



Ss. CYRIL AND METHODIUS UNIVERSITY IN SKOPJE  
FACULTY OF VETERINARY MEDICINE - SKOPJE

# BOOK OF ABSTRACTS

**“Days Of Veterinary Medicine”  
10<sup>th</sup> International Scientific Meeting  
and  
2<sup>nd</sup> European Conference on  
Veterinary and Medical Education 2024**

22-25 September 2024,  
Republic of North Macedonia

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**Published by:**

Faculty of Veterinary Medicine – Skopje,  
Lazar Pop Trajkov 5/7, 1000 Skopje  
Tel: ++389 2 3240 700 Fax: ++ 389 2 3114 619  
www.fvm.ukim.edu.mk



CIP - Каталогизација во публикација  
Национална и универзитетска библиотека "Св. Климент Охридски", Скопје

636.09(062)(048.3)

INTERNATIONAL Scientific Meeting Days of Veterinary Medicine (10 ; 2024)

Book of abstracts [Електронски извор] / 10th International Scientific Meeting Days of Veterinary Medicine – 2024 and 2nd European Conference on Veterinary and Medical Education 22-25 September 2024, Ohrid ; [editors Miroslav Kjosevski ... и др.]. - Skopje : Faculty of Veterinary medicine, 2024

Начин на пристапување (URL):

[https://dvm2024.mk/wp-content/uploads/2024/09/dvm-ecvme-2024\\_book\\_of\\_abstracts.pdf](https://dvm2024.mk/wp-content/uploads/2024/09/dvm-ecvme-2024_book_of_abstracts.pdf).

- Текст во ПДФ формат, 154 стр. - Наслов преземен од екранот. - Опис на изворот на ден 18.09.2024. - Регистар

ISBN 978-9989-774-43-0

1. European Conference on Veterinary and Medical Education (2 ; 2024)

а) Ветеринарна медицина -- Зборници -- Апстракти

COBISS.MK-ID 64439045

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**P34****COMPARISON OF EFFICIENCY OF TWO TYPES SPE COLUMNS FOR DETECTION OF BETA AGONISTS IN LIVER WITH LC-MS/MS METHOD**

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Beta-agonists are a large group of chemical compounds that can be used as drugs to treat bronchial asthma and other pulmonary diseases, due to their spasmolytic properties. Moreover, they are use as tocolytics and heart tonics. Beta-agonists can be illegally used in meat producing animals to accelerate growth and increase muscle mass, thereby increasing total red meat yield. Consumption of meat from treated animals incur a risk to human health, because the residues from beta agonists accumulate and persist in animal tissues. Due to adverse side effects in human, the Commission of European Communities has banned the use of these compounds in slaughter animals. There are various extraction methods for the analysis of beta agonists. The aim of this study was to compare the efficiency of elution procedure of ten beta agonists from liver with two types of solid-phase extraction (SPE) columns. The sample preparation procedure includes homogenization of liver samples, double extraction with phosphate buffer, enzymatic hydrolysis with  $\beta$ -glucuronidasa/aryl sulfatase from *Helix pomatia* and solid phase extraction with two types of SPE columns: Discovery® DSC-MCAX (300 mg, 6 ml) and Strata Screen-C (500 mg, 6 ml). The analyses were performed with liquid chromatography tandem mass spectrometry (LC-MS/MS). The validation of the method was done according to the criteria established in Commission Decision 2002/657. Accuracy (recovery) and precision of the method were used for comparison of the efficiency of the proposed SPE columns. The recovery of the method using DSC-MCAX columns ranges from 75.20 % to 109.4 %. A higher recovery can be observed with Strata Screen-C for some  $\beta$ -agonists. For clenbuterol at spiking levels of 0.25 and 0.75 ng/g, the recoveries were 129.0 % and 130.61 %, respectively, while for terbutaline at the spiking levels of 0.25 and 0.5 ng/g, the recoveries were 244.80 % and 275.76 %, respectively. Zilpaterol was not detected using Strata Screen-C columns. The coefficient of variation ranges from 3.43 % to 15.73 % (DSC-MCAX columns) and from 4.07% to 33.57 % (Strata Screen-C). The difference in the efficiency of the two types of columns is a result of the phases they contain. DSC-MCAX columns contain C8 (octyl), while Strata Screen-C columns contain C18 (octadecyl) phase. In the elution of samples, the C8 phase does not retain all analytes of interest. According to the obtained results DSC-MCAX columns fulfil the criteria, while Strata Screen-C columns don't meet the criteria established in the 2002/657/EC.

**Keywords:** beta-agonists, liver, SPE-columns, efficiency, LC-MS/MS