



Comparison the organic and inorganic solvents effect on phenolic compounds extraction and the activity against breast carcinoma cell lines from callus cultures of *Manihot esculenta*

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Abstract : Cassava (*Manihot esculenta*) is valuable plant including industrial and therapeutic potential, rich in essential nutrients for the body such as carbohydrates, vitamin A, vitamin C, iron, calcium, phosphorus and phenolic compounds. Our study aimed to evaluate the efficiency of absolute organic solvent (methanol) and inorganic solvent (water) for phenols extraction from stem calli of Cassava and identification the phenolic compounds of their crude extracts (methanol and aqueous extracts) by HPLC. Examine the cytotoxicity of both of methanol and aqueous extracts against breast cancer cell lines (MCF7) were determined. Stem, leaf and petiole explants of *in vitro* plantlets were cultured in MS-medium to initiate calli, stem was chosen as the best explant for callus initiation frequency (74.88%) on medium containing 1mg/l NAA+0.5mg/l BA. Effect of 2,4-D and picloramat concentrations 8 and 16 mg/l of each were tested on callus production from stem explant, maximum value of calli mean production (76.51%) was achieved on the optimum selected medium for callus production (8 mg/l 2,4-D). Phenolic acid, flavonoids and cinnamic acid derivatives were identified in methanol and aqueous extracts by HPLC at 280, 320 and 360 nm of the UV chromatographs. At 280 nm, coumarin and gallic acid were mostly separated at concentrations 28.456 and 38.210 µg/ml of each in methanol and aqueous extracts, respectively. At 320 nm, gentisic acid and sinapic acid concentrations were 11.454 µg/ml and 0.448 µg/ml of each in methanol and aqueous extracts, respectively. No detectable compounds at 360 nm in aqueous extract, but in methanol extract, rutin was identified at concentration 0.759 µg/ml. Total amount of the identified free phenols recorded 54.658 µg/ml in aqueous extract higher than value in methanol extract (50.547 µg/ml). Methanol extract gave IC₅₀ of 1.43 µg/ml, while aqueous extract gave a potential IC₅₀ of 1.3 µg/ml. Our work was performed by DNA fragmentation and detection DNA content using flow cytometry of DNA in different groups, untreated- control and treated- Cassava aqueous extract were diploid, while the breast cancer cell line was aneuploid. The results of DNA electrophoresis demonstrated that DNA damage observed in breast cancer cell line intoxicated has been recovered with cassava aqueous extract protection and the treated MCF7 showed a single diploid peak.

Keywords : *Manihot esculenta*; Callus cultures; Methanol and aqueous extracts; Phenolic compounds; MCF7; DNA fragmentation and content.

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