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# Toxicological assessment of technical cashew nut shell liquid combined with dimethyl sulfoxide (DMSO) using *Allium cepa* bioassay

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The cashew plant and its derivatives have been associated with several biological effects: Antioxidant, antifungal, antibacterial and insecticidal/larvicidal activities and pharmacological properties. The cashew nut is industrially prepared by submission to high temperatures (185ºC) releasing technical cashew nut shell liquid (tCNSL), that is composed for phenolic lipids (figure 1). This is an abundant, renewable and underestimated byproduct of cashew nut production chain. Despite the benefits, it also can occur in adverse effects associated with its use, such as toxicity, cytotoxicity, genotoxicity and aneugenic and clastogenic activity. To be used for these purposes, this product, due to its viscosity and insolubility in water, needs to be emulsified using universal organic solvents. However, they also can be harmful and interfere with the action of tCNSL. So, the present study aimed to evaluate the potential toxicity and ability to induce DNA damages of tCNSL combined with dimethyl sulfoxide (DMSO) and of DMSO alone. Four dilutions of DMSO in water were prepared (2, 2.5, 3 and 3.5%) and were added to each two concentrations of tCNSL (250.0 and 500.0 mgL-1). After, *Allium cepa* seeds were exposed to dilutions for germination by 96 h at 25±3ºC. The analyzed parameters for the assessment were germination, mitotic, chromosomal alterations and micronuclei indexes. The results indicated that DMSO inhibits seed germination in concentrations from 2%, when applied alone. However, in combination with tCNSL these effects were partially reversed. In relation to genetic damage, the results indicated that the tCNSL in combination with DMSO didn't show statistical difference in the various tested concentrations, as well as the 2% DMSO from negative control. Nevertheless, they statistically differed from the positive control ($P<0.05$). Thus, the bioassay indicates that tCNSL combined with DMSO has no phytotoxic potential in *A. cepa*, unlike the DMSO alone, and that treatments didn't induce genetic damages in meristematic cells.

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