ANTIOXIDANT PROPERTIES OF PROTEIN EXTRACTS AND PROTEIN HYDROLYSATES OBTAINED FROM HEMP PRESS CAKE

Karina Skrzypoń, Wiktoria Czupryna, Maciej Olesiewicz, Aleksandra Popielarz1, Katarzyna Garbacz2

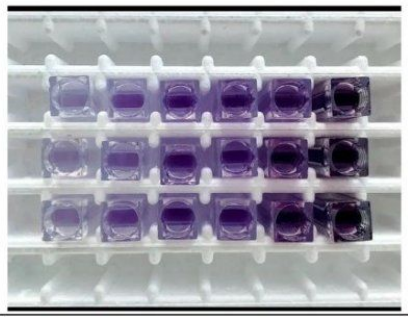
1Proteomics and Cytomics Student Scientific Society, Department of Epizootiology and Clinic of Infectious Diseases, Faculty of Medicine Veterinary, University of Life Sciences in Lublin, Lublin
2BioLive Innovation, Lublin

NOWADAYS INDUSTRIAL HEMP (*CANNABIS SATIVA L.*) HAS GAINED CONSIDERABLE POPULARITY AMONG PLANTS GROWN IN POLAND. BECAUSE OF WIDE APPLICATION THEY ARE USED IN MANY FIELDS, INCLUDING FEED, PHARMACEUTICAL AND COSMETICS INDUSTRIES. DUE TO THE LOW GROUND AND HYDROLOGICAL REQUIREMENTS, THEY CAN BE CULTIVATED PRACTICALLY ON ANY SOIL. THE PROCESSING OF HEMP IS ASSOCIATED WITH FORMATION OF A LARGE AMOUNT OF OFF-PRODUCTS, INCLUDING PRESS CAKE USED IN FEEDS. THIS MATERIAL IS A RESIDUE OF OIL PRODUCTION.

PURPOSE OF RESEARCH

The study's purpose was to answer if there is a possibility of using hemp expeller as a plant-based protein source with antioxidant properties.

TESTS PERFORMED INCLUDED RECEIVING PROTEIN EXTRACTS AND ANTIOXIDANT PROPERTIES ANALYSIS OF THOSE EXTRACTS. ADDITIONALLY THE INFLUENCE OF WIDELY AVAILABLE PRESERVATION METHODS, INCLUDING DRYING AND FREEZE DRYING ON ANTIOXIDANT PROPERTIES WERE STUDIED WITH REGARD TO HEMP PROTEIN EXTRACTS. ENZYMATIC HYDROLYSIS OF EXTRACT USING PAPAIN WAS ALSO PERFORMED. OBTAINED HYDROLYSATES WERE ALSO TESTED FOR ANTIOXIDANT PROPERTIES.

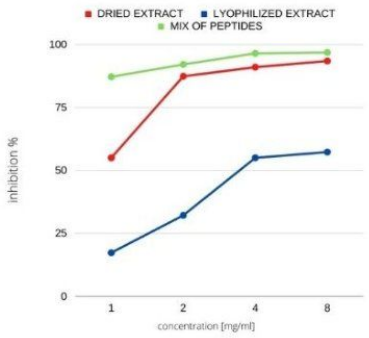


MATERIAL AND METHODS

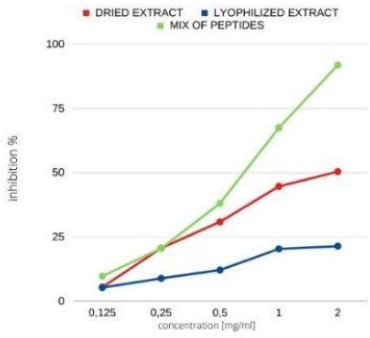
The material used in research was grounded hemp press cake. Protein extraction was conducted in water at room temperature for one hour. Next, extract was centrifuged and obtained supernatant was divided into three parts. One of the parts was used for enzymatic hydrolysis by papain and the other two were dried or freeze-dried. Antioxidant activity of all prepared materials were determined by two analytical methods- DPPH and ABTS assays.

MATERIAL AND METHODS

In each method decrease in absorbance was observed when the radical was reduced by obtained samples. Incubation time with a radical was 30 minutes for DPPH assay (wavelength 517 nm) and 6 minutes (wavelength 734 nm) for ABTS assay. Absorbance measurements were made using spectrophotometer Marcel s300 (Marcel S.A., Poland) and semi-micro cuvettes. Based on obtained absorbance values for different dilution samples percentages of radical inhibition were established.



DPPH



ABTS

RESULTS

TEAC [µmol/g] for dried extract is **117.94** (ABTS) and **23.49** (DPPH).

TEAC [µmol/g] for lyophilized extract is **57.74** (ABTS) and **6.39** (DPPH).

TEAC [µmol/g] for mix of peptides is **296.78** (ABTS) and **21.305** (DPPH).

SUMMARY

Studies carried using two mentioned above methods proved that protein extract obtained from hemp press cake and its hydrolysates exhibited antioxidant activities. Results show that industrial hemp press cake as an by-product from many industrial branches can be used as a plant based protein source with satisfactory properties.