

**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** Silpakorn University Printing House.  
Silpakorn University, Sanamchandra Palace Campus, Nakhon Pathom 73000

© 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 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 article.

### **Editorial Advisory Board**

#### **Assist. Prof. Alice Thienprasert, Ph.D**

*Director, Silpakorn University Research and Development Institute, Thailand*

#### **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*

#### **Assoc. Prof. Kriengsak Poonsuk, Ph.D**

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

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

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

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

*College of Public Health Sciences, Chulalongkorn University, Thailand*

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

*Department of Pharmacy, Mahidol University, Thailand*

#### **Prof. Piyasan Prasertthdam, Ph.D**

*Department of Chemical Engineering, Chulalongkorn University, 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*

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

*Department of Physics, Silpakorn University, Thailand*

### **Editor**

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

*Faculty of Pharmacy, Silpakorn University*

# **SILPAKORN UNIVERSITY**

## **Science and Technology Journal**

### **Editorial Board**

**Assist. Prof. Bussarin Ksapabutr, Ph.D**

*Faculty of Engineering and Industrial Technology, Silpakorn University*

**Prof. Chawewan Ratanaprasert, Ph.D**

*Faculty of Science, Silpakorn University*

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

*Faculty of Science, Silpakorn University*

**Assist. Prof. Jittat Fakcharoenphol, Ph.D**

*Faculty of Engineering, Kasetsart University*

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

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

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

*Faculty of Engineering and Industrial Technology, Silpakorn University*

**Smith Tungkasmit, Ph.D**

*College of Social Innovation, Rangsit University*

**Assoc Prof. Soraya Ruamrungsri, Ph.D**

*Faculty of Agriculture, Chiang Mai University*

**Agnes Rimando, Ph.D**

*U.S. Department of Agriculture, Agricultural Research Service, USA*

**Prof. Juan Boo Liang, Ph.D**

*Institute of Bioscience, Universiti Putra Malaysia, Malaysia*

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

*Graduate School of Agriculture, Kyoto University, Japan*

**Vincenzo Esposito, Ph.D**

*Department of Energy Conversion and Storage, Technical University of Denmark, Denmark*

### **Managing Editor**

**Pranee Vichansvakul**

### **Periodicity**

Twice yearly

### **All correspondence should be addressed to:**

Managing Editor, E-mail address: pranee\_aon1@hotmail.com

Telephone: 080-5996680

### **Information about the Journal**

An electronic journal is provided on the web sites (<http://www.journal.su.ac.th>, <http://www.tci-thaijo.org/index.php/sustj/index>, [http://www.surdi.su.ac.th/journal\\_th.html](http://www.surdi.su.ac.th/journal_th.html)).

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 peer review journal published twice a year in January and July by the Research and Development Institute of Silpakorn University, Thailand. SUSTJ 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.

### Publication Ethics and Publication Malpractice Statement

**The Editor** must ensure that each manuscript is initially evaluated by the editor/co-editor for the originality of the contents before forwarding to two referees for blind peer review. The review period will be from two weeks to one month (Maximum two months in extra ordinary circumstances).

**The Editorial Board** evaluates manuscripts on their intellectual content without regard to authors' race, gender, sexual orientation, or citizenship and must not disclose any information about a submitted manuscript to anyone other than the corresponding author, reviewers, potential reviewers, and the publisher.

**Reviews** should be conducted objectively without personal criticism.

**Reviewers** should express their views clearly with supporting arguments, identify relevant published work that has not been cited by the authors, and report any similarity or overlap between the manuscript under consideration and other published papers to the editor's attention. Reviewers should not review manuscripts in which they have conflicts of interest resulting from competitive, collaborative, or other relationships or connections with any of the authors, companies, or institutions connected to the papers.

**The authors** should ensure that they have written entirely original works, and has been appropriately cited or quoted the work of others.

Manuscripts submitted must not have been published as copyrighted material elsewhere. Manuscripts under review must also not be submitted for consideration by other publication as copyrighted material. This should be declared in the Submission Form. By submitting a manuscript and a Submission Form, the author(s) agree that the copyright will be transferred to SUSTJ if the manuscript and associated multimedia are accepted for publication. The author(s) retain the rights to the fair use (e.g., teaching and non-profit uses) of the published material.

### Types of contributions

Short communications, Research articles, Review articles

## **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*, 2<sup>nd</sup> ed., Blackwell Publishing Ltd., Oxford, pp.1121-1129.

### *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.), 3<sup>rd</sup> ed., 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.consecol.org/Journal/vol3/iss2/index.html](http://www.consecol.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 (not less than 300 dpi JPEG or TIFF format), 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**

All information contained in a manuscript is a full responsibility of the authors, including the accuracy of the data and resulting conclusion. Authors are requested to send the manuscript on a CD 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 manuscript.

Please submit the manuscript with a submission form to the following address: e-mail: [pranee\\_aon1@hotmail.com](mailto:pranee_aon1@hotmail.com)

### **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.



**SUST**

**Silpakorn University  
Science and Technology Journal**

**Volume 7 Number 2 (July - December) 2013**

**Contents**

*Research Articles*

<b>Double Bootstrap-t One-sided Confidence Interval for Population Variance of Skewed Distributions.....</b>	<b>9</b>
Wararit Panichkitkosolkul	
<b>Diversity of Hyperthermophilic Bacteria Belonging to Order Thermotogales Thriving in Three Hot Springs in Thailand: Resources of Genes Encoding Thermostable Enzymes.....</b>	<b>17</b>
Porranee Keawram and Wirojne Kanoksilapatham	
<b>A Study of Adsorption of an Organic Colouring Matter on Powdered Natural Plant Material .....</b>	<b>29</b>
Kiran V. Mehta	
<b>Test Case Based Selection for the Process of Software Maintenance .....</b>	<b>36</b>
Adtha Lawanna	

**Silpakorn University Science and Technology Journal (SUSTJ)**  
**is now available on the following databases:**

**Chemical Abstract Service (CAS)**

**SciFinder Scholar (CAPLUS)**

**International Information System for the Agricultural Sciences and Technology  
(AGRIS) (FAO)**

**AGRICultural Online Access (AGRICOLA)**

**Food Science and Technology Abstracts (FSTA)**

**The National Science Digital Library (NSDL)**

**CAB Abstract**

**Directory of Open Access Journals (DOAJ)**

**Google Scholar**

**Thai Journal Citation Index (TCI) Centre**