

Salt and Quinine Solution Mixing Instructions

Equipment and Supplies:

An electronic balance (scale) readable to at least 0.01 grams, and preferably 0.001 grams
Examples: [Ohaus Adventurer Pro Series](#) or [Denver Instrument Summit Series](#) prices run around \$1000+

Magnetic stirrer

Example: [Fisher Scientific Isotemp Basic Magnetic Stirrer 7 x 7 in, 120 volt](#) price is \$295

Stir bar (1 or 1.5 inches in length)

Example: [Fisher Scientific Stir Bars 9.5 dia X 25.4 mm L](#) price \$7.79

Plastic-coated magnetic retrieving rod

Example: [Fisher Brand Stir Bar Retriever, 12 inch](#) price \$16.27 each

A 1-liter graduated cylinder

Example: [Fisherbrand Serialized Class A Graduated Cylinder](#) price \$169.42 each. A more affordable [Polypropylene graduated cylinder](#) is an option if cost is prohibitive.

Solution storage bottles, light-occluding are required for quinine

Example: [Pyrex Brown Solution Storage Bottles](#) price for case of four 500 ml bottles is \$173.65

A lab spoon

Example: [Fisherbrand Lab Spoon](#) price \$13.93 each

Plastic weigh boats

Example: [Anti-Static Weighing Boats](#) price for small (needed for quinine) \$39 for 500, price for large (needed for NaCl) \$83.50 for 500

Food, Kosher or USP grade Quinine monohydrochloride dihydrate.

Example: [Aldrich Quinine monohydrochloride dihydrate](#) price: \$58 for 100 grams.

USP grade NaCl

Example: [Spectrum Sodium Chloride Granular, USP](#) price: \$174.70 per 2.5 kg. Can also be ordered in bulk.

Distilled or deionized water

Example: [Earth2O Distilled Water](#) available in grocery stores, prices vary by location

Note: NIH Toolbox norms were collected using USP grade NaCl (formula weight 58.44) available from Spectrum Chemicals and Kosher grade quinine monohydrochloride dihydrate (formula weight 396.9) available from Sigma-Aldrich.

Directions

Make sure that balance is on a level surface. Add weigh boat to balance pan, and carefully zero the balance. Then add 58.44 grams of NaCl to the weigh boat. To mix the 1 Molar NaCl solution, you will need to add the NaCl to 1 liter of purified water. To do this, place pre-measured NaCl crystals in a 1-liter graduated cylinder. Make sure all the crystals are emptied from the weigh boat into the graduated cylinder. Slowly add distilled or deionized water to the 1-liter mark by bringing the meniscus (bottom) of the solution to the 1000 ml mark. Gently add the stir bar and then stir on a magnetic stirrer until the NaCl is completely dissolved (approximately 5 to 10 minutes). Once NaCl is fully dissolved, turn off the stirrer,

and use the retrieving rod to remove the stir bar from the solution. Transfer the solution to labeled storage bottles. Wash and rinse graduated cylinder, stir bar, and retrieving rod thoroughly before reusing.

To mix 0.001 M quinine hydrochloride dihydrate, dissolve 0.397 grams quinine in purified water. To do this, weigh out 0.397 grams of quinine HCl dihydrate as described above. If you do not have access to an analytical balance that goes to four decimal points, weigh out 0.40 grams of quinine HCl on a standard top-loading electronic balance. Do not use a triple-beam balance for quinine. Place the pre-measured quinine in a 1-liter cylinder, add distilled or deionized water to the 1000 milliliter mark, gently add the stir bar and then stir on a magnetic stirrer until the quinine is completely dissolved, and no visible crystals can be seen (at least 15 to 20 minutes). Transfer the solution to labeled storage bottles. When finished, wash and rinse graduated cylinder, stir bar, and retrieving rod thoroughly before reusing.

Solution Storage Requirements:

Taste solutions should be made fresh each week, stored under refrigeration when not in use, and should be warmed to room temperature prior to use for testing. Please do not freeze the solutions because the container may crack (Note: 3-4 hours is generally required for solutions to warm to room temperature.)

Taste solutions should be stored in glass bottles with a non-reactive lid. Quinine is light sensitive, so quinine should be stored in a light-occluding glass bottle or a bottle wrapped in aluminum foil to minimize light exposure.

Use of Solutions for Taste Testing:

Each participant will be tested with 10 ml of quinine solution and 10 ml of NaCl solution. Solutions should be at room temperature for testing. Two labeled medicine cups should be used to hold the solutions for testing each participant. 10 ml of quinine solution should be poured into one cup and 10 ml of NaCl solution should be poured into the second cup. For tongue tip testing, a clean cotton swab will be dipped once in the quinine solution and then used to paint the solution across the anterior tongue. After the participant rinses his/her mouth, a second clean cotton swab will be dipped once in the NaCl solution and used to paint the solution across the anterior tongue. The solution remaining in each of the two cups will then be used for whole-mouth testing, first with quinine and then with NaCl. See test instructions for detailed information on administering the test.