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DEVELOPMENT IN VIVO NUCLEAR MODEL WITH MICROPARTICLES OF ALOE VERA/CHITOSAN/VITAMIN E, INCORPORATED HIALURONIC ACID GEL LABELED 99mTc.

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Introduction: Burnings are one of the most serious traumas that occur in health, beyond the physiological problems that can lead to death; burns can cause other problems social order. They are characterized as injuries that involve the diverse layers of the skin, hair, subcutaneous tissue, muscles, eyes among others and can have diverse origins. According to Brazilian Society of Burnings, in Brazil happens a million cases of burns each year, 200 thousand are taken care of in emergency services, 40 thousand-demand hospitalizations, and 6.2% end in death. The treatment of burns is complex, painful and the available treatment today requires the use of multi medicines. To reduce the pain and accelerate cicatrization process many natural substances have been studied like Aloe vera and Chitosan. Aloe vera (L.) has been employed as an alternative for bandages purposes including treatment of skin disorders and healing of burns and wounds. Previously published papers indicate that chitosan enhances the functions of inflammatory cells such as polymorph nuclear leukocytes, macrophages and fibroblasts; thus, it promotes granulation and organization. Another important compound that can be used in burn treatment is vitamin E, which is an important antioxidant and protects the biological membranes avoiding oxidant process. Drug delivery systems, such as polymeric microparticles, represent a significant development area. To prepare microparticles, the spray-drying technique exhibits advantages such as rapid and one step process, low cost and ease of industrial transposition. The use of microparticles to treat burns is new and its mechanism is not well established. The addition of a radionuclide, technetium-99m (99mTc), could show the microparticles behavior after being applied to a burn wound. The goal of this study is to establish whether or not micro particles labeled with 99mTc pass through skin to blood.

Objectives: This work aims the development of an innovative *in vivo* nuclear model using Aloe vera/Chitosan/Vitamin E microparticles labeled with 99mTc.

Material and Methods: Experiments have been carried out under the following conditions: inlet air temperature 120±5°C, outlet air temperature 70°C, aspirator setting 10, suspension feed flow rate 0,30L/h, air flow rate 500NL/h. The permeation of the developed microparticles was evaluated through gamma scintigraphy on five burns mice. For this purpose, the microparticles and saline solution were incubated with $SnCl_2$ for 10 min at room temperature. This complex was then incubated with the 99m Tc radioisotope (5 mCi) for 10 min. After the solution was add in a gel formulation and applied in the animals. The animals were burned according to Medeiros et al. The animal were anesthesiated, their back was chemically shaved and burned with a aluminum plate during 5 seconds at 140°C, after the gel labeled was applied in back of the animals and after 2 hours the scintigrafy images was obtained. This research was approved by the ethical committee of the University of Pernambuco (Protocol No. 23076.002362/2010-37). Mice were euthanized, and the heart, liver, kidneys, lungs, spleen, trachea and stomach were removed and weighed. The total radioactivity instilled in each animal and the remaining radioactivity in each organ was measured with a gamma counter (Cobra II- Auto-Gamma, Packard, USA). The radioactivity of each organ was measured in each organ as a percent of the total administered.

Results and Discussion: The model showed that the microparticles were in the skin and that permeation does not occur. These results indicate that the use of these particles is secure. The size of the particles allows them to stay on the surface of the skin instead of permeating to the blood stream.