

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Medical Care for Humans in Space (3)

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FOOD SUPPLEMENTS FOR COUNTERACTING OXIDATIVE DAMAGE

Abstract

Space flight can increase free radical formation, and therefore it is associated with an increase in oxidative stress. This effect is more pronounced after long-duration space flight and lasts for several weeks after landing. Not just astronauts in spaceflight but also airline pilots show hallmarks of oxidative stress. The balance between the production of free radicals and the activity of antioxidants in cells is important for the oxidation state of biomolecules. Therefore, in order to ensure the safety of longer space travels, it is important to supplement the diet with some effective antioxidants to inhibit the increased oxidative stress induced by space flight or microgravity. An improvement in the balance of the oxidant-antioxidant defense system would lessen the severity of any oxidative stress induced during or after space flight.

Forty eight commercially available different over the counter brands of milk thistle extracts were purchased from local markets and analyzed for their chemical constituents using thin layer chromatography (HPTLC) and liquid chromatography/mass spectrometry (LCMS). Major constituents of milk thistle (*Silybum marianum*) extract are flavonolignans complex mixture identified as silymarin and consistent of several major isomers include silibinin, silychristin, silydianin, dehydrosilybin, deoxysilycistin, deoxysilydianin, silandrin, silybinome, silyhermin, neosilyhermin and taxifolin. All products showed great variation in their contents of the silymarin isomers. Identification of the chemical constituents were done based on their chromatographic motilities (R_f t_R) and confirmed by mass spectrometry. The nematode *Caenorhabditis elegans* exposed to microgravity showed oxidative stress which was absent in the presence of silymarin. Antioxidant activities were also evaluated for all of the products using radical scavenging assay with DPPH reagent. Taxifolin one of the minor constituent of the silymarin was found to be the most effective radical scavenging isomer.

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