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**FACULTY OF  
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# WV INTERNATIONAL CONGRESS

## V ENGINEERING, ENVIRONMENT AND MATERIALS IN PROCESS INDUSTRY EEM2023

### BOOK OF ABSTRACTS



JAHORINA  
MARCH 20-23, 2023

REPUBLIC OF SRPSKA  
BOSNIA AND HERZEGOVINA

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# **VIII INTERNATIONAL CONGRESS**

***ENGINEERING, ENVIRONMENT AND MATERIALS IN  
PROCESS INDUSTRY***

***EEM2023***

**UNDER THE AUSPICES OF  
MINISTRY OF ECONOMY AND ENTREPRENEURSHIP OF THE REPUBLIC OF  
SRPSKA**

**AND**

**ACADEMY OF SCIENCES AND ARTS OF THE REPUBLIC OF SRPSKA**

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## IN VITRO EVALUATION OF THE EFFICACY OF COLD PRESSED BLACKBERRY CAKE AS AN AFLATOXIN B1 ADSORBENT

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### Abstract

*In the recent times, sorption technology with agri-food wastes has proposed as an alternative over conventional binders with the benefits of low-cost, higher rentability, biosustainability and exceptional efficiencies. Nowadays, local and global trend of fruit growing intensification and fruit processing leads to the fact that the by-products represent large economic deficit and environmental problem. Disposal of by-products of the fruit processing industry is a growing problem because plant material is prone to microbiological spoilage and limits further exploitation, so the use of by-products has become one of the major challenges. The present work investigated the potential of the cold pressed blackberry cake (CPBC) as a novel aflatoxin B1 (AFB1) adsorbent from liquid mediums simulating physiological pH values (3 and 7). Scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FTIR), point of zero charge ( $pH_{pzc}$ ) and Boehm titration analysis were used to characterize the adsorbent material. These analyses demonstrated the presence of several functional groups on CPBC surfaces, which may be involved in the binding mechanisms of AFB1. Main adsorption centers for the mycotoxins are assumed to be carboxyl and hydroxyl groups. Results obtained after the Boehm titration confirms more acidic groups (1.58 mmol/g) on the surface of the biosorbent than base groups (1.18 mmol/g). In biosorption study, an initial concentration of AFB1 for testing was 2 mg/ml, while the content of the solid phase of CPBC varied from 2-35 mg/ml. The samples were incubated at 37 °C for 120 min with agitation at 250 rpm. Concentrations of AFB1, in solution, before and after adsorption using CPBC, were determined by liquid chromatography (HPLC). It was observed that increasing the mass of CPBC up to 30 mg increased the adsorption efficiency. The maximum adsorption efficiency using the CPBC was 85.36% at pH 3 and 87.01% at pH 7. Hence, this study confirms that CPBC can be considered as a promising food by-product for AFB1 biosorption and can find technological applications as feed/food additives for mycotoxin detoxification.*

**Key words:** cold pressed blackberry cake, aflatoxin B1, biosorption, HPLC

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