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Contents

Cover	1
Contents	2
Organizing Committee's Welcoming Speech	3
Rector's Opening Remarks	5
NAMES 2015 Committee	7
Program Schedule	9
Keynote Speaker:	22
Session 1. Prof. Shogo Shimazu (Chiba University, Japan)	23
Session 2. Dr. Tutut Herawan (University of Malaya, Malaysia)	
Session 3. Praparsiri Bernattte, Ph.D (Burapha University, Thailand)	24
Abstracts Oral Presentation	26
1. Biology	27
2. Pharmacy	54
3. Chemistry	62
4. Mathematics	86
5. Physics	104
6. Computer Science	122
Abstracts Poster Presentation	132

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Optimization of the Drying Method of Red Fruit (*Pandanus conoideus* Lam) by *Détente Instantanée Contrôlée* (DIC)

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ABSTRACT

The development of process engineering and the finding of plant-based new medicines are growing very fast. *Pandanus conoideus* Lam, an indigenous fruit plant in Irian Jaya, the eastern province of Indonesia is one of the well-known herbal plants. "Buah Merah" (Indonesian), meaning red fruit due to the bright red color of the main variety, is well known as a medicinal plant traditionally used as anti-cancer, antidiabetic, anti dislipidemia, anti-oxidant agent, etc., whose effects greatly depend on its total phenol, flavonoids, tocopherols, carotenoids, vitamins content, etc. Good-quality herbal medicine should be a phyto-pharmaceutical product, which requires certain prerequisites to obtain standardized extract or powder form. Good extract quality normally involves a well dried raw material in order to minimize the enzymatic and hydrolytic reactions. In this study, the effect of *predrying by Détente Instantanée Contrôlée (DIC) method* is studied, as it opens up the plant cells' pores, so that the vaporization will be accelerated; and the thermal degradation is reduced. *Thirteen operating parameters of DIC have been studied. The results showed that maximum moisture content reduction for a drying time of 180*

minutes, of DIC-15 (0.2 MPa steam pressure, 3 cycles of 20 seconds each) was of 94.58%, and of DIC-16 (0.25 MPa, 4 cycles of 15 seconds, each) was 91.24%, which also produced 3.21% Catechin Equivalent (CE) and 6.44% Gallic Acid Equivalent (GAE), respectively. They were higher than those obtained from the conventionally-dried (CD) fruits without and after juice extraction which produced 2.61% and 1.13% CE, and 4.58% and 2.57% GAE, respectively. DIC pretreatment was also able to enhance α -tocopherol extraction compared to those of CD red fruits (after juice extraction); and the DIC-19 (0.15 MPa, 2 cycles of 15 seconds, each) extract produced 3,2750.5 mg α -tocopherol /kg extract, although the yield of the CD fruit extract without juice extraction was 6,631.95 mg/kg extract. This research is a collaboration between the fields of Engineering and Pharmacy.

Key words: herbal medicine, Détente Instantanée Contrôlée (DIC) instantaneous controlled pressure-drop, red fruit, predrying.

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