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## Anti-diabetic and Probiotic Effects of Kombucha on Alloxan Induced Diabetic Rats

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Kombucha is tea fermented with a symbiotic culture of bacteria and yeasts with several reported anecdotal evidences of its medicinal potential. In this study we seek to investigate its anti-diabetic and probiotics properties. We hypothesized that Kombucha, being a complex matrix of probiotics and nutraceuticals, plays an essential role in diabetes management.

Molecular characterization of the microbial ecology of Kombucha using shotgun meta genomics showed the presence of *Brettanomyces bruxellensis* CBS 2499, *Brettanomyces anomalus*, *Komagataei bacterxylinus* NBRC 15237, *Gluconobacter* and several other species of microorganisms. Kombucha performed better than the antidiabetic drugs, metformin and glibenclamide in lowering the fasting blood glucose (FBG) of the diabetic rats. Administration of 25 mg/kg and 100 mg/kg of freeze-dried Kombucha demonstrated a 4-fold reduction in FBG ( $p < 0.05$ ) and a 40% and 50% respective increases in body weight of the alloxan-induced diabetic rats compared to diabetic control. By histological analysis, Kombucha was also shown to enhance pancreas regeneration and hence insulin secretion as demonstrated in the study. Serum lipid profiling showed Kombucha treatment had anti-triglyceridemic effect ( $p < 0.05$ ). Kombucha reduced the elevated levels of alkaline phosphatase, alanine transaminase, aspartate aminotransferase, creatinine and urea. Histology of the kidney and liver also showed that Kombucha has no adverse effect on the morphology of these organs. Kombucha also showed a gut bacteria microbiome modulatory effect.

Kombucha appears to demonstrate ameliorating effect on diabetes. Daily consumption of Kombucha may help in diabetes management and protect against liver and kidney damage as well as modulate the gut microbiome.

### Biography

Emmanuel Edem Adade is a final year master's student pursuing a degree in Molecular Cell Biology of Infectious Diseases at the West African Center for Cell Biology of Infectious Pathogens (WACCBIP), University of Ghana. He is very passionate about research that involves gaining understanding of the interconnectedness and dynamics of the human and environmental microbiome. He seeks to exploit the use of probiotics for novel cost-effective treatments and strategic prevention of metabolic diseases. He is also passionate about scientific innovations and children development.

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