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**NBDC 2019**

# Abstracts

## Third Nordic Baltic Drying Conference

June 2019 – St. Petersburg, Russia



**Editors:**

**Svetlana Goncharova-Alves**

**Odilio Alves-Filho**



3rd Nordic Baltic Drying Conference  
**NBDC 2019**  
12-14 June  
Saint-Petersburg, Russia

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# Abstracts

# Third Nordic Baltic Drying Conference

June 12 to 14, 2019  
Saint Petersburg, Russia

**Editors:**

**Svetlana Goncharova-Alves**  
**Odilio Alves-Filho**



NTNU – Trondheim  
Norwegian University of  
Science and Technology



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## THE THIRD NORDIC BALTIC DRYING CONFERENCE

The NBDC 2019 is the third dewatering and drying conference organized by the Nordic and Baltic countries. Historically, it is a successful expansion of previously Nordic Drying Conferences effectively held in Norway, Denmark, Sweden, Finland and Iceland. The previous NBDCs were held in Poland and Germany. The Third Nordic Baltic Drying Conference is currently held in Saint Petersburg, Russia. It is jointly organized by the Norwegian University of Science and Technology, Dmitry Mendeleev University of Chemical Technology of Russia and Saint Petersburg State Institute of Technology. The NBDC 2019 is sponsored by an Open Access Journal by MDPI "ChemEngineering" (Switzerland), the Danish company EnerDry ApS and the Norwegian-Italian company Waister Srl. The NBDCs established as goal, now incorporated as a tradition, to merge science and practices in the drying field by bringing together the most advanced academia and the best industry. As such, it is a forum for theoretical, experimental and applied knowledge exchange between industrialists, professors and researchers representing companies, universities and R&D centers. The topics include dewatering, drying and related processing of foods, aquaculture, by-products as well as organic and inorganic materials. The common vision is future sustainability and investment feasibility based upon green-drying processes and energy efficient drying technologies.

The participants of the NBDC 2019 are sixty representatives from 26 countries, including Central, Western and Eastern Europe, Asia, Africa, Oceania, as well as South and Central Americas. Keynote lectures and oral presentations on modern and improved technologies and R&D and industrial trends are presented by world-recognized authors and industry-experts in the field. The full-papers and presentations are categorized and distributed into seven sessions: (1) Keynote lectures on major topics of dewatering, drying and related processes; (2) Modeling and simulation; (3) Drying pharmaceuticals and biomaterials; (4) Drying intensification and modern technologies; (5) Drying waste and biomass; (6) Poster session; (7) Industrial session. The full-papers and industrial presentations are published in a USB Proceedings with ISBN 978-82-92739-15-0.

The NBDC has also favored and implemented an industrial roundtable with the purpose of providing the audience, formed by academia and researchers, with industrial feedback and realistic common topics, to serve as a platform for effective cooperation between universities, research centers and industries. The roundtable is and will be part of future NBDCs with added purpose to identify applicable themes and R&D targets for the next years. The effectiveness and progress of the previous roundtable topics will be discussed and evaluated in each subsequent NBDC.

Eight outstanding performance awards are given to participants attending the NBDC 2019:

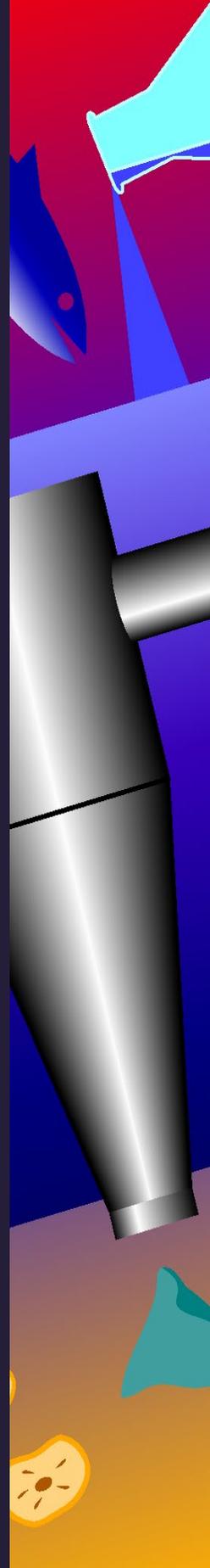
- Distinguished R&D on drying technology in the Nordic and Baltic regions
- Outstanding achievement and excellence in drying R&D
- Outstanding contribution to drying by young scientists
- Merit keynote on novelty and advanced R&D in drying
- Best Nordic and Baltic scientific paper
- Best international scientific paper
- Best industrial presentation on drying technology and process
- Best poster.

Besides that, an Open Access Journal by MDPI "ChemEngineering" sponsored a special award for the best paper.

*Professor Dr. Odilio Alves-Filho,  
President of the NBDC 2019.*

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# DRYING TREATMENT EFFECTS ON ANTHOCYANINS OF ORGANIC RASPBERRY (CV. HERITAGE) FRUIT

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Keywords: anthocyanins, freeze drying, hot-air drying, HPLC, *Rubus idaeus* L.

The aim of this study is to compare the effects of some drying processes (hot-air drying and freeze drying) on total anthocyanin content (TAC) for organic raspberry (cv. *Heritage*) fruits as measured by spectrophotometric method and UPLC technique. The total anthocyanin content was determined in powders obtained from fruits and juice of organic raspberry dried in a *hot-air* dehydrator at 70 °C and a freeze dryer at -55 °C for 45 h.

Qualitative analysis revealed the similar anthocyanin profiles in all raspberry powders and showed a clear anthocyanin pattern with the presence of two major compounds. In both fruit and juice of organic raspberry, freeze drying produced a better extraction of the total anthocyanin content either by spectrophotometric method or UPLC and this could be attributed to the thermal degradation and/or oxidation of these compounds during hot-air drying. As matter of fact, the highest total anthocyanin contents were found in juice of organic raspberry compared to fruits.

The results presented in this work indicate that the most appropriate drying method in terms of the anthocyanin content is freeze drying. However, the detailed qualitative analysis of the raspberry powders should help understanding the effects of different drying treatments.

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