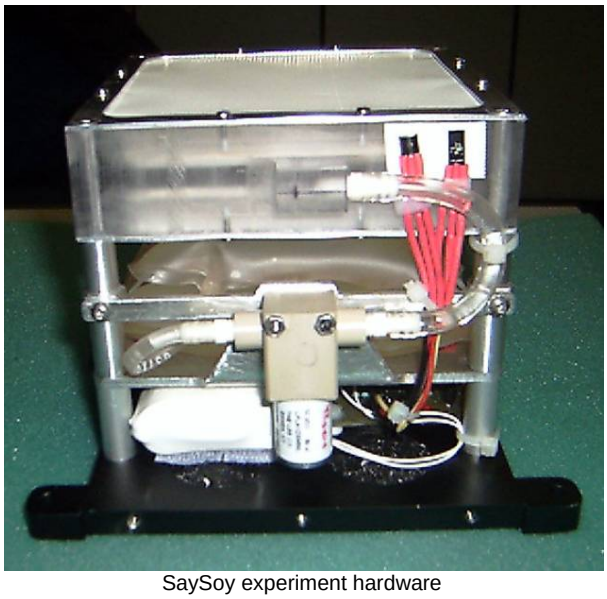
SAY SOY
Space Apparatus to Yield SOYsprouts

The successful development of plants in Space is required in the sight of long-duration missions and permanent orbital stations as they can play an essential role in the establishment of self-sustaining colonies in space through: regeneration of the ambient air of the pressurised modules; recovering of water by transpiration; recycling of liquid waste of the crew; production of fresh food on board to reintegrate crew diet.

The idea proposed herein is to investigate the effect of weightlessness on growth of soy seedlings since their nutritional value, and their beneficial effects on human health, make them suitable for diet integration of astronauts. Soy seedlings can be produced in few days and there is evidence that soy diet protects bones from osteoporosis in women, opposes skeletal muscle atrophy in rats exposed to weightlessness and reduces lipid peroxidation in rat brain.



SaySoy experiment hardware

Weightlessness could affect seedling growth and modify developmental processes, which can influence nutritional value, softness of tissues, food digestibility and, in general, quality of fresh food. In this experiment many aspects related to the correct functionality of the water transport system in plants will be investigated. Indeed the efficiency of water transport system is the base for optimal growth of plants in space as well as on earth.

How is it done?
Sterilised soybean seeds will be placed in an experiment container. Once in orbit the seeds will be automatically watered. After one week, seedlings growth will be stopped through the distribution of organic fixatives.

Following landing the samples will be transferred to the laboratories to be processed for biometry and microscopy analysis according to both traditional and innovative techniques.

Parameters such as germination percent, length of radicle, fresh and dry weights of cotyledons and hypocotyl/root zone will be recorded. Among the produced sprouts, those formed normal looking, succulent, white and unblemished will be selected for further anatomical observations.

Thin sections will be analysed through a combination of techniques: histochemistry, light and fluorescence microscopy, and digital image analysis based on specially devised software programmes. This will provide an objective analysis of anatomical parameters.

Expected Results
Since the sprouts are eaten in an early stage of growth, it is expected that weightlessness does not affect vascular differentiation and storage metabolism in a way to lower nutritional value and softness of tissues.

It is expected that soy sprouts can be produced in few days in weightlessness in the sight of long-duration missions and permanent orbital stations, the injection of water being the only operation required to be performed by the crew.

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