Preface

Many things in our daily life consist of coatings, used either for protective and/or decorative purposes. Coating enhances the aesthetic beauty and durability of a product. However, the coating materials should possess the properties like solvent-free, ease of application, recyclable, and less waste production. In addition, the increased sustainability of the coatings should take into account with increasing demand for the coatings. In this regard, alkyd resins based on undepletable and renewable resources like vegetable oils can contribute to enhance sustainability. With the versatile properties, alkyd resins are of low cost and biodegradable, which give them an altitude above the other vegetable oil derivatives. Moreover, a large number of modifications can be performed on alkyd resins to achieve desired level of properties for their practical applications.

The present thesis deals with the synthesis, characterization, and properties evaluation of Jatropha curcas oil modified alkyd resins for surface coating applications. An effort has been devoted to improve the performance characteristics such as curing time, thermal stability, mechanical properties, and hardness of the prepared alkyd resins by means of blending and nanocomposite decoration with fillers such as expanded graphite (EG), graphene oxide (GO), and multiwall carbon nanotubes (MWCNTs). The contents of the thesis have been compiled into seven chapters. Chapter 1 deals with motivation and research background of the present investigation with brief review on alkyd resins. Chapter 2 deals with the synthesis and characterization of Jatropha curcas oil modified alkyd resins and their blends with a commercially available epoxy resin. Chapter 3 describes the development of a "green technology" in order to improve the performance characteristics of the alkyd resins. Chapter 4 describes the synthesis and characterization of nanocomposites based on the alkyd resins with EG. Chapter 5 reports the study of effects of GO on the performance characteristics such as curing time, thermal stability, and mechanical properties of the alkyd resins. Chapter 6 deals with the study of a class of bionanocomposites based on the polymer networks of epoxidized soybean oil and MWCNTs nano-filler. The last chapter of the thesis i.e., Chapter 7 describes the conclusion and future scope of the present investigation. The major findings of the thesis are highlighted in this chapter.

We hope that this study contributes a little knowledge to the phenomenal growth of 'alkyd resins and bionanocomposites'. At the same time it also opens up the possibilities of further research in this area.

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