

RIGA TECHNICAL UNIVERSITY
60th International Scientific Conference
MATERIALS SCIENCE AND APPLIED CHEMISTRY



MSAC 2019

OCTOBER 24, 2019

New antioxidants containing 1,3-dioxane-4,6-dione moiety

Inese Mierīņa, Dārta Z. Skrastiņa, Elīna Peipiņa, Māra Jure

Institute of Technology of Organic Chemistry, Faculty of Materials Science and Applied Chemistry,

Riga Technical University, Latvia

e-mail: inese.mierina@rtu.lv

Antioxidants are widely used in various areas for increasing oxidative stability of different products. A new type of antioxidants with recognizable free radical scavenging effect in different types of media are substituted Meldrum's acids.¹ In order to modify the properties of these antioxidants, we have focused into two directions. The first direction is covalent-bonding of active compounds to lipid carriers, which is well-known strategy in medicinal chemistry.² It is successfully used for modification of antioxidants, too.³ Similarly, we have attached arylmethyl Meldrum's acids to long saturated and unsaturated aliphatic chains through heterocyclic linker (compounds 1). The second attractive tool for delivering biologically active ingredients is dendrimers.⁴ Such approach has been used also for some antioxidants, e.g., *Irganox 3114* contains four phenolic units attached to the core.⁵ Inspired by these examples, we obtained a few dendrimeric compounds 2 decorated with several 1,3-dioxane-4,6-dione moieties.

The retrosynthetic analysis of reagents lead to similar route for both compounds 1 and 2: firstly, an aldehyde decorated with an alkyl chain or a core with several aldehyde units was obtained and, secondly, the Knoevenagel condensation and reduction of corresponding arylidene compound was realized. Antiradical activity of all synthesized compounds 1 and 2 were analyzed by DPPH and GO tests.



Figure 1. General structures of target compounds 1 and 2.

Acknowledgements

This work has been supported by the European Regional Development Fund within the activity 1.1.1.2 "Post-doctoral research aid" of the specific aid objective 1.1.1 "To increase the research and innovative capacity of scientific institutions of Latvia and the ability to attract external financing, investing in human resources and infrastructure" of the Operational Programme "Growth and Employment" (No. 1.1.1.2/VIAA/1/6/039).

References

1. Mierina, I.; Jure, M.; Zebberga, S.; Makareviciene, V.; Zicans, D.; Tetere, Z.; Ravina, I. *Eur. J. Lipid Sci. Technol.* **2017**, *119*, doi: 10.1002/ejlt.201700172.
2. Markovic, M.; Ben-Shabat, S.; Keinan, S.; Aponick, A.; Zimmermann, E. M.; Dahon, A. *Med. Res. Rev.* **2019**, *39*, 579.
3. Shamseddin, A.; Crauste, C.; Durand, E.; Villeneuve, P.; Dubois, G.; Pavlickova, T.; Durand, T.; Vercauteren, J.; Veas, F. *Biosci. Rep.* **2018**, *38*, doi: 10.1042/BSR20171712.
4. Pedziwiatz-Werbicka, E.; Milowska, K.; Dzmirutk, V.; Ionov, M.; Shecharbin, D.; Bryszewska, M. *Eur. Polym. J.* **2019**, *119*, 61.
5. Saunier, J.; Mazel, V.; Aymes-Chodur, N.; Yagoubi, N. *Int. J. Pharm.* **2012**, *437*, 89.