

REGENERATED CELLULOSE FIBRES

Edited by
Calvin Woodings



The Textile Institute



WOODHEAD PUBLISHING LIMITED

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CRC Press
Boca Raton Boston New York Washington, DC

WOODHEAD PUBLISHING LIMITED

Cambridge England

Published by Woodhead Publishing Limited in association with The Textile Institute

Woodhead Publishing Limited
Abington Hall, Abington
Cambridge CB1 6AH
England
www.woodhead-publishing.com

Published in North and South America by CRC Press LLC,
2000 Corporate Blvd, NW
Boca Raton FL 33431, USA

First published 2001, Woodhead Publishing Ltd and CRC Press LLC
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British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library.

Library of Congress Cataloging in Publication Data
A catalog record for this book is available from the Library of Congress.

Woodhead Publishing ISBN 1 85573 459 1
CRC Press ISBN 0-8493-1147-0
CRC Press order number: WP1147

Cover design by The ColourStudio
Typeset by Best-Set Typesetter Ltd, Hong Kong
Printed by TJ International Ltd, Cornwall, England

Until the early years of the 20th century, textiles were based solely on natural products such as cotton, wool, silk and linen. However a chain of developments commencing in the 1890s led to a global textile industry based largely on fibres manufactured by industrial processes.

These processes can be subdivided into those which use the cell walls of plants *directly* as their starting point, and thermoplastic fibres which start from non-renewable fossil reserves and hence use the plant matter *indirectly*. Synthetic fibres, now economically manufactured from oil reserves valued at little more than the cost of extraction, have come to dominate the manufactured fibre market, and as the 20th century drew to a close, their use overtook that of natural and regenerated fibres combined.

Will this trend continue until natural and regenerated fibres are no more than costly specialities confined to high fashion, 'environmentally friendly' and luxury end-uses? Has cotton usage peaked, like wool and silk in earlier decades, leaving the fibre future to ever-improving synthetics? Will synthetic fibres sustain their cost effectiveness as oil becomes scarcer? If not, will processes such as those described in this book form the basis of a new textile industry based on readily renewable resources, or will fibre-making polymers such as polyesters be producible economically from annual crops? Will thermoplastic hydrophilic polymers ever be synthesised by purpose-designed genetically engineered plants?

These are the big questions facing fibre manufacturers at the turn of the millennium, and this Fibre Series from Woodhead Publishing aims to provide the facts to allow such questions to be debated fully. This book on the regenerated cellulose fibres deals with the original manufactured fibre processes which 'simply' take natural cellulose into solution in order to regenerate it in fibrous form. Cellulosics, including cotton, may be losing market dominance to the cheaper synthetics, but nevertheless remain uniquely capable of providing levels of wearer comfort, absorbency, softness, biodegradability, and environmental compatibility that the synthetics have yet to emulate.

Cellulose will, of course, remain the most abundant biopolymer and will continue to be the driving force of the carbon cycle on which all life depends. Its credentials as a safe, environmentally benign and renewable raw material for many industrial processes will be hard to surpass. Photosynthesis will undoubtedly remain the most efficient polymerisation process on Earth, and it is conceivable that a full understanding of its biochemistry may allow us to engineer organisms to produce modified celluloses and cellulose derivatives directly.

Helping Nature to add to cellulose those properties which the 20th century textile industry has come to regard highly, seems to be at least as worthwhile as trying to make natural processes synthesise the plastic polymers that happen to be the market leaders at the time the fossil reserves, on which they are based, are becoming scarce.

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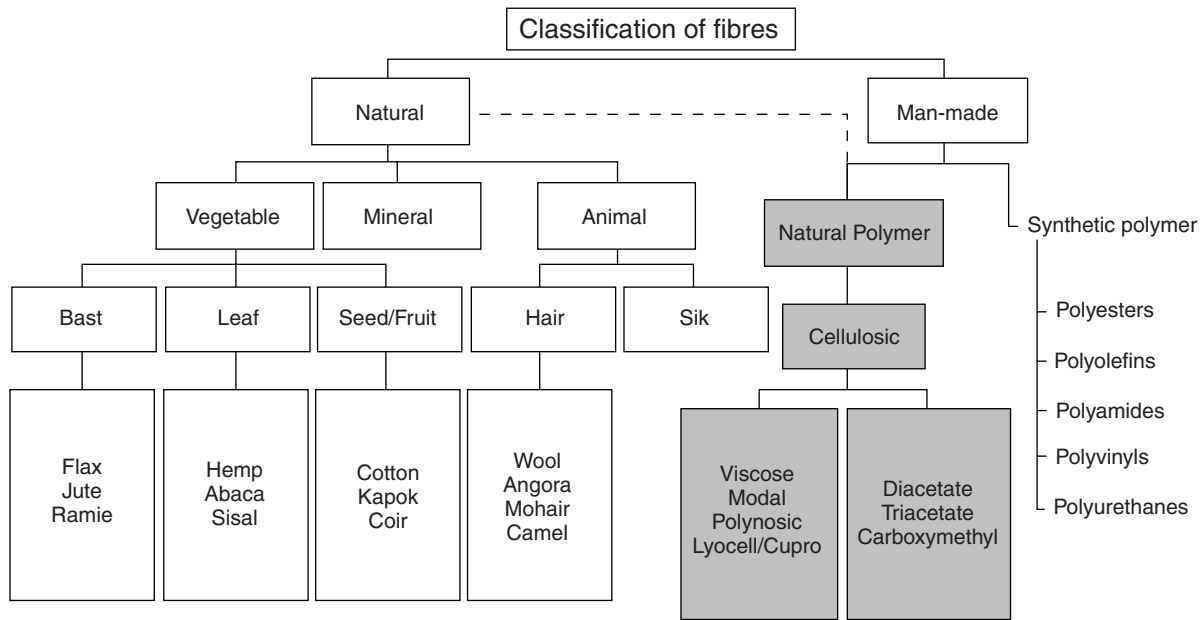
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