# Chitobiotics: Chitin vs. Chitosan Novel Pharmaceutical Water Filtration and Filter Development

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Antibiotic resistance and pharmaceutical contamination are an emerging threat to drinking water sources, particularly those that stem from an aquifer. These items are difficult to neutralize and filter out through traditional filtration methods.Chitosan is a biopolymer with adjustable pores that 'grab' particulates out of water solutions, and is a substance that is repurposed from crustacean waste. Chitin vs. chitosan in a specifically designed muti-layer fan filter should removed nearly 100% of oxidized and fresh particulates that make up these pharmaceutical solutions. The chitin is the base polymer that once deacetylated produces produces chitosan, and both have different sized pores to remove particulates. The deacetylated process removes histones that would cause allergies otherwise. The clarity of the filtrate will be tested through a triple redundancy testing system that includes pH, spectrophotometry, photometry, bacterial analysis, and microscopic analysis. The filter design itself proved to be 99.7% efficient at removal of particulates and producing clear water with oxidized and fresh solutions, 99.8% with chitin and 99.99% with chitosan. Consistent pH levels of 7 and 10% bacterial growth enhancement were noted with all solutions. The filter design in conjunction with both chitin and chitosan proves to be a cost-effective, efficient filter for pharmaceuticals/antibiotics, providing clean, clear water.

**Awards Won:**
Fourth Award of $500