

# **THE CHEMISTRY OF BREADMAKING**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649426195

The Chemistry of Breadmaking by James Grant

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**JAMES GRANT**

**THE CHEMISTRY  
OF BREADMAKING**



# THE CHEMISTRY OF BREADMAKING

BY

JAMES GRANT, M.Sc.TECH., F.I.C., F.C.S.

Head of the Fermentation Industries Department in  
the Municipal School of Technology, Manchester;  
Examiner in Chemical Technology in the  
Victoria University, Manchester

WITH PLATES

NEW YORK  
LONGMANS, GREEN AND CO.

LONDON: EDWARD ARNOLD

1912

*All rights reserved*

CHEM.

TX

769

.G 762 c

## THE CHEMISTRY OF BREADMAKING





## P R E F A C E

THIS volume, on the application of science to the very important industry of Breadmaking, is put forward in the hope that it may fill in a gap which undoubtedly exists in the literature and text-books on this subject. It does not lay claim to any literary merit, but should rather be looked upon as an honest endeavour to assist learners who are groping in some amount of obscurity or darkness, with the dawn only just beginning to break. The majority of earnest students in breadmaking—and there are many—have not the same opportunities that are enjoyed by their fellows in other industries, in most of which there is a plethora of books, many of a very excellent character. For books the breadmaking industry at the moment is dependent upon the efforts of Mr. William Jago of Brighton, and Mr. John Kirkland of the School of Baking and Confectionery in the London Borough Polytechnic, in addition, of course, to several useful trade papers. This book is not intended to be a text-book on either chemistry or physics, but rather on the application of these and the kindred science of technical mycology to the subject of Breadmaking. It is advised that all who study its contents should do so in conjunction with some simple text-books on chemistry, physics, mechanics, and the elements of biology and botany.

Recourse has been had in a few instances to chemical equations, and whenever they have been used, the names

of all substances taking part in the reactions have been inserted immediately below. As years advance, and a scientific education is given to the members of the trade generally, such an arrangement will become as unnecessary as it is in many other technical sciences dependent on a working knowledge of chemistry.

A large number of analytical figures are included in the little volume, which are quite original, and have not before been published. In other instances the sources of the information have been acknowledged. This has been considered advisable for reference sake, as very few of such exist to assist the student in his analytical studies.

If the book merits and receives the favourable consideration of the trade and allied industries, it is hoped that in future editions any imperfections may be eradicated, whilst its scope and usefulness may be greatly enlarged.

The author's thanks are due to his colleagues, Messrs. F. G. Richards, F.C.S., and Abraham Flatters, F.R.M.S., to the former for assistance in analytical work and proof-reading, and to the latter for kindly help in preparing many of the illustrations; also to his student, Mr. F. Robinson, B.Sc. Tech., for aid in the illustrations for the technical mycology portion of the work.

J. G.

MANCHESTER.

## CONTENTS

CHAP.	PAGE
I. INTRODUCTORY . . . . .	1
II. THE ATMOSPHERE. WATER . . . . .	10
III. ACIDS, ALKALIES AND SALTS . . . . .	22
IV. BAKERY PHYSICS: THERMOMETERS, BAROMETERS, AND CALCULATIONS . . . . .	30
V. HEAT AND PHYSICAL PROBLEMS . . . . .	42
VI. THE ORGANIC CONSTITUENTS OF THE CEREALS . . . . .	55
VII. THE CEREALS AND THEIR COMPOSITION . . . . .	91
VIII. MILLING, MEALS, FLOURS, MALTS AND EXTRACTS . . . . .	102
IX. FERMENTS, YEASTS, MOULDS, BACTERIA AND BARMS . . . . .	125
X. BREADMAKING PROCESSES AND BREADS . . . . .	153
XI. ANTISEPTICS AND BAKEHOUSE HYGIENE . . . . .	172
XII. FUELS AND OVENS . . . . .	178
XIII. THE ANALYSIS OF CEREAL FOODS . . . . .	186
BIBLIOGRAPHY . . . . .	217
INDEX . . . . .	219