

## **The influence of flavonoids, extracted from “Saperavi” wine on rat brain antioxidants system of kainic acid induced epileptic model.**

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Flavonoids are secondary metabolites of herbal origin, they are chemically polyphenols. In plants they participate in photosynthesis, protective functions, production of Lignin and act. Flavonoids are naturally occurring polyphenolic compounds that are present in a variety of fruits, vegetables, tea, and wine, and are the most abundant antioxidants in the human diet. Evidence suggests that in human body they have an antioxidant activity, regulating lipid metabolism, have anti-inflammatory, anti-allergic action, they are also known for their positive effects on neurodegenerative disease and might have an impact on brain pathology. The antioxidant role of flavonoids is especially important during the oxidation stress, which is the starting stage for many pathologies. During this time the balance between prooxidant and antioxidant protection systems, free radicals damage proteins, free amino acids, lipids, nucleic acids, cause lipid's oxidative oxidation, which eventually leads to damage to the cell and causing the death of the organism.

In neurodegenerative processes, special attention is given to epilepsy. The progressive spontaneous recurrent seizures induces hippocampal neuronal loss, cognitive impairment and psychiatric comorbidities. Regular treatment with the antiepileptic drugs is useful for controlling seizures. Treatment with antioxidants and anti-inflammatory drugs can reduce or block the development of neurodegenerative disorders associated with neurotoxicity, caused by excessive excitability.

Georgia is considered to be one of the oldest homelands of viticulture in the world. It is proved that wine-making in Georgia has been practiced since the 5<sup>th</sup> millennium BC. The presence of a large number of aboriginal sorts of grape also proves that Georgia is the cradle of initial inter-mutation of wild cultivated grapes. Nowadays ongoing research activity mainly includes collection, conservation, and description of local sorts by means of modern scientific methods. But neurobiological studies of active ingredients from local grapes never have been performed. In this regard to evaluate potential of flavonoids of Georgian endemic grape species is under our intense interest.

In our experiments we investigated the influence of active fraction of flavonoids extracted from Georgian grapes “Saperavi” wine by using modified method on the antioxidant systems of the rat, in kainate–induced rat model of epilepsy (KA-SE).

Extracted active fraction of flavonoids from “Saperavi” were identification using TLC method and it was revealed that extracted probe is multicomponent phenol fraction which contains flavonoidal glikozides as well aglicones, spots were characterized by Rf-values and color under UV light before (UV) and after spraying with gas of anhydrous ammonia. The wavelength absorbance at 210, 275 and 355 - 550 nm was also used to estimate total phenolic content, flavonoids and anthocyanins, respectively.

In our previous experiments antioxidant potency of the active fraction of flavonoids from saperavi was revealed: saperavi flavonoids (SF) effectively prevented age-related increase of quantity of malondialdehyde in the brain of adult rats. It has been shown that in kainate–induced rat model of epilepsy (KA-SE) SF corrects epilepsy-associated behavioral and memory disturbances.

The aim of the present work was to define a role of supplementation of rats during the early stages of epileptogenesis with SF (8 days, 25mg/kg per day, after single i.p. injection of kainic acid (15mg/kg)) on antioxidant ferments activation. Also the main tasks of experiments were to determination of effects of extracted flavonoids on development of oxidative stress in kainate–induced rat model of epilepsy (brain tissue). We studied quantitative changes of malondialdehyde,

which is the one of the final product of lipid peroxidation, in the brain of KA-SE rats. In biochemical experiments it was revealed that the flavonoid extract effectively prevented KA-SE increase of quantity of malondialdehyde in the brain of rats. Treatment of rats during 8 day with flavonoids from “Saperavi” (25 mg/kg), attenuates KA-SE –related lipid peroxidation disturbance in brain. The results showed that the flavonoids from the wine has a complex compound and is characterized by a different composition of flavonoids, characterized by high antioxidant properties. The flavonoids ethyl acetate extract in the brain of the rat suppressed the activity of antioxidant enzymes, Superoxide dismutase and catalase by the exposure of high antioxidant properties in the epileptic model.

Our experiments are first effort to purify the flavonoids from Georgian grapes, to characterize their biochemical specificity and to investigate theirs role in brain plastic processes. Obtained data will enable to find the new flavonoids that mimic some or all of the properties of neurotrophic factors and may be effective for treatment and prevention of chronic and acute diseases of the CNS.