

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Medical Care for Humans in Space (3)Author: Prof. LUISA GARCIA ROJAS VAZQUEZ  
Mexico, luisagr@gmail.comPHYTOCHEMICALS: CONTRAMEASURE AGAINST OXIDATIVE STRESS IN SPACE RADIATION  
AND MICROGRAVITY EXPOSURE. PROPOSAL.**Abstract**

Radiation levels that humans are exposed at during spaceflights vary from 0.1–1 mGy/day, 100 times higher compared to Earth. Space radiation consists of galactic cosmic radiation (GCR) and solar cosmic radiation (SCR). The main components of GCR are baryons, protons, and alpha particles, and only less than 1% are heavy, high energy particles (HZE) like iron ions, which however mediate the biggest part of radiation received by cells. The main components of SCR are protons. However, SCR does not follow a constant pattern resulting in fluctuating doses of radiation. HZE particles are main space radiation and microgravity have a critical significance in provoking the oxidative stress (OS) response and increased after space flight, finding products such as isoprostanes and 8-iso-deoxyguanosine and lipid peroxidation, that's why important found a contrameasure to decrease OS and one way is through the phytochemicals with antioxidant activity, bioactives non-nutrient, secondary metabolites synthesized by plants contained in fruits, vegetables and grains. Among the phenolic compounds with known antioxidant activity, flavonoids, tannins, chalcones and coumarins as well as phenolic acids are highlighted. Flavonoids are the most potent antioxidants from plants and the activity of these substances is related to the presence of hydroxyl groups in B ring. Moreover, degree tannins polymerization is related to this function. In condensed tannins and hydrolysable of high molecular weight, this activity can be up to fifteen to thirty times superior to those attributed to simple phenols. Chalcones are intermediate in the biosynthesis of flavonoids and most frequently found in foods are chalconaringenin and arbutin (karakaya) Phenolic acids constitute about one third of the phenolic compounds in the human's diet. It is known that these substances and their esters have a high antioxidant activity, especially hydroxybenzoic acid, hydroxycinnamic acid, caffeic acid and chlorogenic acid. All antioxidant activity of phenolic compounds, is defense systems function blocking initial production of free radicals, scavenging the oxidants, converting the oxidants to less toxic compounds, blocking the secondary production of toxic metabolites or inflammatory mediators, blocking the chain propagation of the secondary oxidants, repairing the molecular injury induced by free radicals or enhancing the endogenous antioxidant defense system, so are used against free radicals and oxidative damage. Finally, the proposal to decrease a significant OS response is establish a diet rich in phytochemicals and measure lipid peroxidation through MDA biomarker before, during and after the space flight and compare intervention results.