IDENTIFICATION AND CHARACTERIZATION OF BIOACTIVE PEPTIDES IN NUTS (*CARYA ILLINOINENSIS*) STORAGE PROTEINS

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Introduction. The pecan nut is a fruit native to northern Mexico that provides a balanced intake of fat (65%). Its protein content (9 to 15%) is higher than provided by some cereals, making the pecan nut an excellent source of dietary protein (1). The storage proteins provide a source of nitrogen and sulfur during the early stages of development and growth of the seedling (2), the storage protein are rich in asparagine, glutamine, arginine and proline, it can be classified according to their solubility in albumins, globulins, prolamins and glutelins. The study of proteins in food is receiving great attention due to its ability to prevent, abate or treat chronic diseases such as overweight, hypertension and cancer. Bioactive peptides are small amino acid sequences which can have a specific role in the body (3). Within their bioactivities, they may alter cellular metabolism and act as hormones or neurotransmitters playing an important physiological role.
Obtain and characterize bioactive peptides in nuts storage proteins, and test its biological activity in fibroblast, HeLa, Caski and Coronary Endothelial Cells (CEC)

Methods. Based on the standardization of extraction methods to obtain the solubility of each of the fractions, analysis and molecular characterization of storage proteins was performed. The amino acid profile was determined by phase HPLC reverse. The fractions were subjected to mass spectroscopy analysis (4) for the identified and characterized biologically active peptides and cell cycle progression of HeLa and CasKi cell lines were analyzed. These cell lines were treated with different concentrations of tryptic digests of the most important fraction and the antihypertensive activity was evaluated in CEC cells (5).

Results. Using quantification of protein by the Bradford Method it was observed that glutelins are the most important because they represent over 50% of the total soluble fraction. The HPLC analysis determined that the pecan nut is deficient in methionine. In electrophoretic analysis 11S globulins and glutelins showed similarity in the bands 50, 25 and 20 kDa (Figure 1). Was performed *in silico* prediction of peptides with biological activity from a mathematical model, then the fractions were submitted to mass spectroscopy. With a total of 29 peptides identified with various biological activities, it was found that 21 of them belonging to the glutelins. Glutelins peptides showed antihypertensive activity, antioxidant and anti-carcinogenic and found 50µg/mL of tryptic digests that induce approximately 30% of the HeLa cells and CasKi to develop apoptosis. For the antihypertensive activity it was determined that digesting LC_{50} of 250 ug / mL inhibits nearly 82% of CEC cells.

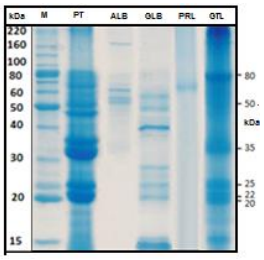

Fig. 1 Electrophoretic pattern of protein fractions from nuts. Marker (M), Total Protein (PT), Albumins (ALB), 11S Globulins (GLB), Prolamins (PRL) and Glutelins (GTL).

Conclusions. It was found that the glutelins' fraction contained most of the peptides with antihypertensive, anticarcinogenic, and antioxidant activity. Biological activity assays of pecan nut glutelins, reported an antiproliferative and antihypertensive effect. In conclusion, the peptides from the proteins in the pecan nut fulfill a regulatory function in the metabolism, as well as and cell cycle progression.

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