The SAS Water Purification System: Utilizing Novel Chemical, Ionizing, Solar and Off Grid Thermal Induction Techniques for Chemical and Microbial Purification and Medical Sterilization of Water in Developing Communities

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Clean water is vital for human consumption and medical treatment, as well as equipment sterilization. 80% of illnesses in developing countries relate to poor water quality and 3.4 million people die annually from contaminated water consumption. 1 in 5 people who undergo surgery in developing countries die from infection. The portable SAS Water Purification System (Sanitation And Sterilization) provides safe drinking water, power and medical-grade sterile water for communities in need. Chemical filtration, biological treatment and disinfection-based storage processes cohesively produce water suitable for human consumption. WHO recommendations were achieved with removal efficiencies of >90% barium (representing arsenic) and 78% fluoride. Reductions of >99% turbidity allowed for successful solar disinfection and copper ionization techniques, targeting microbiological purification. Faecal coliform enumeration revealed a reduction of 10,000 cfu/100 mL to <1 cfu/100mL. The SAS Solar Disinfection Colorimetry Detector accurately measures UV exposure during the solar disinfection process. The SAS system produces 50% more power than a standard fixed panel system. The “all in one”, self-contained sterilization unit utilizes the generated power to pressurize a portion of the treated water, successfully producing medical-grade sterile water for medical application. A world-first use of off-grid induction technology makes the SAS Water Purification System nearly four times more energy efficient than current off-grid sterilization units, which rely on electrical heating techniques / conventional fixed panels. The presented system fits within a standard sized car, making it portable, unlike its single 20-foot competitor which requires semi-trailer transportation.

Awards Won:
Third Award of $1,000
Qatar Foundation, Research &amp
Development: Award of $1,000
King Abdulaziz &amp
his Companions Foundation for Giftedness and Creativity: $20,000 Scholarship for Sustainable Initiatives with Water Technology