

Composites Science and Technology

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Vegetable Oil-Based Composites

Processing, Properties and Applications

 Springer

Composites Science and Technology

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Preface

This book provides solid, quantitative descriptions and reliable guidelines, reflecting the maturation and demand of the field and the development of vegetable oil-based composites. This book focuses on the different vegetable oils used for the preparation of composites such as olive oil and canola oil. The coverage of the book highlighted the most exciting fillers used in the preparation of vegetable oil-based composites. This book will be of interest to researchers working in the fields of composite materials, material science, applied science, and bio-wastes. This book will be useful for scientists working on the preparation of composite materials from natural sources. This book will be very helpful for students in the development of green and sustainable composite materials, as well as graduates in material science, chemical engineering, and biocomposite materials.

The first introductory chapter “[Introduction to Vegetable Oils](#)” covers the basic information about vegetable oils and their application, and the second chapter “[Vegetable Oil Based Polymer Composites—Processing Properties and Applications](#)” provides information about the processing and applications of vegetable oil composites. Chapters “[Olive Oil Based Composites](#)” and “[Canola Oil as a Bio-additive: Properties, Processing and Applications](#)” covers the use of olive oil and canola oil for the preparation of various composites. Chapters “[Vegetable Oil Based Polyurethane Composites](#)” and “[Vegetable Oil Based Epoxy Composites](#)” describe the polyurethane and epoxy-based vegetable oil composites and their applications. Chapters “[Fiber Reinforced Vegetable Oil Based Vinyl Polymer Composites](#)” and “[Natural Fiber Reinforced Vegetable Oil Composites](#)” covers the use of various fibres in the processing of vegetable oil composites. The last two chapters “[Vegetable Oil Based Nanoclay Composites](#)” and “[Carbon Nanotube and Graphene-Reinforced Vegetable Oil-Based Nanocomposites](#)” describe about vegetable oil composites based on nano clay, carbon nanotubes and graphene-reinforced materials.

Finally, we assure the readers that the information provided in this book can serve as a very important tool for anyone working on vegetable oil composites. We are grateful to all the authors who contributed chapters to this book and who helped to

turn our thoughts into reality. Lastly, we are grateful to the Springer team for their continuous support at every stage to make it possible to publish on time.

Kota Samarahan, Malaysia
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George Town, Malaysia
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Introduction to Vegetable Oils



Saba Farooq and Zainab Ngaini

Abstract Vegetable oil (VO) is a naturally occurring hydrocarbon in innumerable compositions and abundantly found in natural plants, seeds and fruits. Vegetable oils have gained a mammoth consideration in this new era due to their limitless applications in different sectors including biofuels, food, soaps, cosmetics, textile, paint and coating, and plastic industries. Numerous researches have been accomplished to improve vegetable oil extraction and usage in significant applications as binders, polymerizations and lubricants. This chapter recapitulates the basic introduction, composition, classification of vegetable oils and their significant roles in daily life. The most acquainted applications of vegetable oils are also summarized in this chapter.

Keywords Fat · Glyceride · Hydrocarbon · Cooking · Epoxide · Fuel industry

1 Introduction

Earlier human civilization preferred animal fats such as butter formed from the milk of goats, cattle and sheep, instead of vegetable oil. Vegetable oil discovery and development was originated as an alternative source. Afterward, the oilseeds pressing and the extraction especially from olives became the primary source of cooking oil. Other resources such as radishes, sesame seeds, or flax seeds have also been used for oil production. In the medieval period Egyptians, Chinese, and Europeans produced infusions of aromatic or medicinal plants (e.g., cinnamon and clove) in vegetable oils as solvents for nutritional and therapeutic purposes [1]. They used vegetable oils for preserving food [2], bio-lubricant [3], coating materials [4], tissue engineering

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12 Perspective and Conclusion

Vegetable oils are low cost, biodegradability, commercially available and outstanding environmental aspects and enriched bioactive compounds. Scientists and researchers may develop novel technologies for the synthesis of polymers, binder, energy provider moieties with low solvent and mild temperatures, solvent-free, at room temperature requirements contributed to maintaining high yields and atom efficiency. Further modifications of vegetable oil-derived materials are still needed to introduce innovative properties; with improved performance, affordable cost and ecofriendly. With extensive and persistent research efforts, VO material will be beneficial in many industries and in the future.

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