

Riga Technical University
Faculty of Material Science and Applied Chemistry

ABSTRACTS

of the

**Riga Technical University
55th International Scientific Conference**

Section:

Material Science and Applied Chemistry
October 14–17, 2014, Riga, Latvia

RTU Press
Riga 2014

Editor-in-Chief

Mārcis Dzenis, *Dr. sc. ing.*, Riga Technical University, Latvia

Editorial Board

Valdis Kokars,	<i>Dr. chem.</i>	Riga Technical University, Latvia
Valdis Kampars,	<i>Dr. habil. chem.</i> ,	Riga Technical University, Latvia
Māris Turks,	<i>Dr. chem.</i>	Riga Technical University, Latvia
Līga Bērziņa-Cimdiņa,	<i>Dr. sc. ing.</i> ,	Riga Technical University, Latvia
Gundars Mežinskis,	<i>Dr. habil. sc. ing.</i> ,	Riga Technical University, Latvia
Māris Knite,	<i>Dr. habil. phys.</i> ,	Riga Technical University, Latvia
Jānis Zicāns,	<i>Dr. sc. ing.</i> ,	Riga Technical University, Latvia
Juris Upatnieks,	<i>M. Sc. (ee)</i> ,	University of Michigan CoE, ASV
Zigismunds Beresnevičius,	<i>Dr. habil. chem.</i> ,	Kaunas University of Technology, Lithuania
Ivars Neretnieks,	<i>Dr. chem.</i> ,	Royal Institute of Technology, Stockholm, Sweden
Pēteris Bolšaitis,	<i>Ph. D. (chem.)</i> ,	Massachusetts Institute of Technology, ASV

Editorial Board Address

Faculty of Material Science and Applied Chemistry
of Riga Technical University
Azenes Str. 14/24
LV-1048, Riga, Latvia
Phone: +371 7089249
Fax: +371 7615756
E-mail: ilze@ktf.rtu.lv

© Riga Technical University, 2014

Published by Riga Technical University Press,
1 Kalku Street, Riga, LV-1658, Latvia

Printed by RTU Printing House

ISBN 978-9934-10-592-0

Contents

Subsection Chemistry and Chemical Technology	8
<i>Karina Cirule, Valdis Kampars</i> Cold Flow Properties of Mixed Diesel Fuels with High Content of Glycerides.....	9
<i>Kristine Lazdovica, Liga Liepina, Valdis Kampars</i> Catalytic Pyrolysis of Wheat Straw with ZSM-5, MCM-41 and CaO.....	10
<i>Kristine Teivena, Valdis Kampars</i> Thermal Reduction of Intercalated Graphite Oxide.....	11
<i>Raimonds Mūrnieks, Lauma Apšeniece, Valdis Kampars, Kristaps Māliņš</i> Rapeseed Oil Hydrodeoxygenation in Cyclohexane.....	12
<i>Zane Šustere, Valdis Kampars, Liene Misiņa</i> The Effect of Alcohol Moiety on Rapeseed Oil Interesterification with Methyl- and Ethyl- Acetates	13
<i>Agnija Ieviņa, Valdis Kampars, Māra Legzdiņa</i> Catalytic Wheat Straw Pyrolysis Investigation.....	14
<i>Andrejs Šišuļins, Ērika Bizdēna, Ilze Neibolte, Māris Turks</i> Synthesis and Fluorescent Properties of New N(9) Substituted Push-pull Purines.....	15
<i>Dmitrijs Stepanovs, Māra Jure, Anatoly Mishnev</i> Multicomponent Drug Crystals of Sildenafil: Salicylate and Salicylate Cocrystal with Salicylic Acid Sesquihydrate – Preparation and Crystal Structure	16
<i>Kristers Ozols, Dace Cīrule, Ērika Bizdēna, Irina Novosjolova</i> Purine Nucleoside Platform for Azide-Alkyne Cycloaddition Reactions	17
<i>Irina Novosjolova, Ērika Bizdēna, Māris Turks</i> 2,6-Diazidopurine Nucleosides as Useful Intermediates for the Synthesis of Novel Triazolyl Purine Analogs	18
<i>Dace Cīrule, Kristers Ozols, Ērika Bizdēna, Irina Novosjolova</i> 2,6-Diazidopurine <i>Deoxyribo</i> -nucleoside as Substrate for the <i>Click</i> Reaction.....	19
<i>Gerda Krastina, Iriša Ravina, Daina Zicane, Zenta Tetere</i> Synthesis of Novel Quinazolinone Derivatives Containing Triazole Cycle	20
<i>Jevgeņija Lugiņina, Māris Turks</i> Reactions of Aziridines with Metal Halides in Liquid Sulfur Dioxide.....	21
<i>Sindija Zēberga, Inese Mieriņa, Māra Jure, Aigars Pāže, Jānis Rižikovs</i> Antiradical Activity of Birch Outer Bark Extracts.....	22

2,6-Diazidopurine *Deoxyribo*-nucleoside as Substrate for the *Click* Reaction

Dace Cīrule¹, Kristers Ozols², Ērika Bizdēna³, Irina Novosjolova⁴
¹⁻⁴Riga Technical University

Keywords – Deoxyribonucleosides, *click* chemistry.

I. INTRODUCTION

The chemistry of triazolyl-substituted purine nucleosides is attractive since some of them exhibit antiviral, anticancer or fluorescent properties [1].

Our group has reported the synthesis of 2,6-bis-triazolyl purine *arabino*- and *ribo*-nucleosides using Cu(I) catalysed azide - alkyne 1,3-dipolar cycloaddition reaction. Various nucleophilic substitution reactions with the obtained products were carried out [2].

In addition to our previous work, herein we report the synthesis of the novel bis-triazolyl purine *deoxyribo*-nucleosides and their reactions with *N*-nucleophiles.

II. RESULTS AND DISCUSSION

Azide-alkyne cycloaddition

Click reactions between diazido purine derivative **1** and different terminal alkynes were performed in *t*-BuOH/H₂O solution with addition of a small amount of acetic acid (Fig. 1). Five-fold excess of alkyne was used. To obtain the Cu(I) source in reaction media, several portions containing 5 mol% of CuSO₄·5H₂O and 10 mol% of sodium L-ascorbate were added during reaction. After purification on silica gel column, products **2a-g** were obtained in 35–70 % yields.

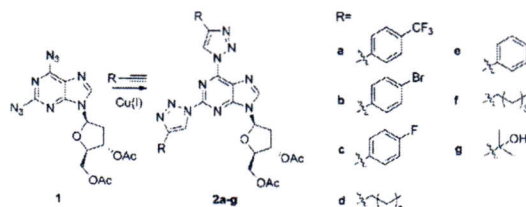


Figure 1. Synthesis of Bis-triazolyl Purine *Deoxyribo*-nucleosides.

Heteroaromatic nucleophilic substitution

The acquired bistriazoles **2a-d** were reacted with either piperidine or pyrrolidine in THF/H₂O solution to give monosubstituted derivatives **3a-d** (Fig. 2) [2]. After the purification process products were isolated in 36–88 % yields.

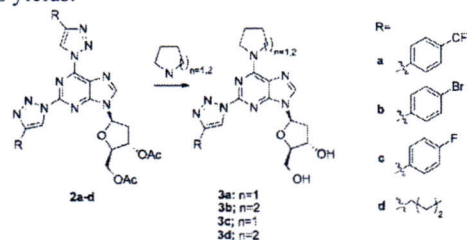


Figure 2. Synthesis of Monosubstituted Derivatives.

Substances **3a-d** possess fluorescent properties, represented by emission spectra in Fig. 3.

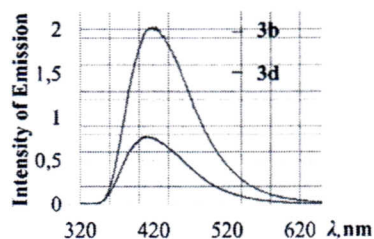


Figure 3. Emission Spectra for Compounds **3b** and **3d**.

REFERENCES

- [1] Amblard, F.; Cho, J. H.; Schinazi, R. F. *Chem. Rev.* **2009**, *109*, 4207-4227 and references cited therein.
- [2] a) Kovaļovs, A.; Novosjolova, I.; Bizdēna, Ē.; Bižāne, I.; Skardziute, L.; Kazlauskas, K.; Jursenas, S.; Turks, M. *Tetrahedron Lett.* **2013**, *54*, 850-853. b) Novosjolova, I.; Bizdēna, Ē.; Turks M. *Tetrahedron Lett.* **2013**, *54*, 6557-6561. c) Novosjolova, I., Bizdēna, Ē., Beļakovs, S., Turks, M. *Materiālizinātne un lietišķā ķīmija.* **2013**, *28*, 39-44.