**EDITOR:** IRVIN E. LIENER

Associate Editors: G. Wayne Ivie Marshall Phillips

Manuscript Office: Yvonne D. Curry, Manager; Marie Crunkleton Wiggins, Senior Associate Editor; Bryan D. Tweedy, Associate Editor; Barbara V. James, Assistant Editor

# ADVISORY BOARD

Terry E. Acree
Paul Addis
John W. Finley
Glenn Fuller
Philip Haworth
Constance Kies
Steven Nagy
Harold Pattee
G. D. Paulson
Tom Richardson
Allan E. Smith
Willis B. Wheeler

Journal of Agricultural and Food Chemistry (ISSN 0021-8561) is published monthly by the American Chemical Society at 1155 16th St., N.W., Washington, DC 20036. Second-class postage paid at Washington, DC, and additional mailing offices. POSTMAS-TER: Send address changes to Journal of Agricultural and Food Chemistry, Member & Subscriber Services, P.O. Box 3337, Columbus, OH 43210. Canadian GST Reg. No. R127571347.

## PUBLICATIONS DIVISION

Robert H. Marks, Director

Journals Department: Charles R. Bertsch, Head; Marianne C. Brogan, Associate Head

Editorial Office: Mary E. Scanlan, Manager; Kathleen E. Duffy, Joseph E. Yurvati, Journals Editing Managers; Eileen M. Richardson, Assistant Editor

Advertising Office: Centcom, Ltd., 1599 Post Road East, P.O. Box 231, Westport, CT 06881.

© Copyright 1992 by the American Chemical Society. Copyright permission: An individual may make a single reprographic copy of an article in this publication for personal use. Reprographic copying beyond that permitted by Section 107 or 108 of the U.S. Copyright Law is allowed, provided that the appropriate percopy fee is paid through the Copyright Clearance Center, Inc., 27 Congress St., Salem, MA 01970. For reprint permission, please write to the Copyright Administrator, Publications Division, at the ACS Washington address.

The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1094

American Chemical Society 1155 16th St., N.W. Washington, DC 20036 (202) 872-4600 TDD (202) 872-8733 FAX (202) 872-4615

# Journal of Agricultural and Food Chemistry

### **Editorial Information**

Guide for Authors and copyright transfer form appear in the first issue of each volume.

Manuscripts for publication should be submitted in triplicate to Manuscript Office, Journal of Agricultural and Food Chemistry, at the ACS Washington address.

Correspondence regarding accepted papers and proofs should be directed to the Journals Department, at the address below.

Page charges of \$40.00 per page may be paid for papers published in this journal. Payment does not affect acceptance or scheduling of papers.

The American Chemical Society and its Editors assume no responsibility for the statements and opinions advanced by contributors.

Registered names and trademarks, etc., used in this publication, even without specific indication thereof, are not to be considered unprotected by law.

# Subscription and Business Information

1992 subscription prices, including postage. (For membership information, contact Office of Member Services at the ACS Washington address.)

	U.S.	Canada and Mexico	Europe*	All Other Countries*
	U.D.	MEXICO	Europe	Countries.
Printed				
Members-1 yr	\$ 30	\$ 48	\$ 70	\$ 85
2 yr	\$ 54	<b>\$ 90</b>	\$134	\$164
Nonmembers	\$303	\$321	<b>\$34</b> 3	\$358
Microfiche				
Members-1 yr	\$ 30	\$ 30	\$ 41	\$ 41
2 yr	\$ 54	\$ 54	\$ 76	<b>\$</b> 76
Nonmembers	\$303	\$303	\$314	\$314
Supplementary material (microfiche)	<b>\$</b> 15	\$ 21	\$ 21	\$ 21

\* Air service included.

New and renewal subscriptions should be sent with payment to American Chemical Society, Department L-0011, Columbus, OH 43268-0011. Subscriptions are available only on a calendar year basis. Rates quoted do not apply to nonmember subscribers in Japan, who must enter subscription orders with Maruzen Company

Ltd., 3-10 Nihonbashi 2-chome, Chuo-ku, Tokyo 103, Japan. Tel: (03) 272-7211. Printed edition single issue prices:

Printed edition single issue prices: current year, \$26.00; 1990-91, \$27.00; prior year, \$54.00. Back volume price: \$323.00. Foreign postage additional. Mail orders should be sent to Microforms & Back Issues Office at the ACS Washington address.

Phone orders can be placed for printed, microfiche, and microfilm editions by calling the ACS toll free at (800) 333-9511 from anywhere in the United States and Canada; elsewhere call (614) 447-3776. Phone orders can be charged to Visa, MasterCard, or American Express accounts.

Changes of address must include both old and new addresses with ZIP code and recent mailing label. Send all address changes to Member & Subscriber Services. Please allow 6 weeks for change to become effective.

Claims for missing numbers will not be allowed if loss was due to failure of notice of change of address to be received in the time specified; if claim is dated (a) North America—more than 90 days beyond issue date, (b) all other foreign—more than 180 days beyond issue date. Hard copy claims are handled by Member & Subscriber Services.

Supplementary material is noted in the table of contents with a . It is available as photocopy (\$10.00 for up to 3 pages and \$1.50 per page for additional pages, plus \$2.00 for foreign postage) or as 24× microfiche (\$10.00, plus \$1.00 for foreign postage). Canadian residents should add 7% GST. See supplementary material notice at end of journal article for number of pages. Orders must state whether for photocopy or for microfiche and give complete title of article, names of authors, journal, issue date, and page numbers. Prepayment is required and prices are subject to change. Order from Microforms & Back Issues Office at the ACS Washington address. Supplementary material except structure factors also appears in the microfilm edition and may be ordered by subscription (in microfiche only).

Bulk reprints of individual articles are available. For information write to Distribution Office at the ACS Washington address.

Member & Subscriber Services American Chemical Society P.O. Box 3337

P.O. Box 3337 Columbus, OH 43210 (614) 447-3776; FAX (614) 447-3671 (800) 333-9511

Journals Department
American Chemical Society
2540 Olentangy River Road
P.O. Box 3330
Columbus, OH 43210
(614) 447-3600, Ext. 3171
TELEX 6842086; FAX (614) 447-3745