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ABSTRACT

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Potassium chromate solution

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Presently metal and metal oxides in NPs have outstanding approaches in various fields owing to their electrical, optical, thermal abilities [1]. Among the metal oxides, Cr_2O_3 has perceptible properties to attract the researchers. Its thermal stability, hardness, chemical resistance and antiferromagnetic property lead to Cr_2O_3 NPs synthesis in various applications [2]. The attractive adaptable properties of Cr_2O_3 NPs have led to the green synthesis. The crucial attractions of Chromium oxides (Cr_2O_3) have an importance in science as well as in technology [3–4]. Distinguishable parts of the plants (leaves, fruit, roots, latex, seed and stem) are having prospective medicinal values. The fabrication of Cr_2O_3 nanoparticles have been developed by diverse technique such as thermal decomposition [5], hydrothermal method [6–8], solvothermal method [9], thermal process [10–12], microwave irradiation method [13], precipitation method [14], magnetron sputtering [15], combustion solution method using glycine [16], laser-induced deposition [17], sonochemical synthesis [18], sol-gel syn-

thesis [19], combustion synthesis [20], thermal reduction [21], urea-assisted homogeneous precipitation [22] and precursor calcinations [23]. Chromium (Cr_2O_3) possess specific applied applications such as liquid crystal displays [24], in high-temperature resistant materials [25], coating materials [26], corrosion resistant materials [27], green pigment [28], solar absorbers [29], heterogeneous catalysts [30], ceramics, coatings, printing and paint industry [31–33].

In contrast with the conventional method, bio synthesis is friendlier to environment because it utilizes plants extract as the chemicals substitute. The plant extract containing destructive compounds helps the reduction of chromium ions in the fabrication of Cr_2O_3 NPs. The *Manihot esculenta* leaves possess biomolecules such as carbohydrates, proteins and lipids [34–35], which could be used as reducing agent to react with chromium ions and act as scaffolds to direct the formation of Cr_2O_3 NPs in solution.

2. Materials and methods

2.1. Preparation of *Manihot esculenta* extract

Healthy leaves of *Manihot esculenta* were collected and washed several times with distilled water to remove the adhering dust particles. The leaves were then cut into small pieces and dried in a hot air oven at 60°C for 48 hours. The dried leaves were then ground into a fine powder and stored in airtight containers for future use.

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