Safety assessment of a novel plant-based milk alternative from kenaf (*Hibiscus cannabinus* L.) seeds through acute oral toxicity study

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Kenaf (*Hibiscus cannabinus* L.) seeds have been discovered to possess the ability to produce milk-like solution when soaked seeds were grounded with excess water, just like soybean milk (SM). Kenaf seed milk (KSM) can be further processed into innovative food products like tofu, milk beverage and cream cheese. However, for human consumption, safety evaluation of this novel plant-based milk is necessary. Toxic effects such as poor absorption of essential nutrients and impaired metabolism caused by plant seeds are often associated with their antinutritional factors that particularly present in seed hulls. In this study, biological effects from KSM consumption were investigated using an *in vivo* model through acute toxicity study. Comparisons to SM were also made. The study was carried out at a single test dose of 9.2 ml/kg of body weight and the treatment resulted in no sign of toxicity including mortality after 14 days of observation. Rats presented normal behavior, physical appearance and physiological state. Hematological parameters (red blood cell, hemoglobin, packed cell volume, mean corpuscular volume, mean corpuscular hemoglobin concentration, white blood cell, neutrophils, lymphocytes, monocytes, eosinophils and platelets) were not significantly affected ($p>0.05$). Serum biochemical analysis revealed that KSM consumption induced a significant reduction ($p<0.05$) in total protein level, but still within the normal range. Liver weight also significantly decreased ($p<0.05$). Nonetheless, other vital organs were not significantly influenced ($p>0.05$). Overall, there are no major toxic effects of acute KSM consumption. Thus, there is the potential of developing KSM as a novel plant-based milk alternative. This is the first study to report on *in vivo* biological effects following consumption of seed milk derived from kenaf seeds. Further investigations including 28-day and 90-day repeated dose oral toxicity studies, and a clinical trial are warranted to declare safe long-term KSM consumption.