ISS: BENEFITS FOR HUMANITY

From

NASA TO NAPA

1
00:00:20,390 --> 00:00:18,470
as farmers and winemakers we work very

2
00:00:23,590 --> 00:00:20,400
hard to grow the best quality fruit

3
00:00:24,870 --> 00:00:23,600
possible to make the best wines possible

4
00:00:26,550 --> 00:00:24,880
the real

5
00:00:28,550 --> 00:00:26,560
polished part of wine making is letting

6
00:00:30,550 --> 00:00:28,560
that wine age gracefully so those

7
00:00:32,870 --> 00:00:30,560
flavors can be preserved and brought to

8
00:00:34,790 --> 00:00:32,880
your home and to enjoy in the glass the

9
00:00:36,709 --> 00:00:34,800
greatest issues we face as wine makers

10
00:00:39,110 --> 00:00:36,719
is that our optimal storage conditions

11
00:00:41,590 --> 00:00:39,120
for our wines are also optimal growth

12
00:00:43,910 --> 00:00:41,600
conditions for mold and bacteria mold is

13
00:00:44,869 --> 00:00:43,920

really bad in a barrel room or in a

14
00:00:47,350 --> 00:00:44,879
cellar

15
00:00:49,350 --> 00:00:47,360
because it has an odor to it

16
00:00:51,350 --> 00:00:49,360
and the wines are a living breathing

17
00:00:54,069 --> 00:00:51,360
thing and actually

18
00:00:56,150 --> 00:00:54,079
they pick up the characters

19
00:00:58,389 --> 00:00:56,160
of where they're living the wines absorb

20
00:00:59,910 --> 00:00:58,399
that aroma and it's just not a healthy

21
00:01:01,910 --> 00:00:59,920
environment to work in

22
00:01:03,270 --> 00:01:01,920
my father and i built this barrel room

23
00:01:05,590 --> 00:01:03,280
underground

24
00:01:07,670 --> 00:01:05,600
the challenge is we've got some stagnant

25
00:01:09,590 --> 00:01:07,680
air which can cause mold growth

26
00:01:12,950 --> 00:01:09,600
who knew that our solution would be not

27
00:01:15,190 --> 00:01:12,960
underground but up in the sky

28
00:01:17,830 --> 00:01:15,200
in order to carry astronauts to

29
00:01:19,830 --> 00:01:17,840
mars for deep space exploration you have

30
00:01:21,670 --> 00:01:19,840
to be able to grow your food storage you

31
00:01:23,670 --> 00:01:21,680
don't have enough space and capacity to

32
00:01:25,510 --> 00:01:23,680
carry them with you so nasa began

33
00:01:26,469 --> 00:01:25,520
experimenting with growing crops in

34
00:01:28,710 --> 00:01:26,479
space

35
00:01:30,630 --> 00:01:28,720
what they found is that in the growing

36
00:01:31,670 --> 00:01:30,640
chambers on the international space

37
00:01:33,270 --> 00:01:31,680
station

38
00:01:35,670 --> 00:01:33,280

the crops they were growing were

39
00:01:38,630 --> 00:01:35,680
emitting a naturally occurring hormone

40
00:01:40,710 --> 00:01:38,640
called ethylene it's a gas and ethylene

41
00:01:41,749 --> 00:01:40,720
is the reason that fruits and vegetables

42
00:01:43,350 --> 00:01:41,759
ripen

43
00:01:45,190 --> 00:01:43,360
but the problem was in space we're going

44
00:01:47,670 --> 00:01:45,200
to have a very confined environment so

45
00:01:49,990 --> 00:01:47,680
the ethylene concentration can build up

46
00:01:51,429 --> 00:01:50,000
especially in a plant growth chamber it

47
00:01:53,109 --> 00:01:51,439
basically

48
00:01:55,590 --> 00:01:53,119
destroys the plant

49
00:01:57,429 --> 00:01:55,600
and so there was a need to grow plants

50
00:01:59,350 --> 00:01:57,439
in space and we were good at

51
00:02:01,830 --> 00:01:59,360
growing plants here at the university of

52
00:02:03,749 --> 00:02:01,840
wisconsin and so nasa came to us and and

53
00:02:06,230 --> 00:02:03,759
says we've got a problem i think you've

54
00:02:08,150 --> 00:02:06,240
got a solution can you help us

55
00:02:10,229 --> 00:02:08,160
through the university of wisconsin

56
00:02:12,550 --> 00:02:10,239
advanced astro culture program they

57
00:02:14,949 --> 00:02:12,560
developed an ethylene removal system

58
00:02:16,790 --> 00:02:14,959
that was successfully tested on a number

59
00:02:18,309 --> 00:02:16,800
of missions on the international space

60
00:02:20,309 --> 00:02:18,319
station

61
00:02:22,869 --> 00:02:20,319
so the ethylene removal system that was

62
00:02:25,190 --> 00:02:22,879
developed draws air through a reaction

63
00:02:27,510 --> 00:02:25,200

chamber the air is passed across a

64
00:02:29,830 --> 00:02:27,520
catalyst bed and that catalyst has the

65
00:02:33,190 --> 00:02:29,840
effect of removing anything organic from

66
00:02:34,830 --> 00:02:33,200
the air that includes mycotoxins

67
00:02:37,350 --> 00:02:34,840
bacteria

68
00:02:38,949 --> 00:02:37,360
viruses and even mold

69
00:02:40,949 --> 00:02:38,959
it showed us that with the right

70
00:02:43,110 --> 00:02:40,959
technology we can overcome the

71
00:02:45,110 --> 00:02:43,120
challenges of growing plants in space

72
00:02:47,350 --> 00:02:45,120
and enable future space explorers to

73
00:02:48,830 --> 00:02:47,360
grow their own food as they continue to

74
00:02:51,350 --> 00:02:48,840
explore the solar

75
00:02:54,150 --> 00:02:51,360
system the international space station

76
00:02:56,309 --> 00:02:54,160
program not only supports the technology

77
00:02:58,149 --> 00:02:56,319
that allowed us to get rid of ethylene

78
00:03:01,270 --> 00:02:58,159
in the space station astroculture

79
00:03:03,670 --> 00:03:01,280
program but it also provides a

80
00:03:05,270 --> 00:03:03,680
great variety of technologies to exist

81
00:03:07,430 --> 00:03:05,280
that otherwise wouldn't have been

82
00:03:09,110 --> 00:03:07,440
possible

83
00:03:11,350 --> 00:03:09,120
realizing that this technology could

84
00:03:13,670 --> 00:03:11,360
have tremendous benefits here on earth

85
00:03:15,509 --> 00:03:13,680
we developed the aeroside air

86
00:03:17,670 --> 00:03:15,519
purification systems

87
00:03:19,670 --> 00:03:17,680
initially used in the perishables world

88
00:03:22,309 --> 00:03:19,680

for prolonging the shelf life of fruits

89
00:03:24,630 --> 00:03:22,319
and vegetables not long after that we

90
00:03:27,190 --> 00:03:24,640
realized because of the the effects the

91
00:03:28,949 --> 00:03:27,200
technology has on mold that the wine

92
00:03:37,910 --> 00:03:28,959
industry was a perfect complement for

93
00:03:42,229 --> 00:03:39,990
this technology has been a real boon to

94
00:03:43,750 --> 00:03:42,239
us it helps me sleep better at night but

95
00:03:46,149 --> 00:03:43,760
as you can see around the cellar there's

96
00:03:47,670 --> 00:03:46,159
not a lot of mold within 24 hours the

97
00:03:50,229 --> 00:03:47,680
amount of airborne mold spores were

98
00:03:53,030 --> 00:03:50,239
dramatically reduced within two weeks

99
00:03:55,670 --> 00:03:53,040
about 99.9 percent of the mold had

100
00:03:57,990 --> 00:03:55,680
vanished on the walls it solves problems

101
00:04:01,429 --> 00:03:58,000
before they occur the room smelled

102
00:04:04,070 --> 00:04:01,439
fresher it actually enhances

103
00:04:05,429 --> 00:04:04,080
your storage conditions for ut to make

104
00:04:07,030 --> 00:04:05,439
better wine

105
00:04:09,190 --> 00:04:07,040
it's really amazing when you think about

106
00:04:10,470 --> 00:04:09,200
all the innovations that are going on up

107
00:04:12,229 --> 00:04:10,480
in space

108
00:04:14,789 --> 00:04:12,239
how they can come into a place as