Effect Of The *Cucumis sativus* Extract In Labeling OF Blood Elements With Technetium-99m.

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Abstract: Human beings have been widely used natural products as medicines. However, sometimes the biological effects of these products are not fully known. The cucumber (*Cucumis sativus*) is a plant which is indicated as anti-inflammatory and anti-anginous. It is concerned that many natural remedies may contain potentially toxic ingredients and contaminants such as heavy metals. Red blood cells (RBC) and plasma proteins labeled with technetium-99m (99mTc) have several clinical applications and it has been reported that some natural products are capable of reducing the efficiency of this radiolabeling. The aim of this work was to assess the effect of an extract of a cucumber extract on the labeling of blood elements with 99mTc. In the preparation of the extracts it was used 50g of cucumber diluted in 500mL of saline solution (NaCl 0.9%). Samples (0.5mL) of blood from Wistar rats were incubated with 0.1 mL of the extracts during 1 hour. After that, the samples were incubated with stannous chloride ($SnCl_2$) and 99mTc. The blood was centrifuged and plasma (P) and RBC were isolated. P and RBC were also precipitated with trichloroacetic acid and soluble (S) and insoluble (I) fraction (F) were determined. The results have shown that the extract has not altered the radiolabeling . It was described that some extracts as *Fucus vesiculosus*, *Paullinia cupana*, *Mentha crispa L* were able to alter the radiolabeling of blood elements. In the light of the results obtained we suggest that the referred extract has a antioxidant properties. [Nature and Science. 2008;6(3):43-52]. ISSN: 1545-0740.

Keywords: cucumber, technetium-99m, red blood cells, antioxidant.

Introduction

The discovery of the ionizing radiations and composites endowed with natural radioactivity soon interested biology and medical sciences. In principle, for the damages that they caused in the alive structures, but later, for its value as half to assist the diagnosis and the treatment of the illnesses. During the last few years science learned to produce, to manipulate and to control radioactive substances, allowing that the involved processes in its production, its storage and its use if became safe more. Some existing chemical elements in the nature already are radioactive. Others can be generated in the nuclear reactors or the particle accelerators. Therefore, the radioisotopes can generically be classified in natural and artificial. The radioactive emission deeply modifies the atomic structure of the emitting element; therefore it modifies

the composition and the energy rocking of its nucleus. The unstable nuclei waste the energy excess that they possess emitting radiations. As the origin of the phenomenon is radioactive nuclear, the isotopes that emit radiation are more properly called radionuclide (Garcia, 1998).

The applications of radioisotopes in nuclear medicine are many and can be: as sources of irradiation and as tracers. In the first case, the biological material receives only the radiation emitted by the radionuclide used, in the second; the very radioisotope is incorporated into the biological environment that you want to study (Knapp & Merzadeth, 1994).

The first step in the preparation of radiopharmaceuticals is the production of a radionuclide appropriate. There are two main sources for the production of radionuclides which are used in procedures in nuclear medicine. There are primary and secondary sources. The primary source involves the direct production of radionuclides from nuclear reactor until the particle accelerator. The method involves a secondary source of indirect production of a radionuclide of a system known as a producer of radionuclides. In a nuclear reactor at the heart of a stable chemical component is bombarded with neutrons of low energy (thermal neutrons). For the absorption of neutrons the nucleus of the atom bombed rearranged is to become so unstable (radioactive). This instability is followed by the emission of particles, gamma rays or fission. There are two types of particle accelerators from: the linear and cyclotron. The core component of a stable chemical is bombarded with different particles such as electrons, protons, and particles. In the linear accelerator, the particles are accelerated α deuterons bombardments along a linear path, while in a cyclotron; the particles are accelerated along a circular path using an electrical current and a magnetic field. These particles are provided with sufficient energy to overcome the barrier of potential generated by the core (the Coulomb barrier). The secondary source is an indirect method to produce radionuclides using a generator system which is constructed in a manner that is easy to chemically separate the radionuclide son of radionuclide father in local hospitals or central radio pharmacy(Owunwanne et al, 1995).

A generator is built on the basis of the relationship between the decay of radionuclide father (half-long life) and the increase in child radionuclide (half-life short). The chemical properties of nuclide father and son radionuclide should be different, so they can be easily separated. The importance of generating radionuclide lies in the fact that they are easily transported and serve as sources of radionuclides in institutions far from the site of the installation of the reactor or cyclotron (Early & Sodee, 1995; Saha, 1998).

The generators are built with Mo-99/Tc-99m of alumina (Al_2O_3) conditional on a column of plastic or glass. The Mo-99 is absorbed in alumina in the chemical form of MoO_4^{-2} (molybdate). In preparing the column is routinely flushed with isotonic saline solution to remove the radioactivity undesirable. The amount of alumina is used by around 5 to 10, depending on the activity of the total Mo-99. The columns of generators are protected with lead. Usually the generators Mo-99/Tc-99m, are produced with Mo-99 obtained by fission of U-235(Hladik III et al, 1987; Taskaev et al, 1995).

The range of scintillation camera or camera is the main instrument used to obtain scintigraphic images. The modern range cameras have crystal detector that can be rectangular with more than 90 valves photo multiplication. The collimator is important in the formation of image and especially in reducing the amount in the spread of radiation. The collimators are commonly referred to as low energy (140 keV), average energy (150-300 keV) and high-energy (300-400 keV). The scintillations based on the ownership of certain crystals that, after being excited by a radiation incident, on their return to their basic level of energy, emit photons of visible light that can be detected and recorded by electronic circuits (Perkins & Frier, 1999).

The vast majority of radiopharmaceuticals used in nuclear medicine for diagnosis are marked with Tc-99m, since this has a great facility to train with chelating complex and diverse molecules, encouraging the taking of several radiopharmaceuticals (Hladik III, 1987; Srivastava & Straub, 1990; Srivastava et al, 1996). Similarly, the Tc-99m also has been used in the marking of various anatomical structures, in order to diagnosis, can also be used in procedures for biological research (Baum, 1987; Bernardo-Filho, 1988).

While presenting many advantages over other radionuclides used in medical sciences, the contact of Tc-99m with the cells can cause various types of injuries, among which are particularly important where they could change the deoxyribonucleic acid (DNA), with obvious risks. This radionuclide has its decay associated with the emission of electrons Auger (EA) (15-21 keV) and electron internal conversion (JIS) (128-138 keV) (Saha, 1998; Silva et al, 1998, Bernardo-Filho, 1999).

The process of marking of cells and molecules with Tc-99m almost always requires the use of a reducing agent, since the eluate obtained in the event, as ion pertechnetate, is not easily connect to other

chemical species. Therefore, it is necessary to reduce this radionuclide of Valencia +7 abilities to lower (+3, +4, +5) (Saha, 2005).

On a practical level, the use of ion stannous was the key to the development of many radiopharmaceuticals. None reducing agent has, to date, marking an efficiency of the radioactive tracer greater than that achieved with the use of chloride stannous thus justify its preference, not only in nuclear medicine, but also the marking of various structures of interest biomedical (Rao et al, 1986; Bernardo-Filho, 1999; Saha, 2005).

The reduction of ion pertechnetate can be obtained through various chemical agents, and the chloride stannous ($SnCl_2$) is the reducing agent most often used for this purpose (Dewanjee et al, 1990; Srivastava & Straub, 1990; Harbert et al, 1996), and allows the labeling of many molecules, and different cell types, with, typically, an additional step of purification. Although the $SnCl_2$ be employed in minimum concentrations in the marking of a number of structures, some harmful effects of the substance have been described (Bernardo-Filho et al, 1994; Dantas et al, 1996). It is suggested that during reactions of oxy-reduction, the $SnCl_2$ could be generating reactive oxygen species. This is explained by the fact $SnCl_2$ act as a reducing agent and having a great affinity for oxygen, which in turn is an excellent oxidizing agent. One of the features of biological importance of $SnCl_2$ is its ability to form cationic organometallic compounds of high lipid solubility, enabling them to cross biological membranes and exert their toxic effects within the cells (Dantas et al, 1996).

A radiopharmaceutical is a radioactive compound used for diagnosis and treatment. In nuclear medicine, approximately 95% of radiopharmaceuticals are used for diagnostic purposes. The primary applications of radionuclides in the health science are as a source of radiation or radioactive tracers. The tracers that have well-defined characteristics for employment in humans are called radiopharmaceuticals. Thus, a radiopharmaceutical can be defined simply as a substance or cell containing a radioactive atom in its structure and which by their pharmaceutical form, quantity and quality of radiation, its administration becomes suitable for use in humans with end of diagnosis or treatment of diseases, whatever the route of administration. Usually the radiopharmaceuticals have no pharmacological effect because in most cases are used in minimum quantities. In these cases show no dose-response relationship, and then differ from conventional drugs. Because they are administered in humans, are sterile, a toxics and free to pyroxenes and should be subject to all measures required for quality control of a conventional drug (Saha, 2005). Advances in nuclear medicine, with several studies are being targeted regarding research and development of several new radiopharmaceuticals (Saha, 2005).

In the nuclear medicine radiopharmaceuticals are used (a) to obtain images, as a radiopharmaceutical with selectivity by an organ and / or system is administered and the radiation emitted is externally captured, processed or recorded on paper, film or video monitors, (b) Study of functions in vivo, measuring the function of an organ or system, in particular based on absorption, dilution, concentration or excretion of radioactivity after administration of radiopharmaceutical, (c) therapeutic procedures, where a specific organ or tissue is selected and, through the issuance of the beta radiation tissue is destroyed (Baum, 1987).

After intravenous administration, the $99mTcO_4Na$ is distributed in the vascular compartment. About 70 to 80% of ions pertechnetate linking up initially to plasma proteins, and this connection is reversible (Nickel, 1995). The plasma elimination is very fast and balance between the compartment vascular and interstitial fluid is completed in a short time, between 2 to 3 minutes. The half-life of elimination from the plasma is approximately 30 minutes, and 30% of the administered dose, is excreted in the first 24 hours. The total urinary excretion of fecal and activity of Tc-99m, is about 50% in 3 days and 70% in 8 days (HladiK III et al, 1987). The dose varies with the type of study to be conducted and is used about 10 to 20 mCi for brain imaging, from 1 to 5 mCi for thyroid, and 20 to 25 mCi for the marking of red cells in vivo. The studies of thyroid and brain are performed after 20 to 30 minutes of the administered dose. When the blood-brain barrier (BHE) is changed, because the presence of abnormal cells per occurrence of tumors, stroke encephalic, abscesses, and other diseases, the accumulation of radiotracer occurs in brain tissue. A normal brain scan shows no distribution of activity on the grounds of protecting the blood-brain barrier that is responsible for the exclusion of sodium pertechnetate (Nickel, 1995). The pertechnetate despite captured, is not up taken by the thyroid gland. For this reason is mainly used for studies of morphological and location of the thyroid. The image of the thyroid with 99mTcO4Na, is also employed in conditions that the normal thyroid cells modified, resulting in areas of lack of tracer. In these diseases are included benign tumors, malignant tumors, cysts, inflammation and bleeding. For detection of tissue para thyroidal hyper functioning shall be used in conjunction with the pertechnetate the thallium-201 (AI-201), for viewing on

the basis para thyroidal anomalies such as tumors and hyperplasia (Bergenfeltz et al, 1992). The image of the salivary glands with 99mTcO4Na, is used to detect some tumors may result in an increase or decrease the capture gland. The gastric mucosa is usually displayed after administration of sodium pertechnetate. It is used to detect mucosal areas located on the outside of the stomach (ectopic mucosa), the Meckel's diverticulum in the intestine, and the region of the distal esophagus. It is also used in the evaluation of gastric resection in surgical procedures (Fernandez-Ulloa et al, 1992).

Natural products are widely used as food or food additives, or as a substance in medicinal treatment for humans. Medicinal plants are widely used worldwide for the treatment of many diseases. Sometimes the toxic and/or genotoxic effects of these products are not fully known. Practically all Countries utilize radioisotopes in medicine, industry, agriculture and research. Technetium-99m (99mTc) has been the most utilized radionuclide in nuclear medicine procedures and it has also been used in basic research. Natural drugs can alter the labeling of red blood cells with technetium-99m (^{99m}Tc) (Early & Sodee, 1995; Braga et al., 2000; Saha, 2005;). When a radionuclide has its capability to bind to blood elements altered by natural and therapy drugs, the process of labeled red blood cells may be repeated, resulting in an additional radiation dose to the patient (Hesslewood & Leung, 1994; Sampson, 1996).

The cucumber is a herbal plant rusticate with gavinhas of stem and acute branches and aspires, leaves of wolves triangular acute, unisexual flowers, yellow, solitary (male) or in bunches, it originating in Southeast Asia. As active principle stand out carbohydrates, proteins and fats, salts of potassium, phosphorus, calcium, magnesium and sodium iron, vitamins A, B1, B2 and C. The cucumber gives effect anti-angiogenesis and anti-tumor. The part used is the fruit. In popular medicine is given as a sedative and diuretic, anti-rheumatic and somniferous has tonifying action of the liver and kidneys. Excellent due to its properties which tonifying hair, nails and skin, and anti-inflammation of the eyes. It is a good stimulant appetite when used before meal. Vouldoukis et al (2004) reported the antithrombotic effect of a glicosaminoglican extracted from the seeds of cucumber.

Then, we have evaluated the influence of a cucumber extract on the labeling of RBC and plasma proteins with ^{99m}Tc using *in vitro* study.

Material and Methods

Radiolabeling process: Samples of heparinized blood (0.5 mL) withdraw from *Wistar* rats were incubated with 100 μL of a preparation (100%v/v) of Cucumber extract (0.1g.mL^{-1}) during 1h at room temperature. After that, it was added 0.5 mL of stannous chloride (1.2 μg. mL^{-1}), as $SnCl_2.2H_2O$, for 1h at room temperature. After this period of time, ^{99m}Tc (0.1 mL), as sodium pertechnetate, was added and the incubation continued for another 10 min. These samples were centrifuged and plasma (P) and blood cells (BC) were separated. Samples (20 μL) of P and BC were precipitated with 1 mL of trichloroacetic acid (TCA) 5% and soluble (SF) and insoluble fractions (IF) were separated. The radioactivity were determined in a well counter. After that, the % of radioactivity (%ATI) was calculated, as previously reported (Bernardo-Filho et al., 1994).

Enzymatic activity (AchE activity) examination: to the watery phase 0.5mL of the enzymatic preparation of the Kit had been added and the residue of the total evaporation of the solvent was dissolved in 0.25 mL of the same enzymatic preparation diluted 2 times. After incubation of 120 min 37°C, 50μL had been removed of the incubation mixture and it was added 0.5 mL of reagent of color and 0.5 mL of substratum. The reaction of formation of the product was mediated in 412 nm during 5 min. The enzymatic activity was express in average of addition of absorvance per minute. This value determined for the control (distilled water extract) corresponds the 100% of the enzymatic activity. The results of percentage of inhibition of the samples had been interpolated in the express curve metil paration standard and results in ppm of metil paration equivalents. The limit of detention of the method is of 0.2 ppm in metil paration equivalents.

Results

The table 1 has shown the effect of the cucumber extract on the labeling of blood elements with 99mTc. Related to the results obtained the extract was not capable of altering the pattern of radiolabeling of blood elements.

Samples blood were incubated with the extract. Saline solution (NaCl 0.9%) was used as control. Then, stannous chloride (1.2 μg. mL^{-1}) and 99mTc, as sodium pertechnetate were added. These samples were centrifuged and (P) and (BC) were separated. Blood samples were precipitated with TCA and SF and IF were separated. The radioactivity in P, BC, SF-BC , IF-BC, SF-P and IF-P was determined in a well

counter and the % of radioactivity (% ATI) was calculated. A statistical analysis (Kruskal Wallis test, n= 5) was used to compare the results.

Table 1- Effect of cucumber extract on the radiolabeling of blood elements

Concentrations of the extract	C	IF-C	IF-P
Control	96.32 ± 3.02	89.65 ± 2.90	77.82 ± 3.96
6.25 %	95.45 ± 3.81	88.23 ± 3.38	81.17 ± 2.72
12.5 %	97.91 ± 0.71	88.15 ± 3.17	74.33 ± 7.14
25 %	97.30 ± 0.93	87.77 ± 2.09	72.08 ± 6.63
50 %	97.72 ± 1.56	86.33 ± 3.08	74.91 ± 4.86
100 %	97.84 ± 1.23	89.04 ± 3.96	77.58 ± 3.50

Discussion

The use of natural products has grown over the years. Generally demand through the use of these products, and among them, in the herbal cure for many diseases and palliative in nature less toxic. So it is of extreme importance of a more scientific evaluation of the biological effects of natural products. For the natural product chosen, the cucumber, few properties in relation to their use are described as a diuretic action, hypotensive, anti-angiogenic and anti-tumor and anti-carcinogenic (Vouldoukis et al, 2004). On the other hand, has a high level of consumption in popular medicine.

Kam & Liew (2002), reported that despite the medicinal herbs used in Traditional Chinese Medicine be relevant at the level of therapy may have in their constitutions components that trigger side effects.

As it was described as extracts of plants could change the labeling of blood elements with Tc-99m (Oliveira et al, 1997; Vidal et al, 1998; Oliveira et al, 2000; Oliveira et al, 2002; Capriles et al, 2002 ; Oliveira et al, 2003; Moreno et al, 2004), we decided to assess whether the extracts of cucumber would also be able to interfere in the process of radiolabelling. The labeling of the blood products with Tc-99m, as sodium pertechnetate, depends on the presence of a reducing agent and stannous chloride is widely used. The determination of optimal concentration of chloride stannous is a predominant factor in the technique of labeling with Tc-99m (Rao et al, 1986; Hladik III et al, 1987; Kelly et al, 1992). In the case of red blood cells, they capture the ion stannous half of extra cell. When the ion concentration is low, the same shall be incorporated by virtually all red blood cells. Thus, in maximum concentration of reducing agent, the red blood cells have the highest percentages of marking, possibly due to "completion" of up to link the sites of molecules of hemoglobin. After the treatment of red blood cells with high concentrations of chloride stannous, the system that controls the flow of this ion is saturated and the same is not able to capture this ion so undefined, which causes the increase of extracellular agent in the middle. To be added the Tc-99m, as ion pertechnetate, it would have to cross the barrier of reducing agent, which would prevent the achievement of red blood cells, thus causing a low efficiency of marking (Bernardo-Filho, 1988).

The mechanism of transport of ions for the intracellular environment has not yet been fully established, but the evidence suggests that the chloride stannous cross the plasma membrane channels by selective calcium (Gutfilen et al, 1992; Sampson, 1996) and ion pertechnetate by the system transport "anion banda-3" (Callahan et al, 1990; Sampson, 1996).

The presence of certain drugs in the blood could change% of the radioactivity of Tc-99m linked to blood elements because they could act: (a) competing with $SnCl_2$ or with the Tc-99m (b) changing the permeability of cell membranes or favoring blocking mechanism of transport of these elements, (c)

occupying sites of binding of Tc-99m or preventing the $SnCl_2$ they occupy the (d) facilitating the connection Tc-99m to plasma proteins or (e) as a reducing agent or oxidizing agent modifying the valence of ions stannous and / or pertechnetate (Hladik et al, 1987; Santos et al, 1995).

Although other plants, as *Thuya occidentalis* (Oliveira et al, 1997), *Nicotiana Tabacum* (Vidal et al, 1998); *Maytenus ilicifolia* (Oliveira et al, 2000); *Syzygium jambolanum* (Santos et al, 2002); *Mentha crispa L*. (Santos-Filho et al, 2002); *Ginkgo biloba* (Moreno et al, 2002; Moreno et al, 2004); *Stryphnodendron adstringens*(Costa et al, 2002); *Solanum melongena*(Capriles et al, 2002); *Fucus vesiculosus* (Oliveira et al, 2003); *Coffea arabia* (Oliveira et al, 2003) have changed the efficiency of labeling of red blood cells with Tc-99m, concentrations of the extracts of chayote studied by Diré et al, 2002 , when administered *in vitro*, did not interfere significantly in the mechanisms of binding of Tc-99m to blood elements. Similar results were found with cucumber extract, as well as with other results reported in studies with extracts of *Peumus boldus* (Reiniger et al, 1999) and Piper methysticum (Santos-Filho et al, 2002) which not induced change in the marking of blood elements with Tc-99m. Lima et al, 2001, reported that an extract of cauliflower (*Brassica oleracea*) to be administered during the same period of time *in vivo*, was unable to change the labeling of blood constituents with Tc-99m. Depending on the action suggested anti-oxidant of cucumber, one can speculate that this natural product prevents oxidation of ion stannous and consequent reduction of blood labeling the elements. Regarding the anti-carcinogenic action of this natural product, its purported anti-oxidant action could justify the potential use of this natural product in the anti-oncogenic and anti-inflammatory. The globulins are proteins that have lower molecular weight when compared to that of albumin. Neither is related to the transport of substances (Villee et al, 1996; Guyton & Hall, 2006), the change in its quantity and the generation of free radicals that could compete and / or change the sites of the link Tc-99m to plasma proteins, this effect could reduce the determination of Tc-99m to the insoluble fraction of the plasma. With respect to the treatment with the cucumber, was not found radiolabelling change in the efficiency of the plasma proteins.

As described for other drugs (Hladik et al, 1987; Hesslewood & Leung, 1994; Gomes et al, 1998; Mattos et al, 2000; Gomes et al, 2002; Amorim, 2003), the extract of cucumber was unable to change the biodistribution of radiopharmaceutical pertechnetate sodium in blood compartments in *in vitro* testing. Lima et al, 2001, reported that an extract of cauliflower (*Brassica oleracea*) was not able to change the biodistribution of radiopharmaceutical sodium pertechnetate, however Capriles et al, 2002, found that an extract of eggplant (*Solanum melongena*) changed the biodistribution of the radiopharmaceutical, similar results were described by Moreno et al, 2002, in studies with an extract of *Ginkgo biloba* and with an extract of *Punica granatum* (Amorim et al, 2003).

The red blood cell (RBC) is one of the most studied biological structures. We know much more about the membrane of RBC than on any other membrane of eukaryotic cells. The easy availability and easy of storage of red blood cells make them ideal object to search for anyone who can make use of a microscope of good quality (Alberts et al, 1996; Stryer, 1996).

The normal form of red blood cells is only one among the many that they can take when environmental conditions change. It should therefore consider how representing a balance between the properties of the cell and the physical forces that act on it. When any of these forces is changing, for example by changing the molecules adsorbed to the surface membrane or alteration of the membrane, is changing the way promptly. Different types of changes can occur in red blood cells in abnormal physiological conditions. The study of these forms can be an indispensable tool in the diagnosis of different diseases (Oliveira-Lima et al, 1992; Ross et al, 1997; Junqueira & Carneiro, 2004). The main method that reveals the cell types of peripheral blood is the distension of the blood. This method differs from conventional forms of preparation seen in histology laboratories because the sample is not included in paraffin. The careful study of distensions of blood diagnostic data provides very important. It is said that 90% of the conclusions which take the examination cytological are provided by the study of distensions stained. This is therefore the best measure of morphological study of the elements, as well as provide a rough idea of the concentration of hemoglobin and the number of red blood cells, white blood cells and platelets (Oliveira-Lima et al, 1992).

A change of the morphology of RBC by extract of medicinal plant (Oliveira et al, 1997; Vidal et al, 1998; Oliveira et al, 2000; Braga et al, 2000; Diré et al, 2001; Oliveira et al, 2002; Moreno et al, 2002; Oliveira et al, 2003) and possible consequent amendment of the transport of ions stannous and pertechnetate into the RBC could lead to a decrease in the labeling of this structure with Tc-99m. There are many evidences that have shown that the shape of the cell depends on the structural organization of the membrane proteins and proteins adsorbed on its surface (Stryer, 2004). Thus, one could suggest that the

extracts of cucumber here have tested the effect of not change the morphology of red blood cells. Furthermore, *in vitro* studies to extract the smoke (Braga et al, 2000), *Thuya occidentalis* (Braga et al, 2000), *Maytenus ilicifolia*(Oliveira et al, 2000), *Paullinia cupana* (Oliveira et al, 2002), *Ginkgo biloba* (Moreno et al, 2002), Fucus (Oliveira et al, 2003), *Coffea arabica* (Oliveira et al, 2003) have shown a relationship between the change in labeling of red blood cells with Tc-99m and changes in quality in the morphology of red blood cells. In *in vitro* studies conducted with mint (*Mentha crispa*) (Santos-Filho et al, 2002) there was a relationship between the change of labeling red blood cells with Tc-99m and quantitative changes in level of red blood cells in morphology. In quantitative studies conducted *in vitro* with an extract of Kava Kava (*Piper methysticum*) (Santos-Filho et al, 2002) described that despite the morphological changes in red blood cells induced by that statement, there was no change in the labeling of red blood cells with Tc - 99m. Diré et al (2001), in a qualitative study, observed morphological changes in red blood cells of animals treated with chayote for 15 days. These findings could justify the reduction of the labeling of red blood cells with chayote, when used blood samples from animals treated with the extracts of this plant, which was also found morphological change of red blood cells. These findings reinforce the idea that metabolites are generated when the extracts of chayote are administrated to animals instead of water. The analysis of the results which were obtained in an *in vitro* study shows that the biological effects of the extracts of cucumber would be associated with anti-oxidants present in the extract natural product that does not thereby altering the labeling of red blood cells and plasma and cellular proteins with Tc - 99m.

Conclusion

The results allow us to assess that the extract of cucumber presents an anti-oxidant action by not change the radiolabelling *in vitro* of red blood cells and plasma proteins and blood cells isolated from rats and is feasible to suggest that the biological effects attributed to this plant reported in level of popular medicine, supposedly, are related to molecules which are present *in nature* in the constitution of that phytochemical fruit.

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