Behavioral and neurochemical studies in mice pretreated with garcinielliptone FC in pilocarpine-induced seizures

Gustavo F. de Sousa[1] (IC), Maria das D. A. de Oliveira[1] (IC), Ana Paula dos S. C. L. da Silva[2] (PG), Joselma S. L. Lopes[2] (PQ), Priscila de S. Vieira[2] (PQ), Emanuelly E. A. Pinheiro[2] (PG), Mirna L. de G. da Silva[2] (PG), José Carlos C. L. Silva Filho[3] (PQ), Joaquim S. da Costa Júnior[1] (PQ), Jorge M. David[4] (PQ), Rivelilson M. de Freitas[2,*] (PG)

[1]*Federal Institute of Piauí, 64000-040 Teresina, Piauí, Brazil*

[2]*Federal University of Piauí, 64048-901 Teresina, Piauí, Brazil*

[3]*North Union of Paraná, 86041-140 Londrina, Brazil*

[4]*Federal University of Bahia, 40170-29 Salvador, Bahia, Brazil*

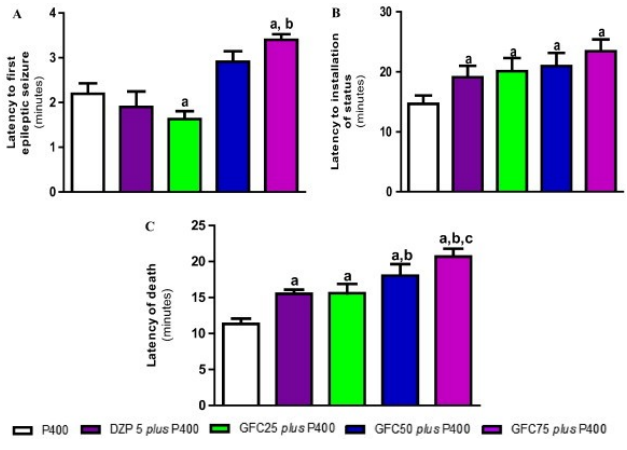
Keywords: *Acetylcholinesterase, Epilepsy, Garcinielliptone FC, Pilocarpine, Seizures.*

Introduction

Garcinielliptone FC (GFC) isolated from hexanic fraction seed extract of species Platonia insignis Mart. It is widely used in folk medicine to treat skin diseases in both humans and animals as well as the seed decoction has been used to treat diarrheas and inflammatory diseases. However, there is no research on GFC effects in the central nervous system of rodents. The present study aimed to evaluate the GFC effects at doses of 25, 50 or 75 mg/kg on seizure parameters to determine their anticonvulsant activity and its effects on amino acid (γ-aminobutyric acid (GABA), glutamine, aspartate and glutathione) levels as well as on acetylcholinesterase (AChE) activity in mice hippocampus after seizures.

Results and discussion

Figure 1. Latency to first seizure (2A), latency to installation of status epilepticus (2B), and latency of death (2C) in mice pretreated with garcinielliptone FC (GFC) after pilocarpine-induced seizures.



Excitatory amino acids such as glutamate and aspartate are involved in generation and expression of epileptic seizures in mammalian brain (Kersante et al., 2013). After its interaction with the NMDA-subtype of glutamate receptor, glutamate induces the Ca^{2+} influx, increasing the neuronal nitric oxide synthase (nNOS) activity and nitric oxide (NO) production which may contribute to neuronal damage (Tome et al., 2010). As noted previously GFC was able to reduce NO levels in in vitro experimental models, which may contribute to the anticonvulsant effect observed in vivo in the present study. On the other hand, inhibitory amino acids such as GABA and glycine counteract the neuronal excitation. GABA, acting through the GABAA receptor, increases the chloride influx, leading to hyperpolarization of cell membrane and antagonism of epileptic seizures. Thus, our results suggest that the anticonvulsant effects of the GFC may be mediated by modulation of the levels correlated with mediators of excitatory and inhibitory neurotransmitter systems.

Conclusion

This study is extremely relevant since the data presented in this report with respect to effects on the central nervous system in the pilocarpine-induced seizures in mice model is being presented for the first time in the literature regarding the subject of this study.

Acknowledgment

We would like to thank the FAPEPI/Brazil (Grant number 004006/20011) and CNPq for the financial support. We also would like to thank Stênio Gardel Maia for the English revision.

[1] Kersante, F.; Rowley, S. C.; Pavlov, I.; Gutierrez-Mecinas, M.; Semyanov, A.; Reul, J. M.; et al. A functional role for both-aminobutyric acid (GABA) transporter-1 and GABA transporter-3 in the modulation of extracellular GABA and GABAergic tonic conductances in the rat hippocampus. J Physiol, 2429 (2013), pp. 41–591.

[2] Tome, A. R.; Ferreira, P. M. P.; Freitas, R. M. Inhibitory action of antioxidants (ascorbic acid or alfa-tocopherol) on seizures and bran damage induced by pilocarpine in rats. Arq Neuropsiquiatr, 355 (2010), pp. 61–68.