Potatoes in space

Is it really possible to grow potatoes on Mars? (photo 20th Century Fox).

When I opened my newspaper this morning a picture of the first plant flowering in ISS (International Space Station) was shown. Last august astronauts were already eating the first space grown Red Romaine lettuce in the same space station. Growing plants in space is becoming popular, how about potatoes?

If you believe movies, it is possible to grow potatoes on Mars. In the motion picture the Martian, the main character survives on Mars on potatoes grown in the soil mixed with his own excrements and water distilled from the atmosphere. The potato plants in the picture are not looking very vigorous but the lonely astronaut can survive on them. Is it really possible to grow potatoes on Mars?

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I have visited different fact checking sites to see what they say about this. The biggest problem is going to be perchlorates in de soil, a salt that is hazardous for the human body, but fortunately they can be washed out with water. In Martian soils water seeps too quickly through the soil and also has no nutrients like soil on earth. That is solved by mixing the soil with poop. For a science fiction movie, the fact that potatoes can be grown on Mars is made sufficiently realistic.

Two months after the movie, NASA and the international potato center in Peru (CIP) announced that they would start experiments to grow potatoes under Martian conditions. They argue that this research is a major step towards building a controlled dome on Mars, capable of farming the valuable crop in order to demonstrate that potatoes can be grown in the most inhospitable environments. When you read further they explain that they are going to conduct experiments with soils sourced from the Pampas de La Joya Desert in Peru which are supposed to mimic Martian soils and they are going to replicate the Martian atmosphere which has a carbon dioxide percentage of 95%.

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In the past, NASA already funded potato research. During the last two decades of the last century research by e.g. Wheeler and Tibbits was done on life support systems in space based on potato. They even sent potato leaves up in the space shuttle to study tube formation at auxiliary buds. They developed a hydroponics system, succeeded to grow potatoes under continuous daylight, found a CO_2 optimum of 1000 µmol mol^{-1} (~10%) and reached a yield of 19.7 kg FM per square meter.

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Are we growing potatoes in a space station now ? No, but the studies did deliver a lot of knowledge that is used to improve potato production. And that's the value of these kind of studies. I guess we won't grow potatoes on Mars for the next decades, but the studies will teach us how to grow crops in less favorable soils and therefore improve the food situation for a considerable number of people.
So even when we study potatoes for production in space the real results are found where potatoes feel best. Down to earth in the dirt.

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