**LABORATORY OF GROWTH REGULATORS**
**&**
**DEPARTMENT OF ORGANIC CHEMISTRY**
Faculty of Science of Palacký University in Olomouc
& Institute of Experimental Botany ASCR

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Assoc. prof. Jiří Pospíšil, PhD

## OPINION OF THE SUPERVISER – PHD THESES OF FRANTIŠEK ZÁLEŠÁK

The PhD Theses of MSc. František Zálešák is tackling an important field of Organic synthetic, and Medicinal Chemistry – the synthesis of heterocyclic (benzothiazoyl) sulfonamides. Sulfonamide functional group is of high interest to both synthetic and medicinal chemistry. In addition, he was also included in the development of novel approaches to neolignane-like plant secondary metabolites.

In the case of heteroaryl sulfonamides, the main focus of his thesis was on the development of novel synthetic approaches to benzothyazoyl (BT) sulfonamides. BT-sulfonamide function was chosen as the representative heteroaryl group and it was expected that the developed methods will be possible to extend to other heteroaryl groups. From the synthetic point of view, there is no general method that would allow a simple and convenient synthesis of heteroaryl sulfonamides. Indeed, the only known way relies on the use of heteroaryl sulfonyl chlorides – compounds that are in general known for their low thermal stability (decomposes under 0°C). Moreover, their synthesis requires either $Cl_2$ gas or its equivalent. Thus, a novel approach to such type of molecules was desperately needed.

Clearly, the demand for a certain type of reagent is going hand-in-hand with its use. Sulfonamides belong to the prominent type of functional groups in medicinal chemistry. The reason behind is their metabolic stability as well as the fact that they are biosters of carboxylic acid function. Carboxylic acid function with tunable N-H proton acidity (hydrogen bond donor ability).

The goal of theses was to develop a new unified approach to BT-sulfonamide functional group that would allow us to generate such compounds starting from various building blocks. Thus, the newly developed approaches would not be dependent only on the S-N bond forming reaction, but also allow to prepare such compounds starting from different S-building blocks and N-building blocks. MSc. Zálešák in his theses successfully tackled all above-mentioned problems and designed several highly complementary approaches to such functional group (full paper in *the Journal of Organic Chemistry*, Q1(WOS)), and further explored their use in H-bond donor-based organocatalytic reactions and in the synthesis of novel α-heteroaryl α-amino acids (unpublished results). His knowledge of the reactivity of BT-groups in general helped also in the design of novel types of reactivity of BT-derived sulfones (two papers in the Journal of Organic Chemistry as co-author, Q1(WOS))). In addition, he was also contributing to the development of new approaches to neolignane-like natural products (review in *Pharmacol. Res.* (D1(WOS)) and *Monatsheft. Chem.* (co-author, Q4(WOS))).

Overall MSc. Zálešák during his PhD studies developed novel unified approaches to various BT-sulfonamides (one publication) that allowed him to shape the reactivity of BT-sulfones in a general manner (two publications) and disclose novel types of use of such BT-sulfonamides (H-bond donor and aminoacid synthesis). In addition, his contributions to our efforts in neolignane synthesis were also nonnegligible (two publications). Undisputedly, such an approach to sulfonamides and neolignane synthesis will find its use in medicinal and synthetic laboratories worldwide. Therefore, I do recommend his Theses for submission and expect to be defended easily.

doc. RNDr. Jiří Pospíšil, PhD

*Post address:* Šlechtitelů 27, CZ-783 71 Olomouc, Czech Republic & 17. listopadu 1192/12, CZ-771 46 Olomouc, Czech Republic
*Tel:* ++420-585634784, *Fax:* ++420-585634870
*E-mail:* j.pospisil@upol.cz *Home page:* http://pospisilab.com