Acute toxicity of high doses of the glycoalkaloids, alpha-solanine and alpha-chaconine, in the Syrian Golden hamster - DTU Orbit (30/01/2019)

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Sprouted, stressed, or spoiled potato tubers have reportedly led to human acute intoxication, coma, and death when consumed in high amounts. These effects have been attributed to glycoalkaloids (GAs), primarily alpha-solanine and alpha-chaconine, naturally present in all potatoes. The level of GAs in potato tubers has previously been shown to increase substantially as a result of improper handling and postharvest storage. A short-term study was performed to investigate the dose-response profile of alpha-solanine and alpha-chaconine alone or in combination, administered daily by oral gavage to Syrian Golden hamsters. Daily doses of 100 mg of alpha-solanine [kg body weight (BW)](-1) induced death in two of four hamsters within 4 days, when administered by gavage to female Syrian hamsters. Doses of 100 mg of alpha-chaconine alone or alpha-solanine and alpha-chaconine combined in a ratio of 1:2.5, in doses of 75 or 100 mg (kg BW)(-1), induced death in one of four hamsters within the same period. Animals dosed with alpha-solanine alone or in combination with alpha-chaconine suffered from fluid-filled and dilated small intestines. The GA administration had no effect on acetyl cholinesterase (AChE) or butyryl cholinesterase (BuChE) activity in plasma or brain. Liquid chromatography-mass spectrometry-based metabolomics showed that there was a specific accumulation of alpha-chaconine in the liver tissues. In addition, metabolomics gave direct evidence of glycolytic metabolism of the GA with the beta(1), beta(2), and gamma-GAs detected in the urine and, to a lesser extent, the feces. Doses from 75 mg (kg BW)(-1) of alpha-chaconine, alpha-solanine, or the two compounds combined were potentially lethal within 4-5 days in the Syrian Golden hamster. However, the cause of death in these studies could not be established. No synergistic effects of alpha-solanine combined with a-chaconine were evident.

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