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## PREPARATION AND CHARACTERIZATION OF ALUMINA AND SILICA MODIFIED CHITOSAN

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## ABSTRACT

In this present work, the modified chitosan composite is prepared by using Alumina and Silica. The prepared composites are characterized by SEM, EDAX, XRD and FTIR techniques. The physiochemical characteristics such as Carbon Yield (%), Moisture content, pH, Acidity and Basicity, Zero point charge, Boehm's titration, Iodine number are also carried out. The yield and iodine number of chitosan modified silica 91.6% and 2743.555mg/g is higher than the chitosan modified alumina 85.2% and 2121.457mg/g. The prepared composites are used as remarkable adsorbents in the treatment of wastewater due to its biodegradable and non-toxic nature. **Keywords**: chitosan, Characterization, alumina, silica, modification, wastewater.

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## **INTRODUCTION**

The color is an important aspect of human life. Coloring process in industries is done using dyes. A dye is a colored substance that has an affinity to the substrate to which it is being applied. Today commercially more than 10,000 dyes are available.<sup>1</sup> Dyes are mostly used in industries like textiles, paper, printing, leather and plastics.<sup>2</sup> Common pollutants in textile effluents are dyes which are toxic, non-degradable due to their complex structure. As a result, the toxic effluents pose a huge risk to the environment if discharged untreated.<sup>3</sup> Due to increase in population and developmental work wastewater recovery, recycling and reuse are necessary to meet the water requirements for domestic uses, irrigation and industry.<sup>4</sup>Wastewater can be recovered from various sources such as agricultural return flows, industrial wastewater, stormwater and municipal wastewater. Water can be reclaimed by various methods on the basis of the presence of physical, chemical and biological constituents.<sup>5</sup> Extensively reported methods for color removal are coagulation, ultra-filtration, chemical oxidation, electrochemical, adsorption and photo oxidation.<sup>6</sup>

Activated carbon is a material which is used for the removal of dyes due to the high capacity of adsorption of various kinds of dyes, but its use is limited because of the high cost. A large variety of low-cost materials as an alternative of activated carbon have been investigated for their ability to remove dyes.<sup>7-9</sup> Chitosan a cationic polymer from natural resources has received much interest of the researchers, due to its inexpensive, biodegradability, non-toxic and environment-friendly.<sup>10</sup> Chitosan is a straight chain copolymer is made of (1-4)-linked D-Glucosamine and N-Acetyl - D-Glucosamine. Deacetylation of Chitin yields chitosan. Chitosan is the second abundant polymer in nature after cellulose.<sup>11</sup> The number of amino groups present in the chitosan can uptake more pollutants than chitin, which has few percentage of amino groups.<sup>12-14</sup> The hydroxyl groups and amino groups of the chitosan can be chemically modified.<sup>15-17</sup> Chemical modification of chitosan enhances the uptake capacity of the pollutants.<sup>18,19</sup> It is used in a number of fields including agriculture, medicine, textile, wastewater treatment. The present work focuses on the preparation and characterization of Chitosan modified with Alumina and Silica.