FEB 06, 2020

OPEN ACCESS

DOI:
[dx.doi.org/10.17504/protocols.io.9h5h386](https://doi.org/10.17504/protocols.io.9h5h386)

External link:
<https://doi.org/10.1371/journal.pone.0227811>

Protocol Citation: Andrii Kyrylchuk, Andriy Bezdudnyy, Denys Klukovskiy 2020. Synthesis of fluorinated neonicotinoids. **protocols.io** <https://dx.doi.org/10.17504/protocols.io.9h5h386>

MANUSCRIPT CITATION: Mesquita RdS, Kyrylchuk A, Grafova I, Klukovskiy D, Bezdudnyy A, Rozhenko A, Tadei WP, Leskelä M, Grafov A (2020) Synthesis, molecular docking studies, and larvicidal activity evaluation of new fluorinated neonicotinoids against *Anopheles darlingi* larvae. PLoS ONE 15(2): e0227811. doi: [10.1371/journal.pone.0227811](https://doi.org/10.1371/journal.pone.0227811)

License: This is an open access protocol distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited

Synthesis of fluorinated neonicotinoids

PLOS One

In 1 collection

Andrii Kyrylchuk¹, Andriy Bezdudnyy¹, Denys Klukovskiy¹

¹Institute of Organic Chemistry, National Academy of Sciences of Ukraine, Murmans'ka str. 5, Kyiv, 02660, Ukraine

Chemistry Method Development Community

Andrii Kyrylchuk

ABSTRACT

This is a general protocol for synthesis of fluorinated neonicotinoid analogues by interaction of amines with 2-chloro-5-(chloromethyl)pyridine.

MATERIALS

MATERIALS

⊗ 2-chloro-5-(chloromethyl)pyridine **Contributed by users Catalog #516910**

⊗ anhydrous potassium carbonate **Contributed by users Catalog #60109**

⊗ anhydrous acetonitrile **Contributed by users Catalog #271004**

⊗ Dichloromethane **Sigma Aldrich Catalog #320269**

⊗ Silica gel **Sigma Aldrich Catalog #645524**

⊗ Ethyl acetate **Sigma Aldrich Catalog #319902**

⊗ Hexane **Sigma Aldrich Catalog #208752**

STEP MATERIALS

⊗ 2-chloro-5-(chloromethyl)pyridine **Contributed by users Catalog #516910**

Substituted aniline, obtained according to literature sources.

Protocol status: Working

Created: Nov 19, 2019

Last Modified: Feb 06, 2020

PROTOCOL integer ID:
29981

Keywords: neonicotinoids;
vector control; fluorinated
compounds; Malaria; larvicide;
molecular modeling; molecular
docking

- 1 Dissolve 2.0 mmol of corresponding substituted aniline in 5 mL of anhydrous acetonitrile in round-bottom flask, add 0.324 g (1.9 mmol) of 2-chloro-5-(chloromethyl)pyridine and 0.828 g (6.0 mmol) of anhydrous potassium carbonate.
- 2 Put a water-cooled backflow condenser on top of the flask and heat the flask under vigorous stirring until the solution starts to boil.
- 3 Continue refluxing for several hours. Monitor reaction progress via thin layer chromatography (TLC).
- 4 After the reaction is complete, filter off inorganic salts and rigorously wash the sediment with dichloromethane.
- 5 Combine all liquid fraction and remove the solvents by evaporation under reduced pressure.
- 6 Purify the residue by preparative (TLC) on SiO₂ (eluent EtOAc/hexane 1:2).