

2nd International Conference in Pharmacology: From Cellular Processes to Drug Targets Rīga, Latvia, 19–20 October 2017

MEETING ABSTRACT

A2.42

Action of proanthocyanidin microdoses on pyruvate in blood

Jelena KRASILNIKOVA^{1,*}, Galina TELYSHEVA², Sarmite JANCEVA²,
Amelia FIGUEIRO VAZ¹, Oda TOMMERAS¹ and Caroline FORSBO¹

¹Rīga Stradiņš University, Rīga, Latvia; ²Latvian State Institute of
Wood Chemistry, Rīga, Latvia

Background: One of the most common chronic diseases is diabetes mellitus, which is characterised by elevated levels of glucose in blood plasma (hyperglycaemia). In this case, the glucose physiological process is characterised by the formation of high-energy ATP-form compounds adenosine triphosphate and nicotinamide adenine dinucleotide hydride (NADH), which accumulate in muscles and internal organs. In diabetes mellitus patients, the pyruvate concentration in blood plasma exceeds 2.5 mg/dl, followed by disorders of the glucose enzymatic process and hampering of the accumulation of the energy compounds ATP and NADH in muscles and internal organs. The permanent disruption of the energy flow in diabetes mellitus patients causes the emergence of toxicity, oxidative stress, muscular dystrophy, endotheliopathy and neuropathy. Taking into account the glucose exchange disorders, with increasing pyruvate levels in blood plasma, the development of an agent that would lower it becomes a topical issue.

Objectives: The aim of the present study was to evaluate the effects of plant proanthocyanidin (PAC) on the reduction of the pyruvate concentrations in blood plasma.

Methods: Pyruvate levels in blood plasma were determined by the biochemical colorimetry method. The method is based on the fact that, for pyruvic acid in alkaline environment, the coloured 2,4-dinitrophenylhydrazine is formed. The investigation on the reduction of the pyruvate levels in blood was carried out in patients with diagnosed type 2 diabetes using series of 64 experimental studies. PAC were obtained from alder bark using single-stage extraction with 40% ethanol/water solution, with further purification using Sephadex LH-20.

Results: The microdose of PAC (50 µl), in *in vitro* conditions, reliably reduces the pyruvate level at its increase, which is promising for the reduction of the metabolic acidosis in patients with diabetes mellitus and can improve cell bioenergetics.

Conclusions: The presented data show that the proanthocyanidins from black and grey alder bark can be promising for the reduction of pyruvate levels in blood plasma.

Acknowledgements: The study was financed by the Bioeconomy grant "LigProBK" and COST Action FA1403 POSITIVE.

Keywords: proanthocyanidins – diabetes mellitus – pyruvate levels – hyperglycaemia

*Corresponding author: Jelena Krasilnikova, Department of Human Physiology and Biochemistry, Rīga Stradiņš University, 16 Dzirciema Str., Rīga, LV-1007, Latvia. E-mail: jelena.krasilnikova@rsu.lv