



An investigative study to demonstrate the link between combined intake of marijuana and codeine in Alzheimer's disease pathology

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INTRODUCTION

Drug abuse is becoming a thing of concern among young people in Africa and across the globe (Ajayi & Akhigbe, 2020). Marijuana (*Cannabis sativa*) and codeine: most abused recreational drug (Atalay et al., 2020).

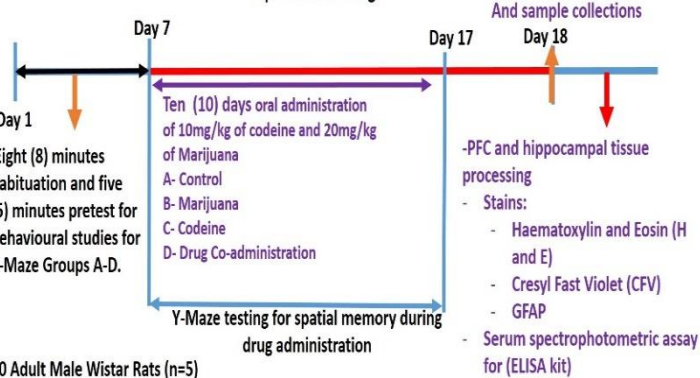
Users mix these drugs for maximum effects (Hamid et al., 2021) which are still now not well-studied reported. Understanding Codeine and marijuana toxicology is a challenge (Barbosa et al., 2021)

Alzheimer's disease is an outcome of chronic degeneration of neuron and severe memory loss (Tiwari, 2017).

This study aimed at assessing the contributory role of combined ingestion of codeine and marijuana on the pathogenesis of Alzheimer's disease by studying changes in histoarchitecture of the prefrontal hippocampal cortex, spatial memory, astrocytic proliferation, Nissl bodies, lipid peroxidation and antioxidant enzyme status

METHODS

Experimental Design



Tissue Photomicrography
Data Analysis: ANOVA via Graphpad Prism (version 8.4.3 (686)).
P<0.05 Data Expressed as Mean ± SD (Standard Deviation).

RESULTS

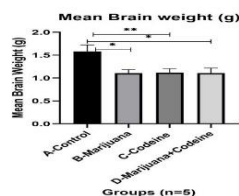


Figure 2: Graphical representation of mean brain weight There was a significant decline in differences observed in B vs A (* P< 0.0214); C vs A (** P< 0.0014); D vs A (* P< 0.10101)

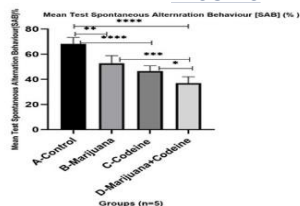


Figure 3: Graphical representation of Spontaneous Alternation Behaviour (Y-maze test) during drug administration. Data expressed as Mean ± SD. *Statistical Significance is set at P<0.05.

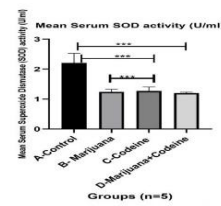


Figure 4: Graphical representation of Mean Serum Superoxide Dismutase Activity. Data expressed as Mean ± SD. *Statistical Significance is set at P<0.05.

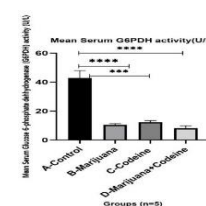


Figure 5: Graphical representation of Mean Serum Glucose 6-Phosphate dehydrogenase (G6PDH) activity. Data expressed as Mean ± SD. *Statistical Significance is set at P<0.05.

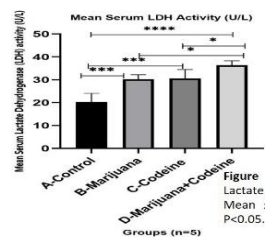


Figure 6: Graphical representation of Serum Lactate Dehydrogenase (LDH). Data expressed as Mean ± SD. *Statistical Significance is set at P<0.05.

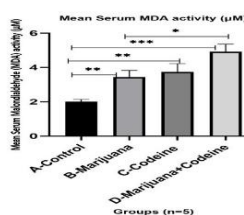


Figure 7: Graphical representation of Serum Malondialdehyde (MDA). Data expressed as Mean ± SD. *Statistical Significance is set at P<0.05.

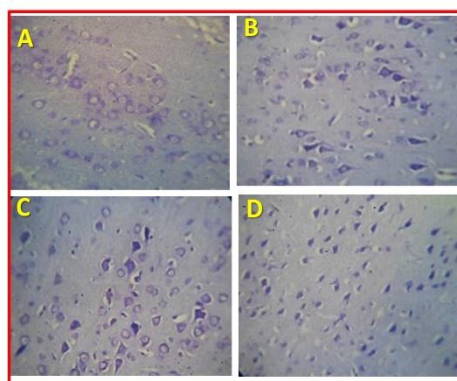


Figure 8: Shows photomicrograph of a Section of the Prefrontal cortex of adult male Wistar rat stained with Cresyl Fast Violet Stain (CFV) for Nissl / Chromatophil bodies .Mag x 400 **Legend-** A= control, B= Marijuana C= Codeine and D- Marijuana and Codeine Results : normal granule cells of the CA while B, C and D characteristic by pyknotic and necrotic cell (neurodegeneration)

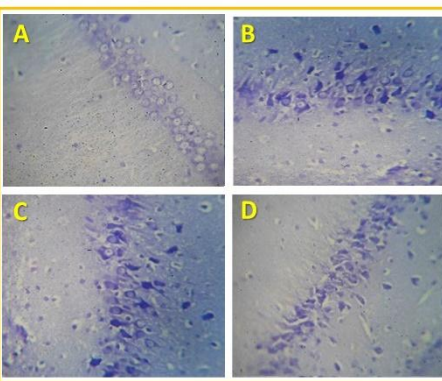


Figure 9: Shows photomicrograph of a Section of the CA1 – hippocampal cortex of adult male Wistar rat stained with Cresyl Fast Violet Stain (CFV) for Nissl / Chromatophil bodies .Mag x 400 **Legend-** A= control, B= Marijuana C= Codeine and D- Marijuana and Codeine Results : normal granule cells of the CA while B, C and D characteristic by pyknotic and necrotic cell (neurodegeneration)

Take home message:Combine intake of codeine and marijuana can induce the pathogenesis of AD

REFERENCES

- Akhigbe R, Ajayi A (2020) Testicular toxicity following chronic codeine administration is via oxidative DNA damage and up-regulation of NO/TNF-α and caspase 3 activities. PLoS ONE 15(3): e0224052. <https://doi.org/10.1371/journal.pone.0224052>
- Archibong V, B.B., Ekanem, T.B., Anozog O. Igiri, Ann M. Lemuel, Ibe M. Usman, Akceem A. Okesina & Nsiong J. Obosi | Tsai-Ching Hsu (Reviewing editor) (2020) Immunohistochemical studies of codeine medication on the prefrontal cortex and cerebellum of adult Wistar rats, Cogent Medicine, 7:1, DOI: [10.1080/2331205X.2020.1824390](https://doi.org/10.1080/2331205X.2020.1824390)
- Akinola, O., Ogbeche, E. O., Olumoh-Abdull, H. A., Alli-Oluwafuyi, A. O., Oyewole, A. L., Amin, A., AbdulMajeed, W. I., Olajide, O. J., Nafiu, A. B., Njan, A. A., Olorundare, O. E., & Gbotosho, G. O. (2018). Oral Ingestion of *Cannabis sativa*: Risks, Benefits, and Effects on Malaria-Infected Hosts. *Cannabis and cannabinoid research*, 3(1), 219–227. <https://doi.org/10.1089/can.2018.0043>
- Barbosa, J.; Faria, J.; Garcez, F.; Leal, S.; Afonso, L.P.; Nascimento, A.V.; Moreira, R.; Pereira, F.C.; Queirós, O.; Carvalho, F.; Dinis-Oliveira, R.J. Repeated Administration of Clinically Relevant Doses of the Prescription Opioids Tramadol and Tapentadol Causes Lung, Cardiac, and Brain Toxicity in Wistar Rats. *Pharmaceuticals* **2021**, *14*, 97. <https://doi.org/10.3390/ph14020907> Balogun, S., Oshu, J., & Onibokun, O. (2020). Effects of Separate and Combined Chronic Ingestion of Codeine and Tramadol on Feeding Behaviour of Female Albino Rats. *Journal of Medical Research and Health Sciences*, 3(7). <https://doi.org/10.15520/jmrhs.v6i7.220> Hamid, O.I.A., Sabik L.M.E., Abdelfadeel, K.F and Shaban, F. (2021). Tramadol aggravates cardiovascular toxicity in a rat model of alcoholism: Involvement of intermediate microfilament proteins and immune-expressed osteopontin. *Journal of Biochemical and Molecular Toxicology*, Volume 35, Issue 6 e22748 p. 1-

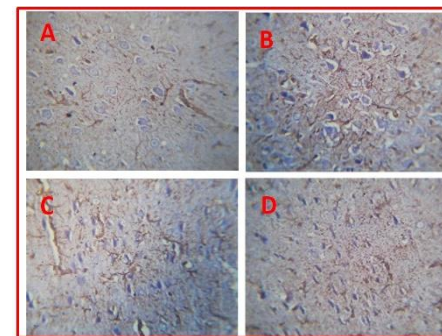


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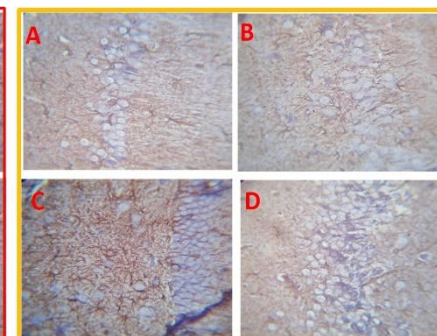


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