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Potential Antiepileptic Activity of Spirulina: The Concept of Antioxident Properties in Rats Model of epilepsy

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ABSTRACT

Background

Blue-green algae, or Spirulina platensis, is used as a dietary supplement. It has a high protein content, antioxidants, several phytopigments, and neuroprotective properties. Penzyltetrazole is one of the greatest medications for creating an animal model of epilepsy, which is recognized as a neuropsychiatric condition in humans with a shortened lifespan and deficits in social and professional functioning. While many antiepileptic medications are recognized as effective treatments for epilepsy symptoms, they also have negative side effects. As a result, the need for novel therapies or treatments with minimal side effects is overwhelming. By giving spirulina to rat groups following seizure induction and comparing the results with those of valporic acid, the antioxidant impact of spirulina was investigated. Taking spirulina by itself and When spirulina is administered both alone and in conjunction with an antiepileptic medication, oxidative stress indicators such as MDA that are generated by PTZ induction decrease.

key words: spirulina, epilepsy, valporic acid, blue-green algae

Introduction

About 50 million people worldwide suffer from epilepsy, a chronic, non-communicable brain disorder. Recurrent seizures, which are brief periods of uncontrollable movement that can affect the whole body (generalized) or only a portion of it, are its defining feature. They can occasionally be followed by loss of consciousness and control over one's bowel or bladder functions (World Health Organization). A mismatch between the generation and elimination of reactive oxygen species (ROS) and reactive nitrogen species (RNS) is referred to as "oxidative stress ". There is a chance that elevated ROS production will cause oxidative damage (Sharifi-Rad M et al., 2014). ROS and RNS change the genetic apparatus function by oxidizing proteins, nucleic acids, and lipids, that are major component for cells and lead to death of cells, It has

been reported that seizures lead to the formation of ROS and RNS, which in turn causes oxidative stress and cellular damage. It has been proposed that stopping the production of ROS can stop the damage to neurons that happens during epileptic convulsions. (Williams S et al., 2015). Valporic acid is a branching short-chain fatty acid. VPA's primary goal is to treat epilepsy. Recent research has examined its use as an adjuvant medication for neurological disorders, HIV therapy, and cancer. (Terbach N and Williams RS ,2009) Spirulina, an undifferentiated cyan- bacterium with a spiral shape, can grow naturally in saline and alkaline conditions, doubling its biomass every two to five days. Spirulina served as a main source of food for the Aztec and Maya civilizations for a long time., and because to its extremely low toxicity, it is today regarded as safe for human ingestion (Gutiérrez-Salmeán G et al .,2015) There is an urgent need to find a novel treatment that may be able to treat or prevent epilepsy because, despite the availability of numerous anti-epileptic drug types, the rate of disease recovery has not increased.

Materials and Methods

Grown-up white male rodents were brought to the animal house of the college of medicine, rats were benefited from pellets and were left for quite a long time for adaptation. The spirulina dose utilized in this study depending on past study (200 mg\kg \day), and the identification relies upon estimating oxidative pressure marker. After the time for adaptation had passed, the animals were given 200 mg/kg of spirulina daily orally through an oral tube for gavage, whereas the animals in the control group were given DW. After a 14-day treatment period, the animals were anesthetized and euthanized for the study.

Result and conclusion

The current study highlighted that the PTZ-kindling model led to a significant surge in oxidative insult state in the tissues of the brain, as evidenced by a significant increase in concentration of MDA, which reflected the increase in ROS in the pathophysiology of PTZ-induced epilepsy. Sp became determined to suppress the development of PTZ-inducing seizures through modulating oxidative strain in (institution 4) treatment. Spirulina became significantly reduced the extent of The activation of nicotinamide adenine dinucleotide phosphate (NADPH) oxidase, which results in an increase in MDA level, by PTZ increased the production of reactive oxygen species (ROS), which includes hydroxyl radicals. Subsequently, from present discoveries it could be recommended that blue-green alga spirulina supports fighting the oxidative pressure actuated by PTZ in seizure rat model. As a result, we have attempted to find a new supplement with minimal side effects that can be used as an adjuvant in both the prevention and treatment of seizures. Our study is limited by the lack of a neurochemical and histopathological profile of the seizure-prone rat brain supplemented with spirulina to identify the fundamental underlying mechanism underlying sp's neuroprotective effects against seizures.

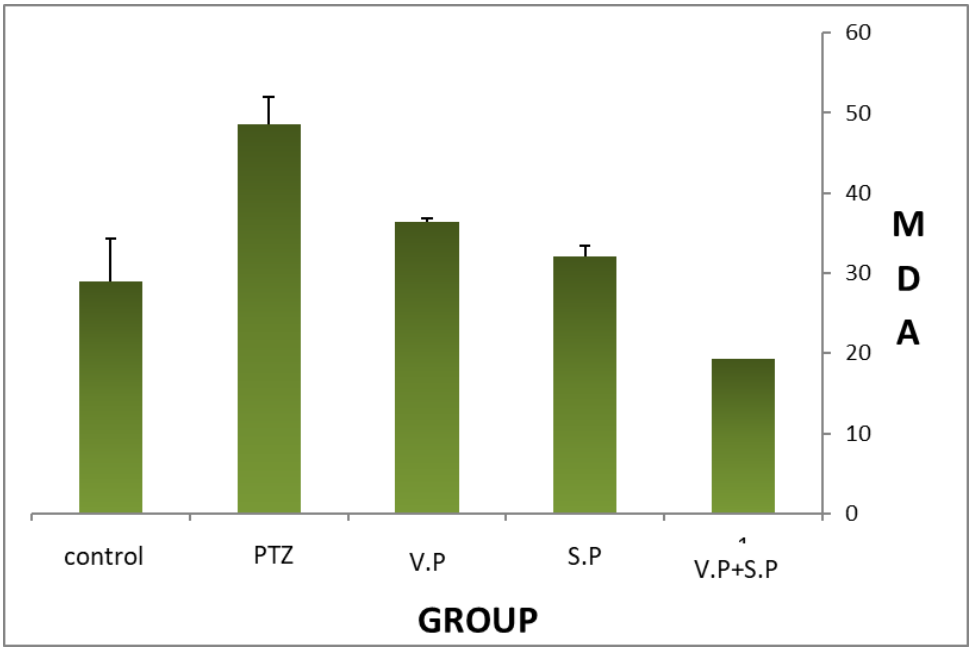

Figure 1. Effect of spirulina 200 mg/kg +ptz40mg,valporic acid 400 mg/kg + ptz 40 mg and combination of spirulina 200 mg/kg + valporic acid 400 mg/kg + ptz 40 mg on MDA level (µg/L) in rat's brain. Results (n = 5) have been stated as the average (±SD). (*P < 0.05), (**P < 0.001)

CONCLUSION

By reducing oxidative stress, this study suggests that blue-green algae may have therapeutic or preventative effects against the pathogenesis of seizures. Spirulina's mechanism of action in an animal seizure model can be further investigated through neurochemical and histopathological studies.

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