

**SILPAKORN UNIVERSITY**  
**Science and Technology Journal**  
**SUSTJ**

**Copyright** All rights reserved. Apart from citations for the purposes of research, private study, or criticism and review, no part of this publication may be reproduced, stored or transmitted in any other form without prior written permission by the publisher.

**Published by** Archetype Co.,Ltd.

44/114 Soi Phaholyothin 52 Phaholyothin Road Klongthanon Saimai Bangkok 10220

© Silpakorn University ISSN 1905-9159

# SILPAKORN UNIVERSITY

## Science and Technology Journal

### Editorial Office

Silpakorn University Research and Development Institute (SURDI), Silpakorn University,  
Sanamchandra Palace Campus, Nakhon Pathom, Thailand

### Editorial Advisory Board

**Prof. Amaret Bhumiratana, Ph.D**

*Department of Biotechnology, Mahidol University, Thailand*

**Prof. Geoffrey A. Cordell, Ph.D**

*Professor Emeritus, University of Illinois at Chicago, USA*

**Prof. Kanaya Shiginori, Ph.D**

*Department of Material and Life Sciences, Osaka University, Japan*

**Prof. Keiji Yamamoto, Ph.D**

*Graduate School of Pharmaceutical Sciences, Chiba University, Japan*

**Assist. Prof. Lerkiat Vongsarnpigoon, Ph.D**

*National Metal and Materials Technology Center (MTEC), Thailand*

**Assoc. Prof. Nijsiri Ruangrungsri, Ph.D**

*Department of Pharmacognosy, Chulalongkorn University, Thailand*

**Assoc. Prof. Petcharat Pongcharoensuk, Ph.D**

*Department of Pharmacy, Mahidol University, Thailand*

**Prof. Piyasan Praserttham, Ph.D**

*Department of Chemical Engineering, Chulalongkorn University, Thailand*

**Assoc. Prof. Sarote Khajareern, Ph.D**

*Department of Animal Sciences, Khon-Kaen University, Thailand*

**Prof. Shuji Adachi, Ph.D**

*Graduate School of Agriculture, Kyoto University, Japan*

**Assoc. Prof. Supanee Chayabutra, Ph.D**

*Silpakorn University Research and Development Institute, Thailand*

**Assoc. Prof. Surachai Nimjirawath, Ph.D**

*Department of Chemistry, Silpakorn University, Thailand*

**Prof. Tharmmasak Sommartya, Ph.D**

*Faculty of Agriculture, Bangkhen Campus, Kasetsart University, Thailand*

**Assoc. Prof. Vichai Korpraditskul, Ph.D**

*Faculty of Animal Sciences and Agricultural Technology, Silpakorn University, Thailand*

**Prof. Virulh Sa-Yakanit, Ph.D**

*Department of Physics, Silpakorn University, Thailand*

### Senior Editor

**Assist. Prof. Maneepin Phromsuthirak, Ph.D**

*Editor of Silpakorn University International Journal (SUIJ)*

### Editor

**Assoc. Prof. Onoomar (Poobrasert) Toyama, Ph.D**

*Faculty of Pharmacy, Silpakorn University*

# SILPAKORN UNIVERSITY

## Science and Technology Journal

### Editorial Board

**Assist. Prof. Arunsri Leejeerajumnean, Ph.D**

*Faculty of Engineering and Industrial Technology, Silpakorn University*

**Assist. Prof. Boonsri Jongsareejit, Ph.D**

*Faculty of Science, Silpakorn University*

**Assist. Prof. Chockpisit Thepsithar, Ph.D**

*Faculty of Science, Silpakorn University*

**Chon PooSuwan, M.Sc.**

*Faculty of Animal Sciences and Agricultural Technology, Silpakorn University*

**Hunsa Nilapan, B.S.**

*Silpakorn University Research and Development Institute*

**Assoc. Prof. Mana Kanjanamaneesathian, M.Appl.Sc.**

*Faculty of Animal Sciences and Agricultural Technology, Silpakorn University*

**Assist. Prof. Panadda Phattanawasin, Ph.D**

*Faculty of Pharmacy, Silpakorn University*

**Assist. Prof. Pramote Khuwijtjaru, Ph.D**

*Faculty of Engineering and Industrial Technology, Silpakorn University*

### Managing Editor

Hunsa Nilapan

Silpakorn University Research and Development Institute (SURDI)

### Periodicity

Twice yearly

### Editorial Policy

All articles submitted for publication will be evaluated by a group of distinguished reviewers.

The editorial board claims no responsibility for the contents or opinion expressed by the authors of individual articles.

### All correspondence should be addressed to:

Managing Editor, SUSTJ, Silpakorn University Research and Development Institute,  
Silpakorn University, Sanamchandra Palace Campus, Nakhon Pathom 73000, Thailand

Telephone: 66-3425-4066, 66-3425-9686 Fax: 66-3421-9013

E-mail address: [hunsa@su.ac.th](mailto:hunsa@su.ac.th)

Web site: <http://www.journal.su.ac.th>

### Information about the Journal

An electronic journal is provided on the web site (<http://www.journal.su.ac.th>).

The journal is available at Silpakorn University Book Center. Telephone: 66-2223-7345, 66-2434-1792, 66-3424-4054

## Instructions to Authors

*Silpakorn University Science and Technology Journal (SUSTJ)* is a journal published twice a year in June and December by the Research and Development Institute of Silpakorn University, Thailand. The journal is the Science and Technology version of the formerly *Silpakorn University International Journal (SUIJ)* which was first published in the year 2000. This new journal puts together articles in Science and Technology and aims to promote and distribute peer reviewed articles in the areas of science, health science, animal science, agriculture, engineering, technology and related fields. Articles from local and foreign researchers, invited articles and review from experts are welcome.

### Types of contributions

Short communications, Research articles, Review articles, Case Studies

### Preparation of manuscripts

1. The text should be double-spaced with line number on A4 and a font Times New Roman size 11 should be used. When using MS Word, insert all symbols by selecting "Insert-Symbol" from the menu and use the "Symbol" font.

2. Manuscripts should be organized in the following order:

Cover page with title and authors' names and affiliations

Abstract (in English and Thai)

Key Words

Introduction

Materials and Methods, Area Descriptions, Techniques

Results

Discussion

Conclusion

Acknowledgements

References

Tables and Figures

### Authors' names and affiliations

Full names and affiliations (marked with superscript number) should be provided for all authors on the cover page, separately from the content. The corresponding author (marked with superscript asterisk) should also provide a full postal address, telephone and fax number and an e-mail address as a footnote on the title page.

### Abstract

First page of the content starts with Abstract, including title of the article on top of page. Provide a short abstract not more than 200 words, summarizing the question being addressed and the findings.

### Key Words

Provide 3-5 key words or short phrases in alphabetical order, suitable for indexing.

### References

*In text references:* Refer to the author's name (without initials) and year of publication, e.g., Feldmann, 2004 (for 1 author), Feldmann and Langer, 2004 (for 2 authors), or Feldmann et al., 2004 (for more than 2 authors).

*Article references:* References should be listed in alphabetical order of author(s). For journal, list all names of authors.

*Book*

Feldmann, H. (2004) *Forty Years of FEBS*, Blackwell Publishing Ltd., Oxford.

#### *Chapter in a book*

Langer, T. and Neupert, W. (1994) Chaperoning mitochondrial biogenesis. In *The Biology of Heat Shock Proteins and Molecular Chaperones* (Morimoto, R. I., Tissieres, A., and Georgopoulos, C., eds), pp. 53-83. Cold Spring Harbor Laboratory Press, Plainview, New York.

#### *Article in a journal*

Hammerschlag, F. A., Bauchan, G., and Scorza, R. (1985) Regeneration of peach plants from callus derived from immature embryos. *Journal of Natural Products* 70(3): 248-251.

Hammerschlag, F. A., Bauchan, G., and Scorza, R. Regeneration of peach plants from callus derived from immature embryos. *Journal of Natural Products* (in press).

#### *Article on the web*

Lee, K. (1999) Appraising adaptive management. *Conservation Ecology* 3(2). [Online URL:[www.consecolo.org/Journal/vol3/iss2/index.html](http://www.consecolo.org/Journal/vol3/iss2/index.html)] accessed on April 13, 2001.

#### *Proceedings*

MacKinnon, R. (2003) Modelling water uptake and soluble solids losses by puffed breakfast cereal immersed in water or milk. In *Proceedings of the Seventh International Congress on Engineering and Food*, Brighton, UK.

#### *Patent*

Yoshikawa, T. and Kawai, M. (2006) Security robot. U.S. Patent No. 2006079998

### **Tables and Figures**

Each Table and Figure must be on a separate page of the manuscript.

*Tables:* Number the tables according to their sequence in the text. The text should include references to all tables. Vertical lines should not be used to separate columns. Leave some extra space instead.

*Figures:* Figures should be of high quality, in black and white only, with the same size as the author would like them to appear in press. Choose the size of symbols and lettering so that the figures can be reduced to fit on a page or in a column.

### **Submission of Manuscripts**

The submitted manuscript has not been published or is being considered for publication elsewhere. All information contained in an article is full responsibility of the authors, including the accuracy of the data and resulting conclusion.

Authors are requested to send the manuscript on a diskette labeled with the authors' names and file names. The files should be prepared using MS Word only. Three copies of manuscript must be supplied.

The editorial office will acknowledge receipt of the manuscript within 2 weeks of submission. The 'accepted date' that appears in the published article will be the date when the managing editor receives the fully revised version of the manuscript.

The manuscript may be returned to authors for revision. Authors will be given 2 weeks after receipt of the reviewers' comments to revise the article.

Please submit the manuscript with a diskette to the following address:

Hunsa Nilapan  
Silpakorn University Research and Development Institute  
Silpakorn University, Sanamchandra Palace Campus  
Nakhon-Pathom 73000

### **Proofs**

Proofs will be sent to the corresponding author by e-mail (as PDF file) or regular mail. Author is requested to check the proofs and return any corrections within 2 weeks.



**Silpakorn University**

**Science and Technology Journal**

**Volume 1 Number 2 (July – December) 2007**

## **C o n t e n t s**

### *Research Articles*

**Directed-Mutagenesis and Deletion Generated  
through an Improved Overlapping-Extension PCR  
Based Procedure** 7

Wirojne Kanoksilapatham, Juan M. Gonzalez and  
Frank T. Robb

**Effects of Levels of Sulfur Fertilizer on Growth  
of *Digitaria eriantha* Grass** 13

Auraiwan Isuwan, Jeerasak Saelim and  
Somsak Poathong

**Kinetics of Acetylcholinesterase Inhibition of  
*Quisqualis indica* Linn. Flower Extract** 20

Penpan Wetwitayaklung, Chutima Limmatvampirat,  
Thawatchai Phaechamud and Sindhchai Keokitichai

**Goodness of Fit of Cumulative Logit Models for  
Ordinal Response Categories and Nominal Explanatory  
variables with Two-Factor Interaction** 29

Veeranun Pongsapukdee and Sujin Sukgumphaphan

### *Review Article*

**Recent Development in Alkynol Chemistry:  
Electrophilic Iodonium-Induced Rearrangements** 39

Pakorn Bovonsombat, Pratheep Khanthapura and  
Juthamard Leykajarakul