

Effect of Plants Proanthocyanidins Rich Extracts on Salivary Amylase Activity in Vitro Conditions

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Introduction. Salivary alpha amylase is the main digestion ferment initiating degradation of complex food carbohydrates to small chain or even single sugar. Thus, the digestion begins from the mouth, and in some cases it can be complete before the coming of food in to smaller intestine. Control of salivary alpha amylase activity is the question of primary importance. The normal level of alpha amylase activity in average measured as amyloclastic force (AF) equals 320. The effects of AF value deviation to both sides are the object of treatment. Lowering of alpha amylase activity often leads to decrease of functional activity of pancrease and then to splitting and absorption of food nutrition compounds.

In opposite case, the faster carbohydrates are digested and absorbed the more quickly, the higher blood sugar level can rise after eating: for people with type 2 diabetes, high blood glucose levels are observed for a long period of time after eating; keeping blood sugar levels lower by slowing down digestion and absorption of carbohydrates is a real approach to diabetes treatment and obesity as well. Therefore, the search of efficient promoters and inhibitors of salivary activity is a topical problem nowadays.

Many natural compounds, in particular polyphenols, can control amylase activity and glucose absorption in smaller intestine that may help the above-mentioned diseases treatment. It has to be mentioned that natural polyphenols, applied as inhibitors, unlike of commercial synthetic pharmaceutical means (e.g. acarbose) have no undesirable side effect. Thus, oligomeric proanthocyanidins (OPCs) that belong to a class of polyphenolic compounds. OPCs possess antioxidant, antimutagenic, anticarcinogenic, anti-inflammatory, and antiviral properties. Experimental evidences accumulated in the recent years support the idea that OPCs as individual compounds or in a hydrophilic extract have a great potential as an agent for normalisation of amylase activity.

Aim, Materials and Methods. The aim of the present study was to evaluate the effects of OPCs rich extracts (OPCEs) of deciduous trees bark on amylase activity in saliva from those growing in Latvia. The objects of the study were OPCEs obtained from the bark of grey alder (*Alnus incana*), black alder (*Alnus glutinosa*) and goat willow (*Salix caprea*). OPCEs were obtained from the bark as the products of final stage of sequential extraction using 50% ethanol water solution (extraction temperature – 80 °C, extraction time – 30 min.). The activity of amylase was evaluated by measurement of AF and defined as the volume (in ml) of 0.1% starch solution that is hydrolysed by 1 ml of saliva at 38 °C during 30 minutes incubation.

Results. The obtained data show that grey and black alder bark extracts in dose 1 mg work as strong activators (640→2560), in dose 10–25 mg works as inhibitors (640→320). OPCE from goat willow shows significant inhibition (two times) of AF already at low dosage (0.05 ml added to the saliva test solution).

Conclusions. Inhibition of α -amylase can delay carbohydrate digestion resulting in reduced postprandial glucose. This may have beneficial effects on insulin resistance and glycemic index control in diabetic patients. On the other hand, activation of amyloclastic force resulting in acceleration of starch degradation to glucose could be useful for treatment of persons with underweight, malnutrition and malabsorption.

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