichlorophenoxy)-phenoxy]-2-oxo-ethoxy]-ethoxy]acetate

C₃₀H₂₀Cl₆O₈
MW 721.19



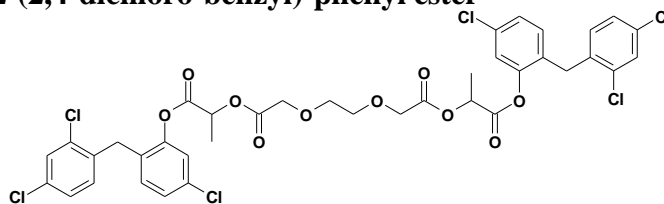
19-2224 {2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxycarbonylmethoxy}-ethoxy}-acetic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenoxy carbonylmethyl ester

C₃₆H₂₈Cl₆O₁₀
MW 833.34



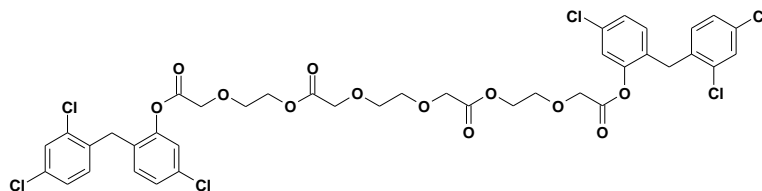
19-2225 2-[2-(2-{1-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonyl}-ethoxycarbonylmethoxy)-ethoxy]-acetoxy]-propionic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester

C₃₈H₃₂Cl₆O₁₀
MW 861.39

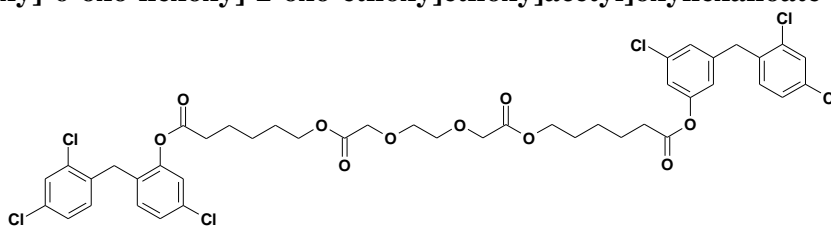


19-2226 {2-[2-(2-{2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxy}-ethoxycarbonylmethoxy}-ethoxy)-acetoxy]-ethoxy}-acetic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester

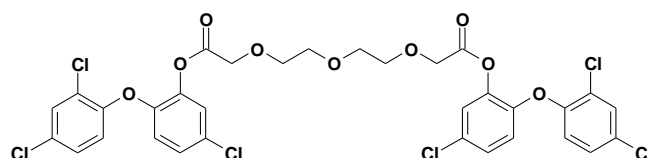
C₄₀H₃₆Cl₆O₁₂
MW 921.44



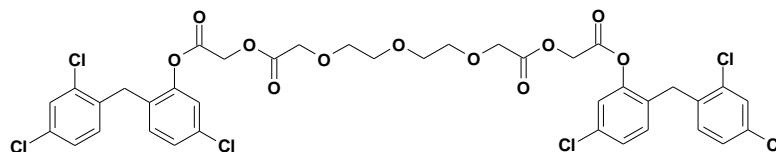
19-2227 [3-chloro-5-[(2,4-dichlorophenyl)methyl]phenyl] 6-[2-[2-[2-[6-[5-chloro-2-[(2,4-dichlorophenyl)methyl]phenoxy]-6-oxo-hexoxy]-2-oxo-ethoxy]ethoxy]acetyl]oxyhexanoate
C₄₄H₄₄Cl₆O₁₀
MW 945.53



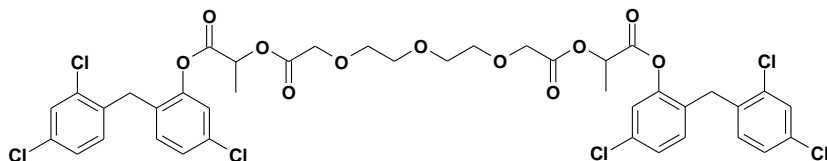
19-2228 [5-chloro-2-(2,4-dichlorophenoxy)phenyl] 2-[2-[2-[2-[5-chloro-2-(2,4-dichlorophenoxy)phenoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetate
C₃₂H₂₄Cl₆O₉
MW 765.24



19-2229 (2-{2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxycarbonylmethoxy}-ethoxy)-ethoxy)-acetic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenoxy carbonylmethyl ester
C₃₈H₃₂Cl₆O₁₁
MW 877.39



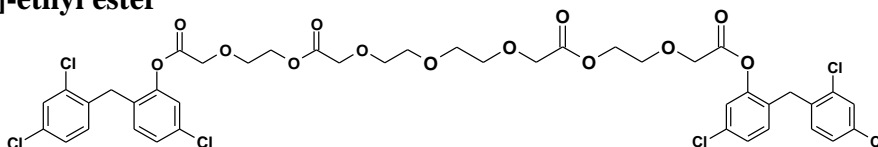
19-2230 2-[2-[2-(2-{1-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonyl]-ethoxycarbonylmethoxy}-ethoxy)-ethoxy]-acetoxy]-propionic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester
C₄₀H₃₆Cl₆O₁₁
MW 905.44



19-2231 [2-(2-{2-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxy}-ethoxycarbonylmethoxy}-ethoxy)-ethoxy]-acetic acid 2-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxy]-ethyl ester

C₄₂H₄₀Cl₆O₁₃

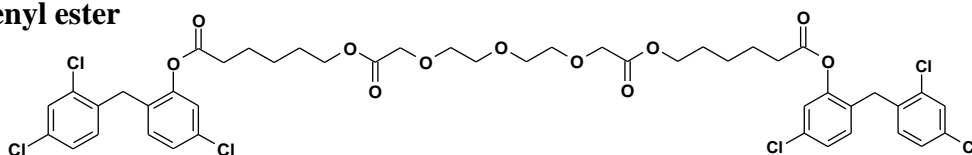
MW 965.50



19-2232 6-{2-[2-(2-{5-[5-Chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxy}-ethoxy)-ethoxy]-acetoxy}-hexanoic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenyl ester

C₄₆H₄₈Cl₆O₁₁

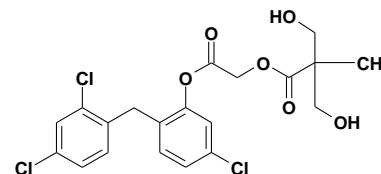
MW 989.61



19-2233 3-Hydroxy-2-hydroxymethyl-2-methyl-propionic acid 5-chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethyl ester

C₂₀H₁₉Cl₃O₆

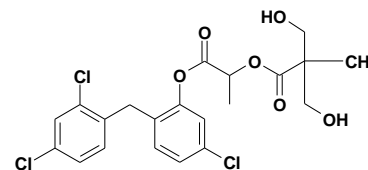
MW 461.7



19-2234 3-Hydroxy-2-hydroxymethyl-2-methyl-propionic acid 1-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonyl]-ethyl ester

C₂₁H₂₁Cl₃O₆

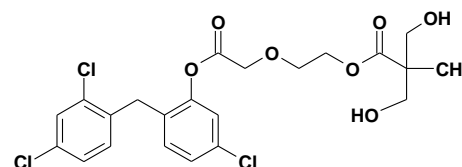
MW 475.76



19-2235 3-Hydroxy-2-hydroxymethyl-2-methyl-propionic acid 2-[5-chloro-2-(2,4-dichloro-benzyl)-phenoxy]carbonylmethoxy]-ethyl ester

C₂₂H₂₃Cl₃O₇

MW 505.78

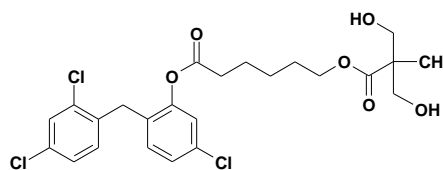


19-2236 6-(3-Hydroxy-2-hydroxymethyl-2-methyl-propionyloxy)-hexanoic acid 5-chloro-2-(2,4-dichloro-benzyl)

-phenyl ester

C₂₄H₂₇Cl₃O₆

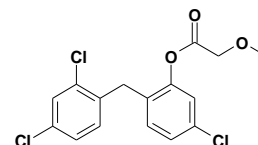
MW 517.84



19-2536 [5-Chloro-2-[(2,4-dichlorophenyl)methyl]phenyl] 2-methoxyacetate

C₁₆H₁₃Cl₃O₃

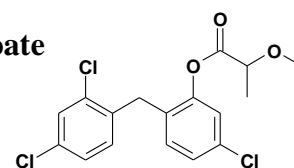
MW 359.63



19-2537 [5-Chloro-2-[(2,4-dichlorophenyl)methyl]phenyl] 2-methoxypropanoate

C₁₇H₁₅Cl₃O₃

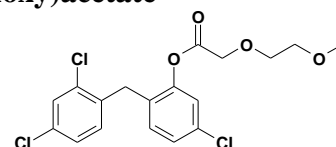
MW 373.66



19-2538 [5-Chloro-2-[(2,4-dichlorophenyl)methyl]phenyl] 2-(2-methoxyethoxy)acetate

C₁₈H₁₇Cl₃O₄

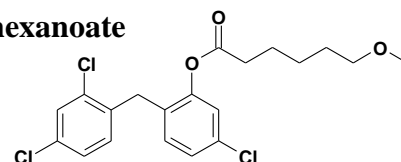
MW 403.68



19-2539 [5-Chloro-2-[(2,4-dichlorophenyl)methyl]phenyl] 6-methoxyhexanoate

C₂₀H₂₁Cl₃O₃

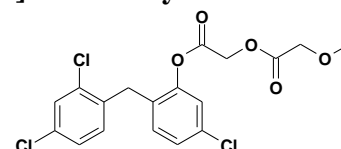
MW 415.74



19-2540 [2-[5-Chloro-2-[(2,4-dichlorophenyl)methyl]phenoxy]-2-oxo-ethyl] 2-methoxyacetate

C₁₈H₁₅Cl₃O₅

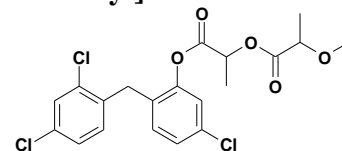
MW 417.67



19-2541 [2-[5-Chloro-2-[(2,4-dichlorophenyl)methyl]phenoxy]-1-methyl-2-oxo-ethyl] 2-methoxypropanoate

C₂₀H₁₉Cl₃O₅

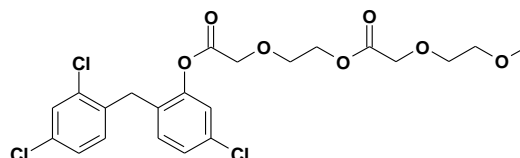
MW 445.72



19-2542 2-[2-[5-Chloro-2-[(2,4-dichlorophenyl)methyl]phenoxy]-2-oxo-ethoxy]ethyl 2-(2-methoxyethoxy)acetate

C₂₂H₂₃Cl₃O₇

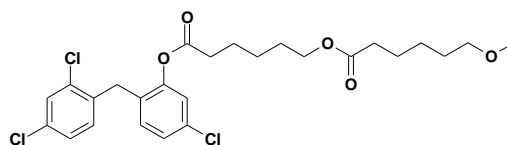
MW 505.77



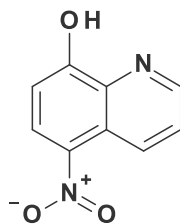
19-2543 [6-[5-Chloro-2-[(2,4-dichlorophenyl)methyl]phenoxy]-6-oxo-hexyl] 6-methoxyhexanoate

C₂₆H₃₁Cl₃O₅

MW 529.88



Nitroxoline



Nitroxoline, derivative of 8-oxyquinolines is an antimicrobial drug with broad spectrum of antibacterial activity. It has also shown in-vitro anti-fungal activities¹. Nitroxoline actively inhibits the synthesis of bacterial DNA. It is found to be active against gram-positive and gram-negative microorganisms. It is effective against urinary tract infections caused by cystitis, urethritis, pyelonephritis, infectious adenoma of the prostate. It is commercially sold under the tradename of Nicene[®]-N as a urinary antibacterial agent active against susceptible gram-positive and gram-negative organisms commonly found in urinary tract infections. It was recently discovered that nitroxoline has anti-angiogenic properties, which could make it useful as an anti-cancer drug².

Wide spectrum anti-microbial potential of this compound motivated us to enhance its native value by functionalizing it with safe and biocompatible molecules such as glycolic acid, lactic acid, caprolactone and p-dioxanone. These molecules are the key components of commercially available medical devices. This functionalization enhances the native value of Nitroxoline and allows for the controlled release of Nitroxoline at the site of action over desired time period along with increased solubility. Furthermore, these hydrolysable Nitroxoline compounds have improved bioavailability, improved efficacy and are also anticipated to degrade into safe and biocompatible molecules. This functionalization is expected to enhance the native value, solubility and bioavailability of Nitroxoline along with controlled degradation profiles.

Potential applications of functionalized Nitroxoline molecules shown below includes (a) broad spectrum antimicrobial in disinfectants, antiseptics, and soaps (b) topical antiseptic for skin (c) antimicrobial formulations for urinary tract infections.

References:

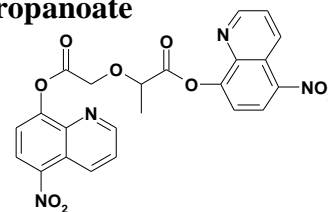
3. Francis O'Grady, Barbara Smith. *The Journal of Pathology and Bacteriology*, volume 92, Issue 1, pages 43–48, July 1966
4. Joong S et al. *J Natl Cancer Inst.* **102** (24): 1855–1873, 2010
5. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent Publication No. 20090076174.
6. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent No. 8, 163, 806.
7. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent No. 8, 053, 591.
8. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent No. 8, 026, 285.
9. Bezwada, Rao S. Functionalized drugs and polymers derived therefrom. US Patent No. 7, 691, 364.
10. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent Publication No. 20120095114.
11. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent Publication No. 20120010284.
12. Bezwada, Rao S. Functionalized drugs and polymers therefrom. US Patent Publication No. 20100152272.
13. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent Publication No. 20090105352.
14. Bezwada, Rao S. Functionalized drugs and polymers derived therefrom. US Patent Publication No. 20060172983.

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19-2237 (5-Nitro-8-quinolyl) 2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-propanoate

C₂₃H₂₆N₄O₉

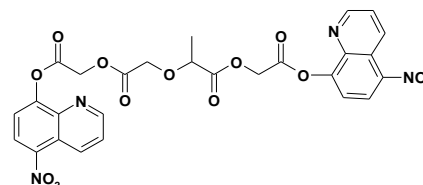
MW 492.41



19-2238 [2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethyl] 2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]-propanoate

C₂₇H₂₀N₄O₁₃

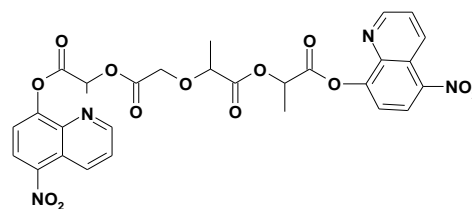
MW 608.48



19-2239 [1-Methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethyl] 2-[2-[1-methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]propanoate

C₂₉H₂₄N₄O₁₃

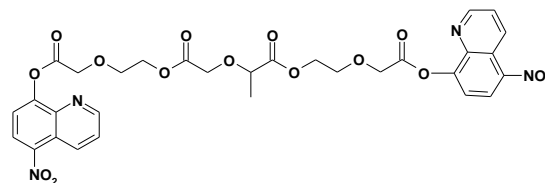
MW 636.53



19-2240 2-[2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 2-[2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]propanoate

C₃₁H₂₈N₄O₁₅

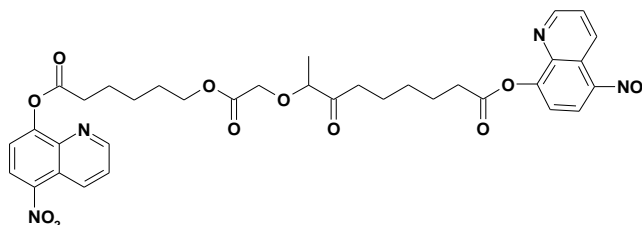
MW 696.59



19-2241 (5-Nitro-8-quinolyl) 8-[2-[6-[(5-nitro-8-quinolyl)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]-7-oxo-nonanoate

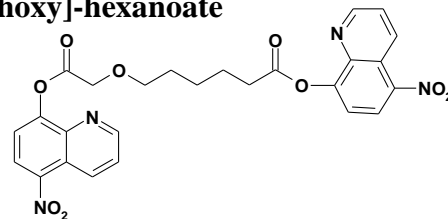
C₃₅H₃₆N₄O₁₂

MW 704.70



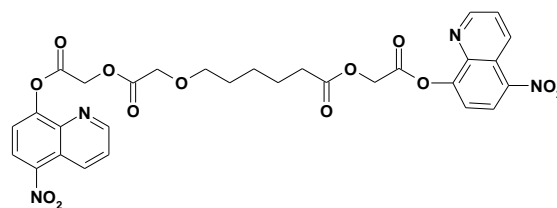
19-2242 (5-Nitro-8-quinoly) 6-[2-[(5-nitro-8-quinoly)oxy]-2-oxo-ethoxy]-hexanoateC₂₆H₂₂N₄O₉

MW 534.49



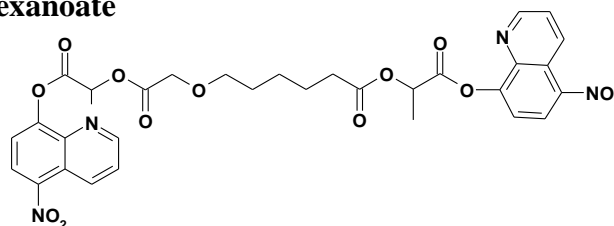
19-2243 [2-[(5-Nitro-8-quinoly)oxy]-2-oxo-ethyl] 6-[2-[2-[(5-nitro-8-quinoly)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]hexanoateC₃₀H₂₆N₄O₁₃

MW 650.56



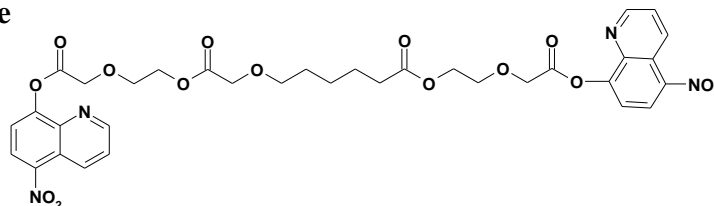
19-2244 [1-Methyl-2-[(5-nitro-8-quinoly)oxy]-2-oxo-ethyl] 6-[2-[1-methyl-2-[(5-nitro-8-quinoly)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]-hexanoateC₃₂H₃₀N₄O₁₃

MW 678.61



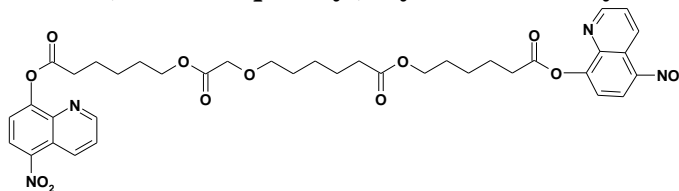
19-2245 2-[2-[(5-Nitro-8-quinoly)oxy]-2-oxo-ethoxy]ethyl 6-[2-[2-[2-[(5-nitro-8-quinoly)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]-hexanoateC₃₄H₃₄N₄O₁₅

MW 738.67



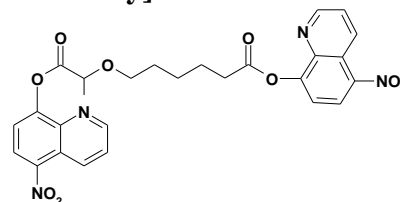
19-2246 [6-[(5-Nitro-8-quinoly)oxy]-6-oxo-hexyl] 6-[2-[6-[(5-nitro-8-quinoly)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]-hexanoateC₃₈H₄₂N₄O₁₃

MW 762.78



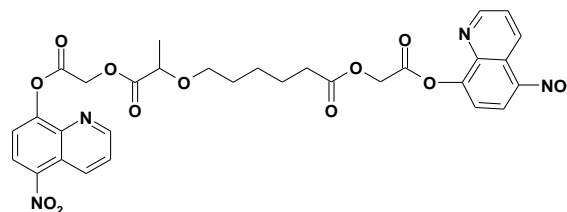
19-2247 (5-Nitro-8-quinolyl) 6-[1-methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-hexanoateC₂₇H₂₄N₄O₉

MW 548.51



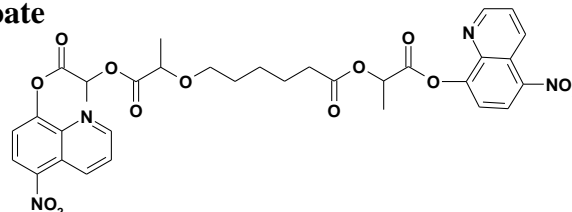
19-2248 [2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethyl] 6-[1-methyl-2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]hexanoateC₃₁H₂₈N₄O₁₃

MW 664.59



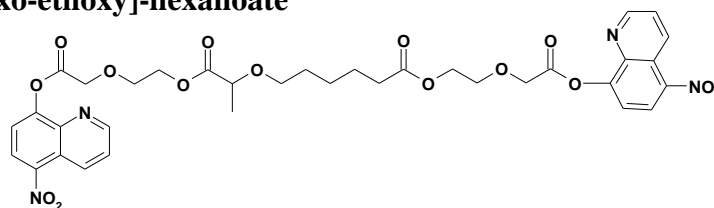
19-2249 [1-Methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethyl] 6-[1-methyl-2-[1-methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]-hexanoateC₃₃H₃₂N₄O₁₃

MW 692.64



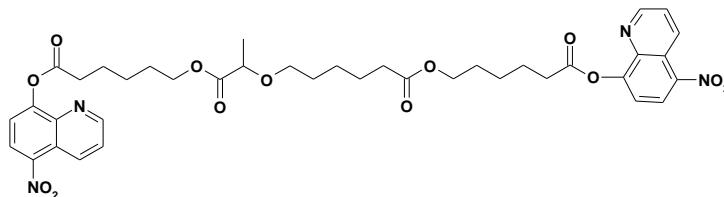
19-2250 2-[2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 6-[1-methyl-2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]-hexanoateC₃₅H₃₆N₄O₁₅

MW 752.69



19-2251 [6-[(5-Nitro-8-quinolyl)oxy]-6-oxo-hexyl] 6-[1-methyl-2-[6-[(5-nitro-8-quinolyl)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]-hexanoateC₃₉H₄₄N₄O₁₃

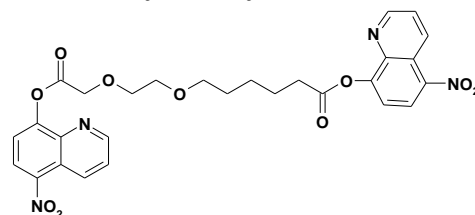
MW 776.80



19-2252 (5-Nitro-8-quinolyl) 6-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-hexanoate

C₂₈H₂₆N₄O₁₀

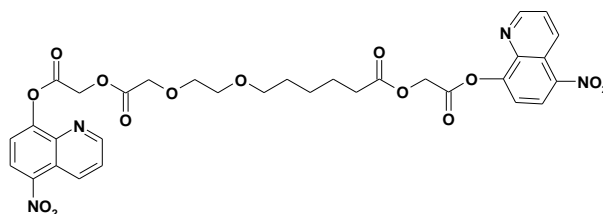
MW 578.54



19-2253 [2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethyl] 6-[2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]-hexanoate

C₃₂H₃₀N₄O₁₄

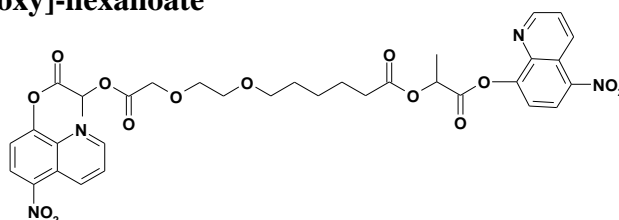
MW 694.61



19-2254 [1-Methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethyl] 6-[2-[2-[1-methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]-hexanoate

C₃₄H₃₄N₄O₁₄

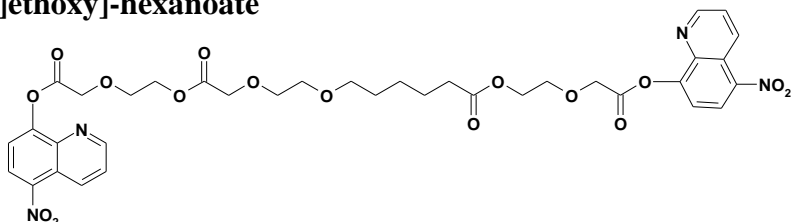
MW 722.67



19-2255 2-[2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 6-[2-[2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]ethoxy]-hexanoate

C₃₆H₃₈N₄O₁₆

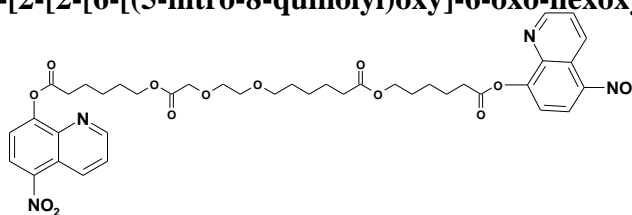
MW 782.72



19-2256 [6-[(5-Nitro-8-quinolyl)oxy]-6-oxo-hexyl] 6-[2-[2-[6-[(5-nitro-8-quinolyl)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]ethoxy]-hexanoate

C₄₀H₄₆N₄O₁₄

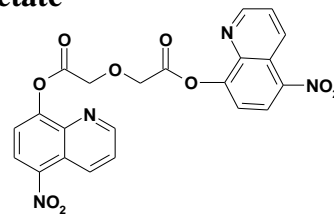
MW 806.83



19-2257 (5-Nitro-8-quinolyl) 2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]acetate

C₂₂H₁₄N₄O₉

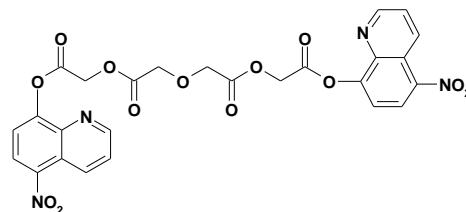
MW 478.38



19-2258 [2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethyl] 2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]acetate

C₂₆H₁₈N₄O₁₃

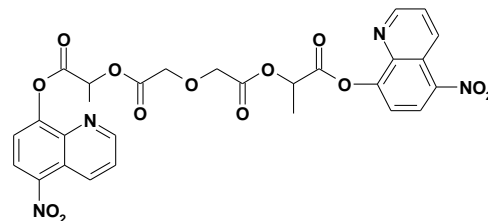
MW 594.44



19-2259 (5-Nitro-8-quinolyl) 2-[2-[2-[1-methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]acetyl]oxypropanoate

C₂₈H₂₂N₄O₁₃

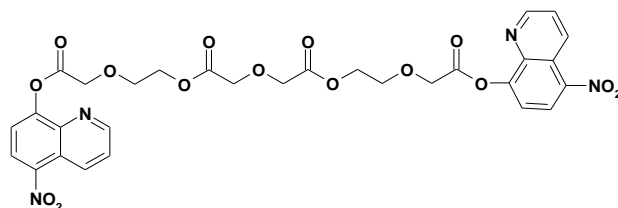
MW 622.49



19-2260 (5-Nitro-8-quinolyl) 2-[2-[2-[2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]acetyl]oxyethoxy]acetate

C₃₀H₂₆N₄O₁₅

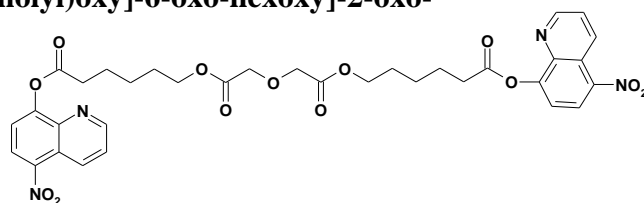
MW 682.54



19-2261 (5-Nitro-8-quinolyl) 6-[2-[2-[6-[(5-nitro-8-quinolyl)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]acetyl]oxyhexanoate

C₃₄H₃₄N₄O₁₃

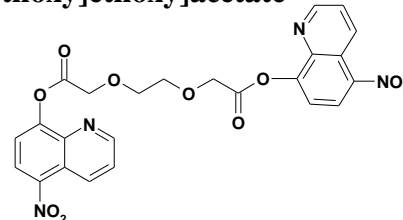
MW 706.65



19-2262 (5-Nitro-8-quinolyl) 2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]acetate

C₂₄H₁₈N₄O₁₀

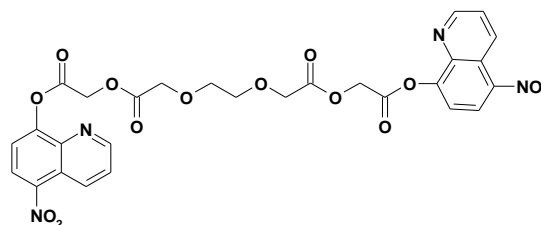
MW 522.42



19-2263 [2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethyl] 2-[2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]acetate

C₂₈H₂₂N₄O₁₄

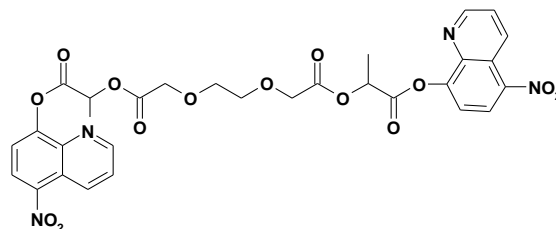
MW 638.49



19-2264 (5-Nitro-8-quinolyl) 2-[2-[2-[2-[1-methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]acetyl]oxypropanoate

C₃₀H₂₆N₄O₁₄

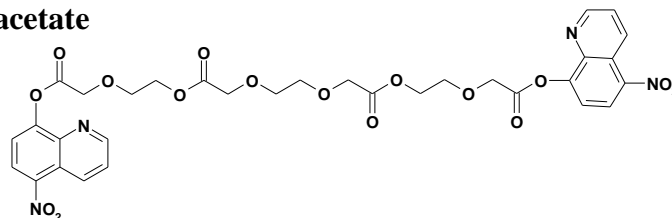
MW 666.54



19-2265 2-[2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 2-[2-[2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]ethoxy]acetate

C₃₂H₃₀N₄O₁₆

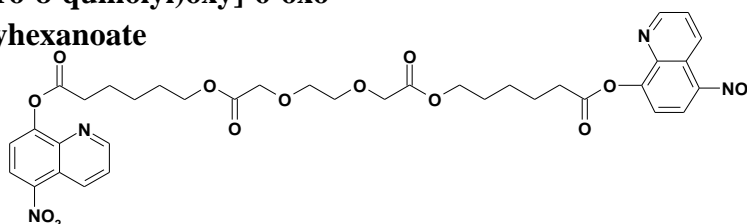
MW 726.60



19-2266 (5-Nitro-8-quinolyl) 6-[2-[2-[6-[(5-nitro-8-quinolyl)oxy]-6-oxo-hexoxy]carbonyloxyethoxy]acetyl]oxyhexanoate

C₃₆H₃₈N₄O₁₄

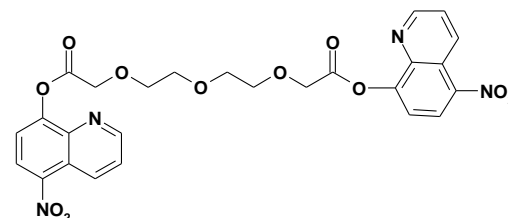
MW 867



19-2267 (5-Nitro-8-quinolyl) 2-[2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetate

C₂₆H₂₂N₄O₁₁

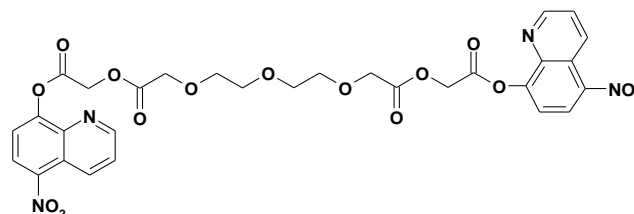
MW 566.47



19-2268 [2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethyl] 2-[2-[2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetate

C₃₀H₂₆N₄O₁₅

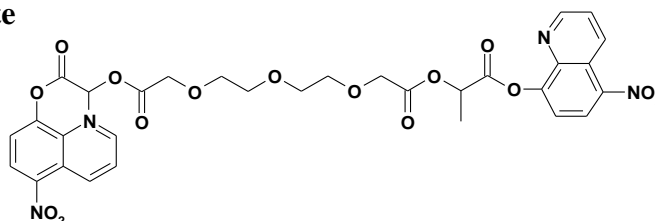
MW 682.54



19-2269 (5-Nitro-8-quinolyl) 2-[2-[2-[2-[2-[1-methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetyl]oxypropanoate

C₃₂H₃₀N₄O₁₅

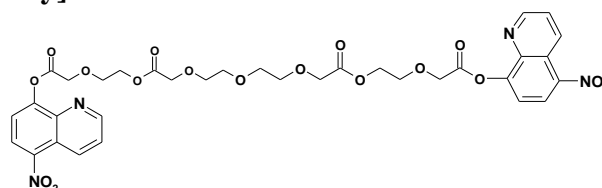
MW 710.60



19-2270 2-[2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 2-[2-[2-[2-[2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetate

C₃₄H₃₄N₄O₁₇

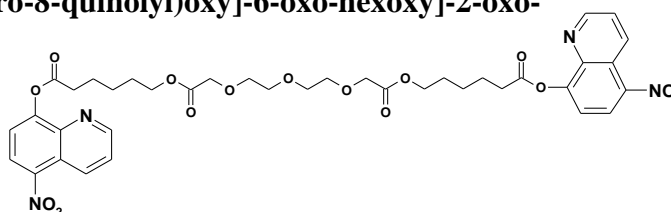
MW 770.65



19-2271 (5-Nitro-8-quinolyl) 6-[2-[2-[2-[2-[6-[(5-nitro-8-quinolyl)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetyl]oxyhexanoate

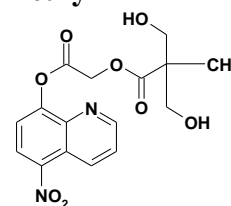
C₃₈H₄₂N₄O₁₅

MW 794.76



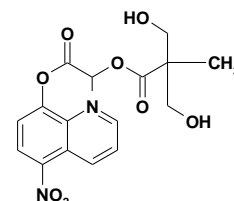
19-2272 [2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethyl] 3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoate

C₁₆H₁₆N₂O₈
MW 364.31



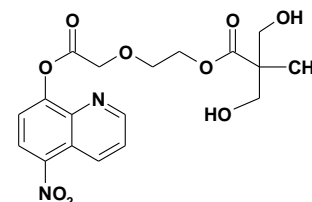
19-2273 [1-Methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethyl] 3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoate

C₁₇H₁₈N₂O₈
MW 388.33



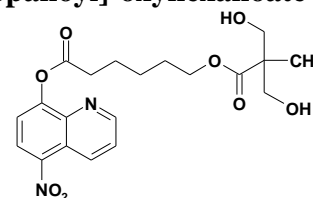
19-2274 2-[2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoate

C₁₈H₂₀N₂O₉
MW 408.36



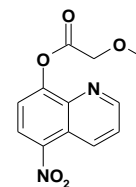
19-2275 (5-Nitro-8-quinolyl) 6-[3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoyl]-oxyhexanoate

C₂₀H₂₄N₂O₈
MW 420.41



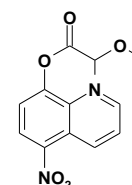
19-2544 (5-Nitro-8-quinolyl) 2-methoxyacetate

C₁₂H₁₀N₂O₅
MW 262.22



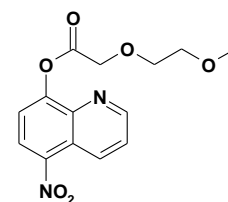
19-2545 (5-Nitro-8-quinolyl) 2-methoxypropanoate

C₁₃H₁₂N₂O₅
MW 276.24

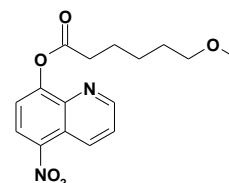


19-2546 (5-Nitro-8-quinolyl) 2-(2-methoxyethoxy)acetateC₁₄H₁₄N₂O₆

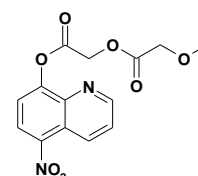
MW 306.27

**19-2547 (5-Nitro-8-quinolyl) 6-methoxyhexanoate**C₁₆H₁₈N₂O₅

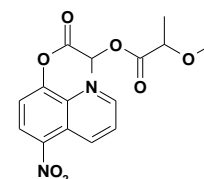
MW 318.32

**19-2548 [2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethyl] 2-methoxyacetate**C₁₄H₁₂N₂O₇

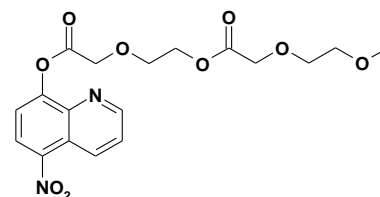
MW 320.25

**19-2549 [1-Methyl-2-[(5-nitro-8-quinolyl)oxy]-2-oxo-ethyl] 2-methoxypropanoate**C₁₆H₁₆N₂O₇

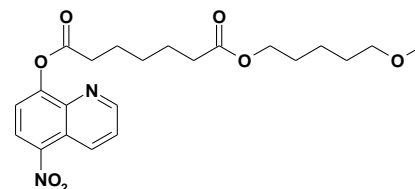
MW 348.31

**19-2550 2-[2-[(5-Nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 2-(2-methoxyethoxy)acetate**C₁₈H₂₀N₂O₉

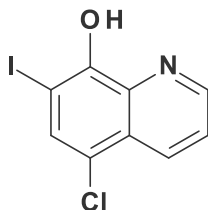
MW 408.36

**19-2551 1-(5-Methoxypentyl) O7-(5-nitro-8-quinolyl) heptanedioate**C₂₂H₂₈N₂O₇

MW 432.47



Clioquinol



Clioquinol is used as antibacterial and antifungal drug. It is a member of family of drugs called hydroxyquinolines which inhibit certain enzymes related to DNA replication. These drugs have been found to be active against both viral and protozoal infections¹. It is administered orally in the treatment of amebic dysentery. Being an anti-infective, it is used in treatment of gynecological infections, dermatological and protozoal diseases.

Wide spectrum anti-microbial potential of this compound motivated us to enhance its native value by functionalizing it with safe and biocompatible molecules such as glycolic acid, lactic acid, caprolactone and p-dioxanone. These molecules are the key components of commercially available medical devices. This functionalization enhances the native value of Clioquinol and allows for the controlled release of Clioquinol at the site of action over desired time period along with increased solubility. Furthermore, these hydrolysable Clioquinol compounds have improved bioavailability, improved efficacy and are also anticipated to degrade into safe and biocompatible molecules. This functionalization is expected to enhance the native value, solubility and bioavailability of Clioquinol along with controlled degradation profiles.

Potential applications of functionalized Clioquinol molecules shown below includes (a) broad spectrum antimicrobial in disinfectants, antiseptics, and soaps (b) topical antiseptic for skin (c) antimicrobial in cosmetic formulations and (d) as fungicide for adhesives, paints, textiles, paper products, and polishes.

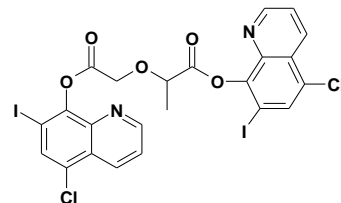
References:

1. Rohde W *et al.* *Antimicrob. Agents Chemother.* 1976 **10** (2): 234–40.
2. Nguyen T *et al.* *Proc. Natl. Acad. Sci. U.S.A.* 2005 **102** (33): 11840–5
3. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent Publication No. 20090076174.
4. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent No.8, 163, 806.
5. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent No.8, 053,591.
6. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent No.8, 026,285.
7. Bezwada, Rao S. Functionalized drugs and polymers derived therefrom. US Patent No.7, 691,364.
8. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent Publication No. 20120095114.
9. Bezwada, Rao S. Controlled release of biologically active compounds from multi-armed oligomers. US Patent Publication No.20120010284.
10. Bezwada, Rao S. Functionalized drugs and polymers therefrom. US Patent Publication No.20100152272.
11. Bezwada, Rao S. Functionalized biodegradable triclosan monomers and oligomers for controlled release. US Patent Publication No.20090105352.
12. Bezwada, Rao S. Functionalized drugs and polymers derived therefrom. US Patent Publication No.20060172983.

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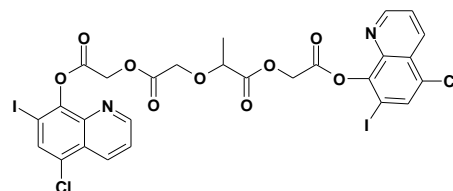
19-2276 (5-Chloro-7-iodo-8-quinolyl) 2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]-propanoate

C₂₃H₁₄Cl₂N₂O₅
MW 723.09



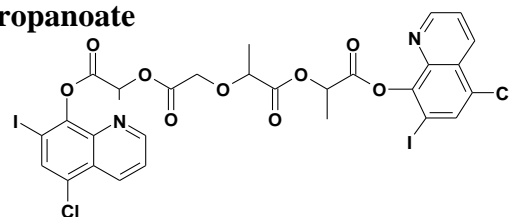
19-2277 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethyl] 2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]-propanoate

C₂₇H₁₈Cl₂I₂N₂O₉
MW 839.17



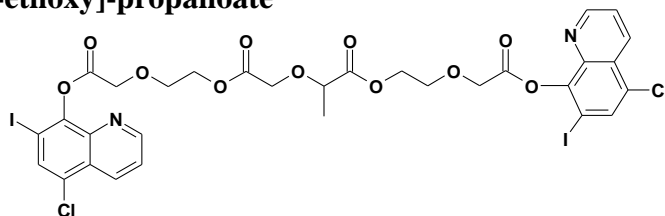
19-2278 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethyl] 2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethoxy]-2-oxo-ethoxy]-propanoate

C₂₉H₂₂Cl₂I₂N₂O₉
MW 867.22



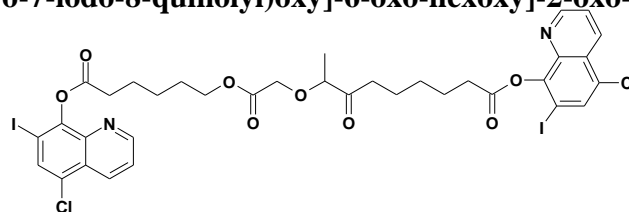
19-2279 2-[2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 2-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy] ethoxy]-2-oxo-ethoxy]-propanoate

C₃₁H₂₆Cl₂I₂N₂O₁₁
MW 927.27



19-2280 (5-Chloro-7-iodo-8-quinolyl) 8-[2-[6-[(5-chloro-7-iodo-8-quinolyl)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]-7-oxo-nonanoate

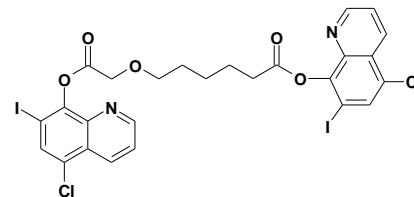
C₃₅H₃₄Cl₂I₂N₂O₈
MW 935.38



19-2281 (5-Chloro-7-iodo-8-quinolyl) 6-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]-hexanoate

$C_{26}H_{20}Cl_2I_2N_2O_5$

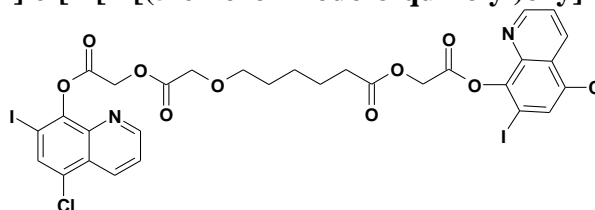
MW 765.17



19-2282 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethyl] 6-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]-hexanoate

$C_{30}H_{24}Cl_2I_2N_2O_9$

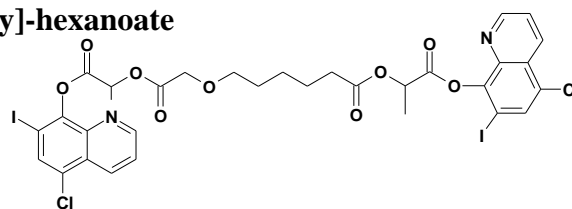
MW 881.25



19-2283 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethyl] 6-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethoxy]-2-oxo-ethoxy]-hexanoate

$C_{32}H_{28}Cl_2I_2N_2O_9$

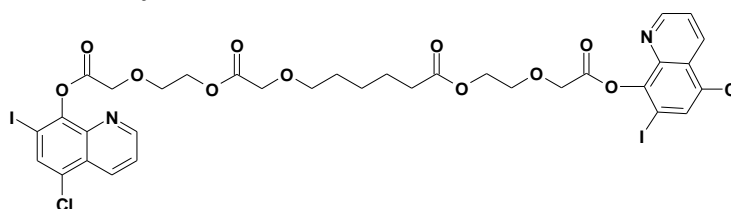
MW 909.30



19-2284 2-[2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 6-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]-hexanoate

$C_{34}H_{32}Cl_2I_2N_2O_{11}$

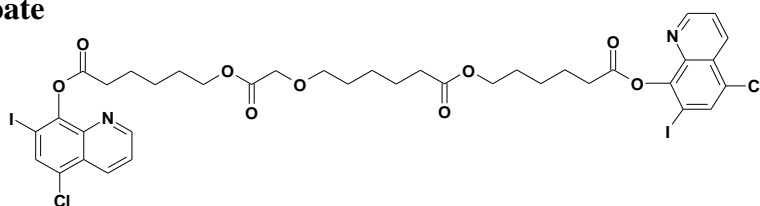
MW 969.36



19-2285 [6-[(5-Chloro-7-iodo-8-quinolyl)oxy]-6-oxo-hexyl] 6-[2-[6-[(5-chloro-7-iodo-8-quinolyl)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]-hexanoate

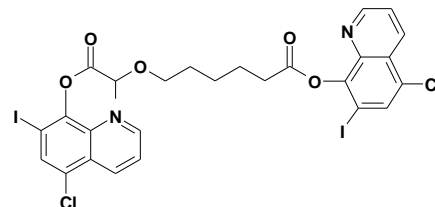
$C_{38}H_{40}Cl_2I_2N_2O_9$

MW 993.47



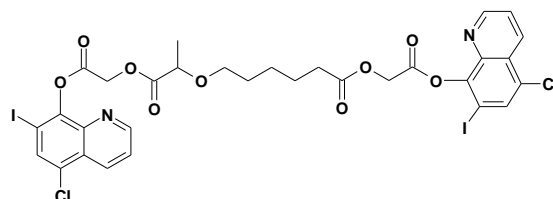
19-2286 (5-Chloro-7-iodo-8-quinolyl) 6-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethoxy]-hexanoate

$C_{27}H_{22}Cl_2I_2N_2O_5$
MW 779.20



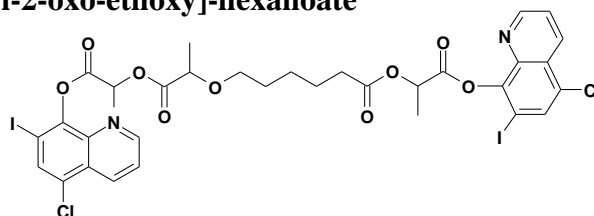
19-2287 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethyl] 6-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]-1-methyl-2-oxo-ethoxy]-hexanoate

$C_{31}H_{26}Cl_2I_2N_2O_9$
MW 895.28



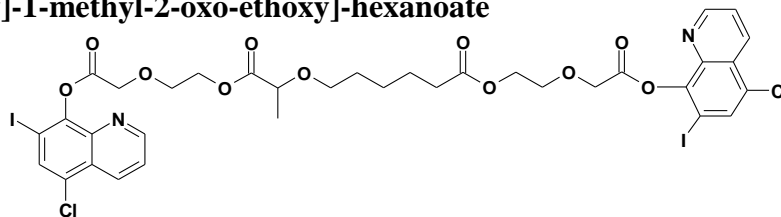
19-2288 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethyl] 6-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethoxy]-1-methyl-2-oxo-ethoxy]-hexanoate

$C_{33}H_{30}Cl_2I_2N_2O_9$
MW 923.33



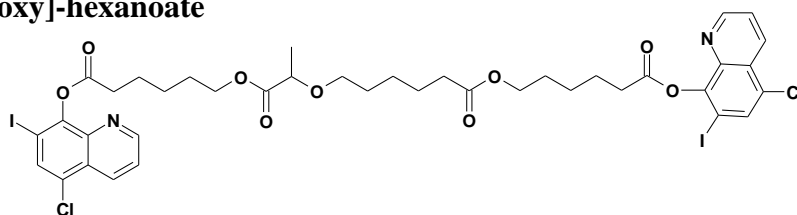
19-2289 2-[2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 6-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-1-methyl-2-oxo-ethoxy]-hexanoate

$C_{35}H_{34}Cl_2I_2N_2O_{11}$
MW 983.38



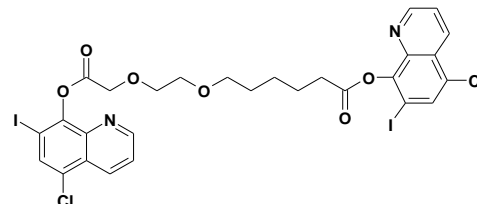
19-2290 [6-[(5-Chloro-7-iodo-8-quinolyl)oxy]-6-oxo-hexyl] 6-[2-[6-[(5-chloro-7-iodo-8-quinolyl)oxy]-6-oxo-hexoxy]-1-methyl-2-oxo-ethoxy]-hexanoate

$C_{39}H_{42}Cl_2I_2N_2O_9$
MW 1007.49



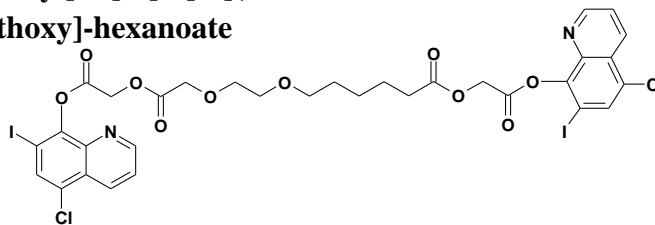
19-2291 (5-Chloro-7-iodo-8-quinolyl) 6-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-hexanoate

C₂₈H₂₄Cl₂I₂N₂O₆
MW 809.23



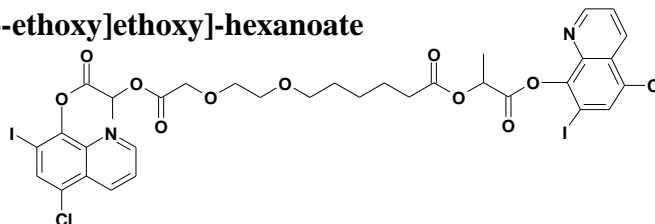
19-2292 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethyl] 6-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]-hexanoate

C₃₂H₂₈Cl₂I₂N₂O₁₀
MW 925.30



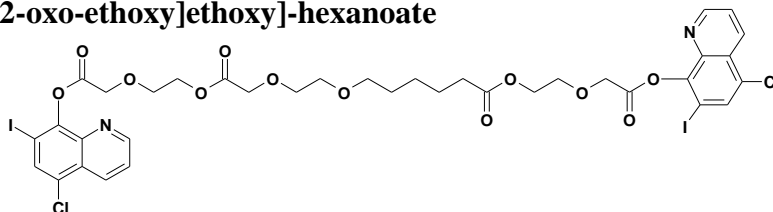
19-2293 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethyl] 6-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]-hexanoate

C₃₄H₃₂Cl₂I₂N₂O₁₀
MW 953.36



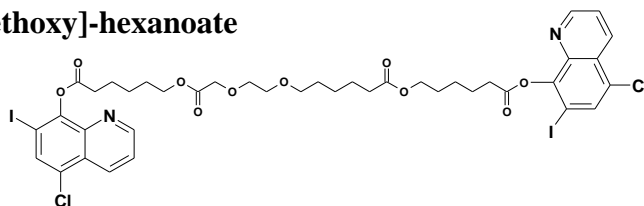
19-2294 2-[2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 6-[2-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]ethoxy]-hexanoate

C₃₆H₃₆Cl₂I₂N₂O₁₂
MW 1013.41



19-2295 [6-[(5-Chloro-7-iodo-8-quinolyl)oxy]-6-oxo-hexyl] 6-[2-[2-[6-[(5-chloro-7-iodo-8-quinolyl)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]ethoxy]-hexanoate

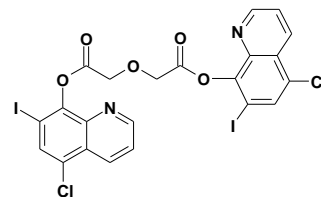
C₄₀H₄₄Cl₂I₂N₂O₁₀
MW 1037.52



19-2296 (5-Chloro-7-iodo-8-quinoly) 2-[2-[(5-chloro-7-iodo-8-quinoly)oxy]-2-oxo-ethoxy]acetate

C₂₂H₁₂Cl₂I₂N₂O₅

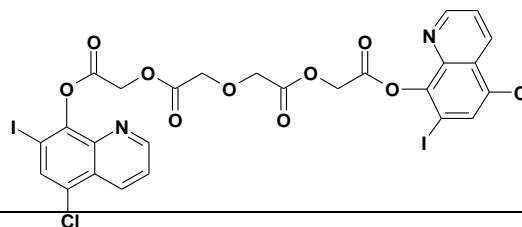
MW 709.07



19-2297 [2-[(5-Chloro-7-iodo-8-quinoly)oxy]-2-oxo-ethyl] 2-[2-[2-[(5-chloro-7-iodo-8-quinoly)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]acetate

C₂₆H₁₆Cl₂I₂N₂O₉

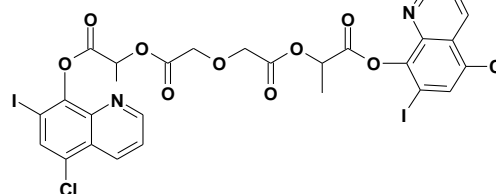
MW 825.14



19-2298 (5-Chloro-7-iodo-8-quinoly) 2-[2-[2-[2-[(5-chloro-7-iodo-8-quinoly)oxy]-1-methyl-2-oxo-ethoxy]-2-oxo-ethoxy]acetyl]oxypropanoate

C₂₈H₂₀Cl₂I₂N₂O₉

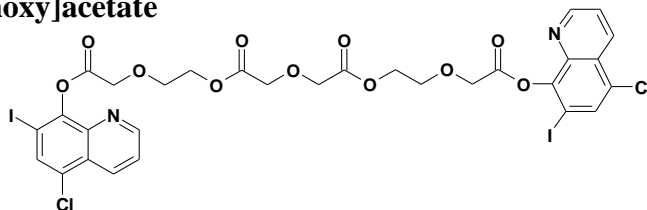
MW 853.19



19-2299 (5-Chloro-7-iodo-8-quinoly) 2-[2-[2-[2-[2-[(5-chloro-7-iodo-8-quinoly)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]acetyl]oxyethoxy]acetate

C₃₀H₂₄Cl₂I₂N₂O₁₁

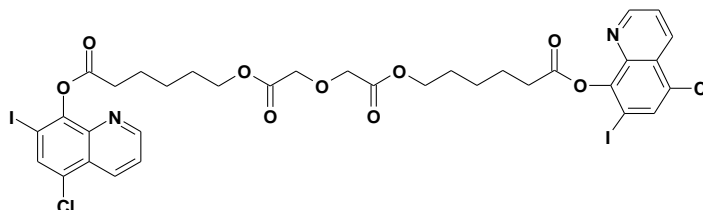
MW 913.25



19-2300 (5-Chloro-7-iodo-8-quinoly) 6-[2-[2-[6-[(5-chloro-7-iodo-8-quinoly)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]acetyl]oxyhexanoate

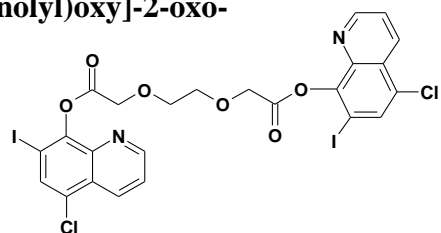
C₃₄H₃₂Cl₂I₂N₂O₉

MW 937.36



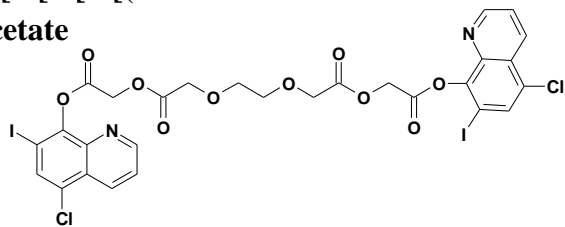
19-2301 (5-Chloro-7-iodo-8-quinolyl) 2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]acetate

$C_{24}H_{16}Cl_2I_2N_2O_6$
MW 753.12



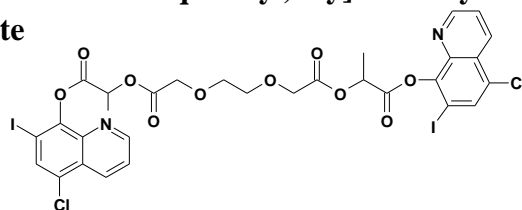
19-2302 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethyl] 2-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]acetate

$C_{28}H_{20}Cl_2I_2N_2O_{10}$
MW 869.19



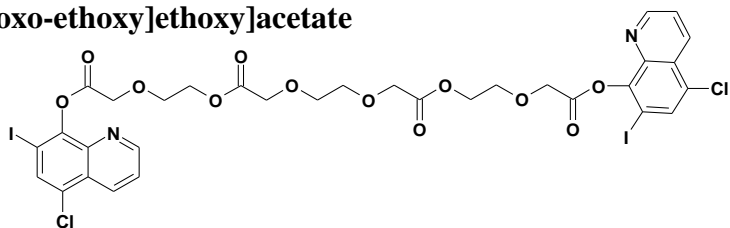
19-2303 (5-Chloro-7-iodo-8-quinolyl) 2-[2-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]acetyl]oxypropanoate

$C_{30}H_{24}Cl_2I_2N_2O_{10}$
MW 897.25



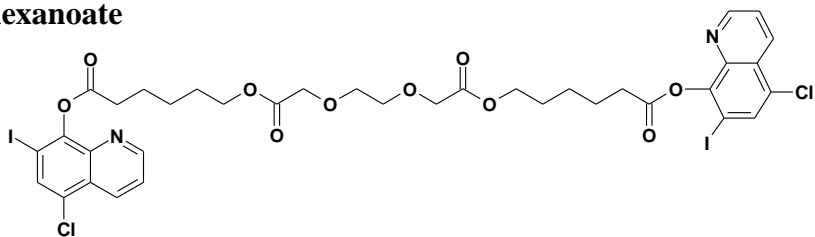
19-2304 2-[2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 2-[2-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]ethoxy]acetate

$C_{32}H_{28}Cl_2I_2N_2O_{12}$
MW 957.30



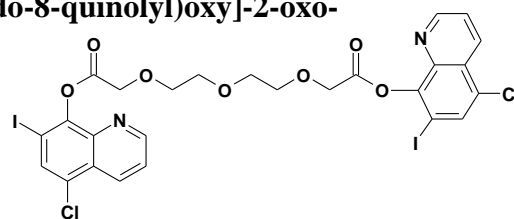
19-2305 (5-Chloro-7-iodo-8-quinolyl) 6-[2-[2-[2-[6-[(5-chloro-7-iodo-8-quinolyl)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]ethoxy]acetyl]oxyhexanoate

$C_{36}H_{36}Cl_2I_2N_2O_{10}$
MW 981.41



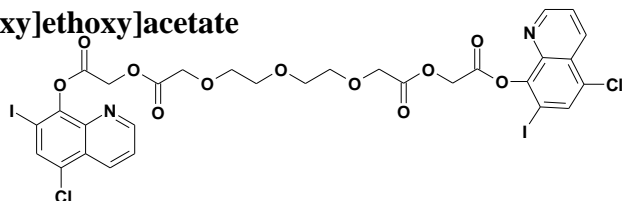
19-2306 (5-Chloro-7-iodo-8-quinolyl) 2-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetate

C₂₆H₂₀Cl₂I₂N₂O₇
MW 797.17



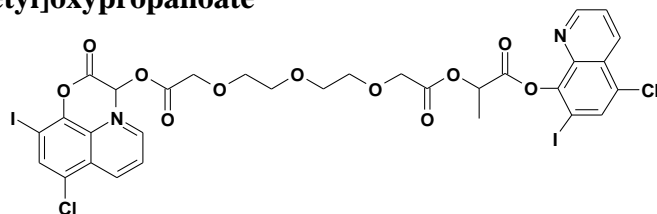
19-2307 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethyl] 2-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetate

C₃₀H₂₄Cl₂I₂N₂O₁₁
MW 913.25



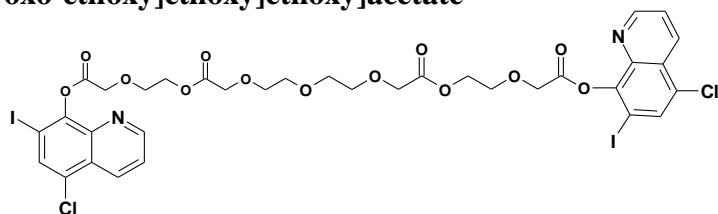
19-2308 (5-Chloro-7-iodo-8-quinolyl) 2-[2-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetyl]oxypropanoate

C₃₂H₂₈Cl₂I₂N₂O₁₁
MW 941.30



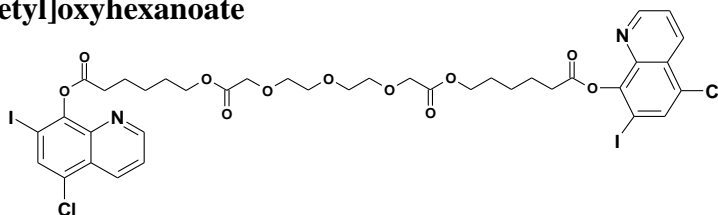
19-2309 2-[2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 2-[2-[2-[2-[2-[(5-chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetate

C₃₄H₃₂Cl₂I₂N₂O₁₃
MW 1001.35



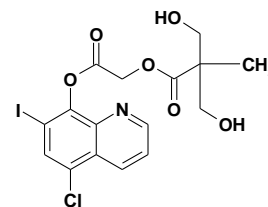
19-2310 (5-Chloro-7-iodo-8-quinolyl) 6-[2-[2-[2-[2-[6-[(5-chloro-7-iodo-8-quinolyl)oxy]-6-oxo-hexoxy]-2-oxo-ethoxy]ethoxy]ethoxy]acetyl]oxyhexanoate

C₃₈H₄₀Cl₂I₂N₂O₁₁
MW 1025.46



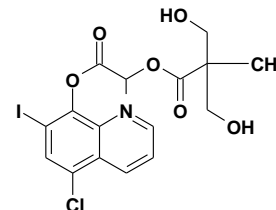
19-2311 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethyl] 3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoate

C₁₆H₁₅ClNO₆
479.66



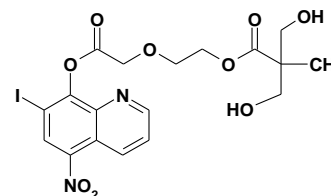
19-2312 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethyl] 3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoate

C₁₇H₁₇ClNO₆
493.69



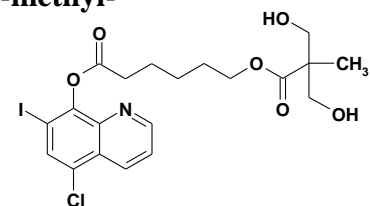
19-2313 2-[2-[(7-Iodo-5-nitro-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoate

C₁₈H₁₉N₂O₉
MW 534.26



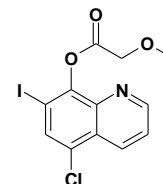
19-2314 (5-Chloro-7-iodo-8-quinolyl) 6-[3-hydroxy-2-(hydroxymethyl)-2-methyl-propanoyl]oxyhexanoate

C₂₀H₂₃ClNO₆
MW 535.77



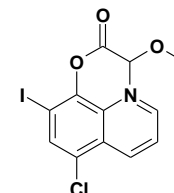
19-2552 (5-Chloro-7-iodo-8-quinolyl) 2-methoxyacetate

C₁₂O₉ClNO₃
MW 377.56



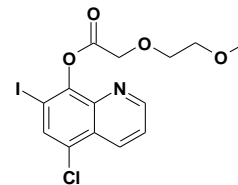
19-2553 (5-Chloro-7-iodo-8-quinolyl) 2-methoxypropanoate

C₁₃H₁₁ClNO₃
MW 391.59



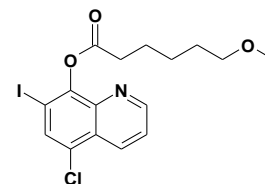
19-2554 (5-Chloro-7-iodo-8-quinolyl) 2-(2-methoxyethoxy)acetateC₁₄H₁₃ClNO₄

MW 421.61



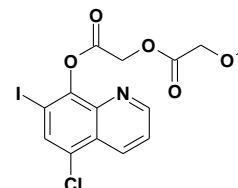
19-2555 (5-Chloro-7-iodo-8-quinolyl) 6-methoxyhexanoateC₁₆H₁₇ClNO₃

MW 433.67



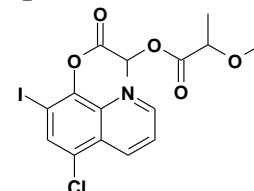
19-2556 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethyl] 2-methoxyacetateC₁₄H₁₁ClNO₅

MW 435.60



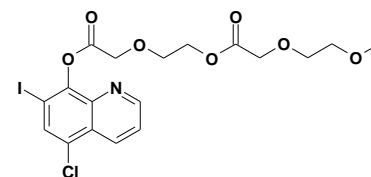
19-2557 [2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-1-methyl-2-oxo-ethyl] 2-methoxypropanoateC₁₆H₁₅ClNO₅

MW 463.65



19-2558 2-[2-[(5-Chloro-7-iodo-8-quinolyl)oxy]-2-oxo-ethoxy]ethyl 2-(2-methoxyethoxy)acetateC₁₈H₁₉ClNO₇

MW 523.70



19-2559 7-(5-Chloro-7-iodo-8-quinolyl) O1-(5-methoxypentyl) heptanedioateC₂₂H₂₇ClNO₅

MW 547.81

