

# Certificate of Analysis

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**Product Name:** Tetrodotoxin citrate

**Catalog No.:** 1069

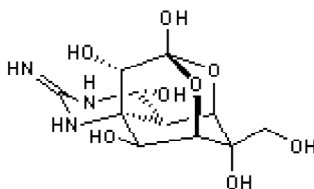
**Batch No.:** 25

**CAS Number:** 18660-81-6

**IUPAC Name:** Octahydro-12-(hydroxymethyl)-2-imino-5,9:7,10a-dimethano-10a*H*-[1,3]dioxocino[6,5-*d*]pyrimidine-4,7,10,11,12-pentol citrate

## 1. PHYSICAL AND CHEMICAL PROPERTIES

**Batch Molecular Formula:** C<sub>11</sub>H<sub>17</sub>N<sub>3</sub>O<sub>8</sub>  
**Batch Molecular Weight:** 319.27  
**Physical Appearance:** White lyophilised solid  
**Solubility:** water to 10 mM  
**Storage:** Store at -20°C  
**Batch Molecular Structure:**



## 2. ANALYTICAL DATA

**HPLC:** Shows >98% purity

Caution - Not Fully Tested • Research Use Only • Not For Human or Veterinary Use

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**IUPAC Name:** Octahydro-12-(hydroxymethyl)-2-imino-5,9:7,10a-dimethano-10aH-[1,3]dioxocino[6,5-d]pyrimidine-4,7,10,11,12-pentol citrate

**Description:**

Tetrodotoxin citrate, the water-soluble citrate salt of tetrodotoxin, is a reversible, potent, selective and high affinity inhibitor of voltage gated sodium channels Na<sub>v</sub> 1.6, 1.1, 1.3, 1.4, 1.2 and 1.7 (IC<sub>50</sub> values are 2.3 nM, 4.1 nM, 5.3 nM, 7.6 nM, 14 nM and 36 nM, respectively). Binding is reversible and high affinity (K<sub>d</sub> = 1-10 nM). Tetrodotoxin shows antagonism of aconitine-induced cardiac toxicity, analgesic effects in mouse models of neuropathy and prolonged duration of local anesthesia in animals when combined with capsaicin. Tetrodotoxin also shows pH-dependent blockade of canine cardiac L-type Ca<sup>2+</sup> (Ca<sub>v</sub>1.x) channels, blocks primary ... Please see product specific page on www.tocris.com for full description.

**Physical and Chemical Properties:**

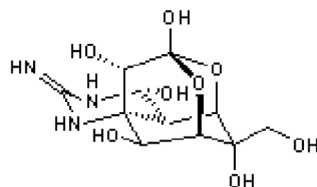
Batch Molecular Formula: C<sub>11</sub>H<sub>17</sub>N<sub>3</sub>O<sub>8</sub>

Batch Molecular Weight: 319.27

Physical Appearance: White lyophilised solid

**Minimum Purity:** ≥98%

**Batch Molecular Structure:**



**Storage:** Store at -20°C

**Solubility & Usage Info:**

water to 10 mM

Each vial contains 1mg of tetrodotoxin and 5mg of lyophilized citrate buffer, pH 4.8. Each vial contains 1mg of tetrodotoxin lyophilized from citrate buffer. This product is supplied as a lyophilized solid and may be very hard to visualize. Solutions should be made by adding solvent directly to the vial. The vial should then be vortexed vigorously to ensure the product has completely dissolved.

**Stability and Solubility Advice:**

Some solutions can be difficult to obtain and can be encouraged by rapid stirring, sonication or gentle warming (in a 45-60°C water bath).

Information concerning product stability, particularly in solution, has rarely been reported and in most cases we can only offer a general guide. \*Unless contradicted by product-specific protocols or instructions, our standard recommendations apply:

**SOLIDS:** Provided storage is as stated on the product label and the vial is kept tightly sealed, the product can be stored for up to 6 months from date of receipt.

**SOLUTIONS:** We recommend that stock solutions, once prepared, are stored aliquoted in tightly sealed vials at -20°C or below and used within 1 month. Wherever possible solutions should be made up and used on the same day.

**Other Information:**

This product is supplied as a lyophilised solid and may be very hard to visualise. Solutions should be made by adding solvent directly to the vial. The vial should then be vortexed vigorously to ensure the product has completely dissolved.

**This is a dual-use item with associated conditions of supply; the relevant licence/documentation from the appropriate governing body will be required.**

**References:**

**Shoromony *et al*** (2019) Prolonged duration local anesthesia by combined delivery of capsaicin- and tetrodotoxin-loaded liposomes. *Anesth.Analg.* **129** 709. PMID: 31425210.

**Tsukamoto *et al*** (2017) Differential binding of tetrodotoxin and its derivatives to voltage-sensitive sodium channel subtypes (Nav1.1 to Nav1.7). *Br.J.Pharmacol.* **174** 3881. PMID: 28832970.

**Hegyi *et al*** (2013) Tetrodotoxin blockade on canine cardiac L-type Ca<sup>2+</sup> channels depends on pH and redox potential. *Mar.Drugs* **11** 2140. PMID: 23771047.

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