Chloramine Test Kits for an Efficient Process of Swimming Pools' Disinfection

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Chloramine in swimming pools is considered hazardous. It is generated by reaction of free chlorine with amine compounds including urine and perspiration. To eliminate chloramine, excessive amount of hypochlorite compounds is normally added to swimming pools in a method called “pool shocking”. However, with this method, the pool needs 6-8 hours of resting to allow the chlorine concentration to drop below 3 ppm before swimmers re-entering the pool. This project develops a direct chloramine test kit utilized for efficient pool treatment. The test kit contains two main parts: (a) salicylate reagent, used to react with chloramine to normalize the measurement, and (b) sodium iodide and starch mixture, used to react with chloramines as a colorimetric indicator for measuring chloramine concentration. Before chlorine treatment, water from the pool usually contains excessive chloramine and little chlorine, resulting in reaction product (triiodide/starch complex) having blue color and indicating that the sample is not yet at the chlorination breakpoint. Then, calcium hypochlorite is gradually added until the solution turned colorless to find the chlorination breakpoint, which is the lowest chloramine concentration. Appropriate amount of chlorine for pool treatment can then be calculated. The finding indicates the convenience and effectiveness of the developed test kit, allowing less use of hypochlorite compounds and less waiting time for swimmers. To enhance the ability of the test kit, a color sensor on a microcontroller board is applied to distinguish more color levels of the solution and then the program automatically calculates the proper amount of chlorine for pool treatment.

Awards Won:
Fourth Award of $500