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1. As part of the evaluation of the vacuum probe as a surface sampler for microbial contamination, tests were conducted with several pure bacterial cultures to determine if differences existed in the ability of specific types to withstand impaction and subsequent exposure to airflow on the membrane filter. The test procedure involved preparation of the inoculum by growing each culture on Trypticase Soy Agar (TSA) for 24 hours, harvesting, washing, insonating and diluting the suspension in sterile buffered distilled water to the desired concentration. One-ml portions of each suspension were plated in quintuplicate with TSA. Each of fifteen 1-ml portions was dispersed in approximately 10 ml of sterile distilled water and drawn through membrane filters. Five filters were immediately placed on solidified TSA. The remaining 10 filters were air dried for 20 minutes at which time 5 filters were placed on TSA and the remaining 5 were placed in individual filter holders set up in a horizontal laminar flow clean bench. Air was drawn through these filters for 10 minutes at a velocity comparable to that in the vacuum probe. At the end of this airflow exposure the filters were placed on TSA and all 15 filters as well as the 5 pour plates were incubated at 32 C for 48 hours. Colony counts were made and the mean value for each type of microorganism was calculated and compared to determine the effect of each procedure on the bacterial population. Table 1 presents these data by expressing the mean bacterial count surviving each procedure as a percentage of the population exposed to that procedure. While the effects of filtration and drying on these bacterial types are of interest, the possible effect of the vacuum probe on survival was perhaps best judged by the populations surviving exposure to 10 minutes of airflow, since microorganisms usually enter the probe in an air-dried state. It was evident that great variations existed between bacterial types in the abilities to survive exposure to airflow on a membrane filter. The 94% survival by vegetative cells of Bacillus subtilis var. niger exposed to airflow after showing a large degree of sensitivity to filtration and air drying may have resulted from the presence of a small (approximately 1 - 3%) fraction of spores in the inoculum. Staphylococcus aureus and Streptococcus faecium showed good survival after exposure to the airflow and the gram negative bacteria, Escherichia coli and Pseudomonas alcaligenes, were most sensitive to airflow. More extensive studies which will include other microorganisms and will more closely simulate the deposition of organisms as it occurs in the vacuum probe are planned.

2. Studies on the effects of subculture on the dry heat resistances of bacterial spores associated with spacecraft were continued. As reported earlier (Report No. 23), D_{125C} values of certain isolates varied depending upon the sporulation medium employed. Accordingly, a supplemented TSA recovery medium was compared to the standard recovery medium to observe possible differences in D_{125C} values and/or total recovery of selected spore crops exposed to dry heat.

   Several isolates from soil and spacecraft have shown survivor curves with "shoulders" indicating that most of the initial spore population required heat activation for maximum germination. During a routine

survival test of one such spore crop, the recovery medium (TSA) was supplemented with 0.2% yeast extract and 0.1% soluble starch (added before autoclaving). Subsequent colony counts were higher and countable colonies appeared earlier than usual. Further investigation of this supplemented medium and its possible effects on total recovery of heat injured spores and on D-values was indicated. Duplicate strips, each inoculated with 0.05 ml of an ethanol suspension of spores, were suspended in a forced air oven at 125 C in the usual manner (Report No. 19) at each of three time intervals. Strips were removed from the oven and placed in 10 ml of buffered distilled water and insonated for 12 minutes in an ultrasonic bath. The resulting suspension was diluted appropriately and plated in triplicate with TSA and supplemented TSA. Mean plate counts of individual strips at each time interval were compared and subjected to a t-test for significant differences in recovery between the two media. Results are shown in Table 2. Of the three spore crops tested, all mean plate counts with the supplemented TSA recovery medium were higher than those of the unsupplemented TSA. However, highest increases (9:5 - 14.0:1) in recovery occurred with the unheated controls of the two crops of isolate G-2. All increases were statistically significant ($p < .01$) with the exception of isolate CK-4 (TAM), Test 2 at 120 minutes.

In another experiment triplicate strips of each spore crop were suspended in the forced air oven at each of six time intervals, processed as usual (Report No. 19), and were plated in triplicate with both TSA and supplemented TSA. Survivor curves are shown in Figures 1, 2, and 3. Even though supplemented TSA showed a higher degree of recovery than TSA there was no accompanying alteration in D_{125C} values. It was concluded from these data that TSA supplemented with yeast extract and soluble starch was a superior recovery medium for the three spore crops tested when compared to unsupplemented TSA. Preliminary indications were that the starch and yeast extract of the supplemented medium might have played a role in satisfying a portion of the "heat activation requirement" of each unheated control suspension. However, since "shoulders" also were present in the initial portions of survivor curves obtained with supplemented TSA, it appeared that at least two factors were responsible for the differences in recovery. The primary one seemed to be a requirement for "heat activation" of spores for maximum germination. This was most noticeable in the unheated control suspensions. The second factor appeared to be a nutritional requirement which was responsible for the differences in recovery in the middle and terminal portions of the survivor curves.

3. A method to obtain naturally occurring spore populations in quantity from flight spacecraft environments was devised employing the vacuum probe (Report Nos. 21, 22, and 23). Previous attempts to obtain these populations by the ethanol-soil suspension method (Report No. 19) using dust from a general maintenance vacuum cleaner in the MSOB were unsuccessful because viable spore counts of the resultant suspensions were too low, even after concentration, for valid heat survivor tests. Prefilters on two laminar flow clean benches at the Phoenix Laboratories were vacuumed with a single probe. The mass of dust collected was suspended in 400 ml of 95% ethanol in a 500 ml beaker and insonated in an

ultrasonic bath for 30 minutes to break up clumps of dust and spores. The resulting suspension was filtered through a sterile linen towel to remove larger particles, centrifuged, and resuspended in 40 ml of 95% ethanol. Subsequent viable counts showed 3.2×10^5 spores/ml. Preliminary tests indicated that dry heat survivor curves of this suspension were diphasic. During the next quarter, dry heat survivor tests will be performed using naturally occurring spore populations obtained in the above manner from filters in spacecraft environments at Cape Kennedy. Spore isolates obtained from naturally occurring spore populations exhibiting relatively high degrees of heat resistance will be studied in an attempt to determine the maximum D_{125C} values of bacterial spores which would be potential contaminants on spacecraft. In addition, efforts will be made to obtain a frequency distribution of D_{125C} values of spores isolated directly from spacecraft in residence at Cape Kennedy.

4. At the request of the Planetary Quarantine Officer, NASA, efforts are being made to produce a standard spore crop of B. subtilis var. niger which will be made available to investigators doing research on dry heat and recovery. Since a relatively large mass will be needed a liquid sporulation medium was considered necessary. A. Irons (personal communication) found that a liquid medium described by Lazzarini and Santangelo (J. Bacteriol. 94:125-130) was the best among several tested for optimum sporulation of B. subtilis var. niger. Preliminary tests in this laboratory have confirmed this observation and the medium will be used to produce the standard spore crop. Details of this technique will be described in the next report.

5. The Apollo 7 (CSM-101) and 8 (CSM-103) spacecraft were sampled for microbial contamination while at the Manned Spacecraft Operations Building (MSOB) and at Launch Complex 34 (Apollo 7) and Complex 39A (Apollo 8). The levels of microbial contamination present on both command modules (C/M) are presented in Table 3. There were approximately ten times as many aerobic spores on the Apollo 7 C/M in the MSOB than at Launch Complex 34, while the level of aerobic mesophilic microorganisms remained essentially the same. Contamination levels for the Apollo 8 C/M remained basically the same throughout the study period except for the last sampling, 7 days prior to launch, when the USPHS man was not allowed inside of the C/M and the swab samples were taken by non-biologically trained personnel. A seven-fold increase in contamination was observed at this time, but no definite conclusion could be made because of good possibility of a technique induced artifact. These results clearly show the need for samples to be taken by microbiologically trained and qualified personnel if consistent and reliable results are desired.

   Because of the high probability of lunar impact, the level of microbial contamination on the Instrument Unit (IU) and the Saturn S-4B engine (Table 4) was determined at F-14 and F-7 days (14 and 7 days prior to launch). Studies were initiated on the C/M (CSM-104) of the Apollo 9 spacecraft (Table 5). An increase in surface contamination occurred during its stay in the Vehicle Assembly Building. This was the first opportunity in which an Apollo spacecraft could be studied in all of the intramural environments to which is was exposed during assembly and testing; i.e., the Manned Spacecraft Operations Building (MSOB), the

Vehicle Assembly Building (VAB) and Launch Complex 39A. The Apollo 7 spacecraft did not go to the VAB and Apollo 8 was moved to the VAB, but did not remain in that environment long enough to be examined.

Studies were continued on the Lunar Module 3 (LM-3) and initiated on the Lunar Module 4 (LM-4). The levels of microbial contamination in the interior of the LM-3 remained relatively stable during the sampling period. A decrease in counts was noted on 11/29/68, five days after the LM-3 was enclosed in the Spacecraft Lunar Module Adapter (SLA) (Table 6). The contamination level on the exterior surfaces of the LM-3 ascent stage remained fairly constant. The descent stage showed some variation in the contamination levels at different sampling periods. Both ascent and descent stages showed increases in the aerobic spore level after being enclosed in the SLA for five days (Table 7).

The number and percentage of molds detected on the interior surfaces of the command modules, CSM-101, CSM-103 and CSM-104, are shown in Table 8. The level of mold contamination on the three command modules was relatively low. Similar results were obtained from the interior and exterior surfaces of the LM-3 (Table 9), where the interior surfaces of the ascent stage contained lower levels than those found on the exterior surfaces of the ascent and descent stages. These results may have been due to the use of filtered air, and the employment of clean room procedures in the LM-3 cabin.

The types of aerobic mesophilic microorganisms isolated from the command modules of Apollo 7 (CSM-101) and 8 (CSM-103) and the Lunar Module 3 are shown in Tables 10 and 11. Most of the contaminants were Staphylococcus spp. and Micrococcus spp. (ca. 87%). Aerobic sporeformers (Bacillus spp.) accounted for 3 - 6% of the population.

Studies were initiated on the Apollo 10 spacecraft. This includes the command module (CSM-106) and the Lunar Module 4 (LM-4). The field evaluation of the Sandia vacuum probe is being continued. The USPHS Mobile Laboratory has been given, on loan, to the Jet Propulsion Laboratory personnel for conducting their microbiological studies of the Mariner 69 spacecraft.

The study to determine if extended incubation would increase the recovery of molds from the surfaces of space hardware (Report No. 23) has been completed. Swab samples taken from various Apollo spacecraft were assayed according to NASA Standard Procedures for the Microbiological Assay of Space Hardware, and incubated at 32 C for 21 days. Colony counts on TSA were performed at 3, 7, 14 and 21 days. The results are shown on Table 12. From a total of 362 culture plates, selected from 12 sampling periods, only 6 plates showed an increase in mold colonies. This increase was only one mold colony in each of the 6 culture plates. These results indicate that there was no significant increase in the number of mold colonies after 72 hours of incubation at 32 C.

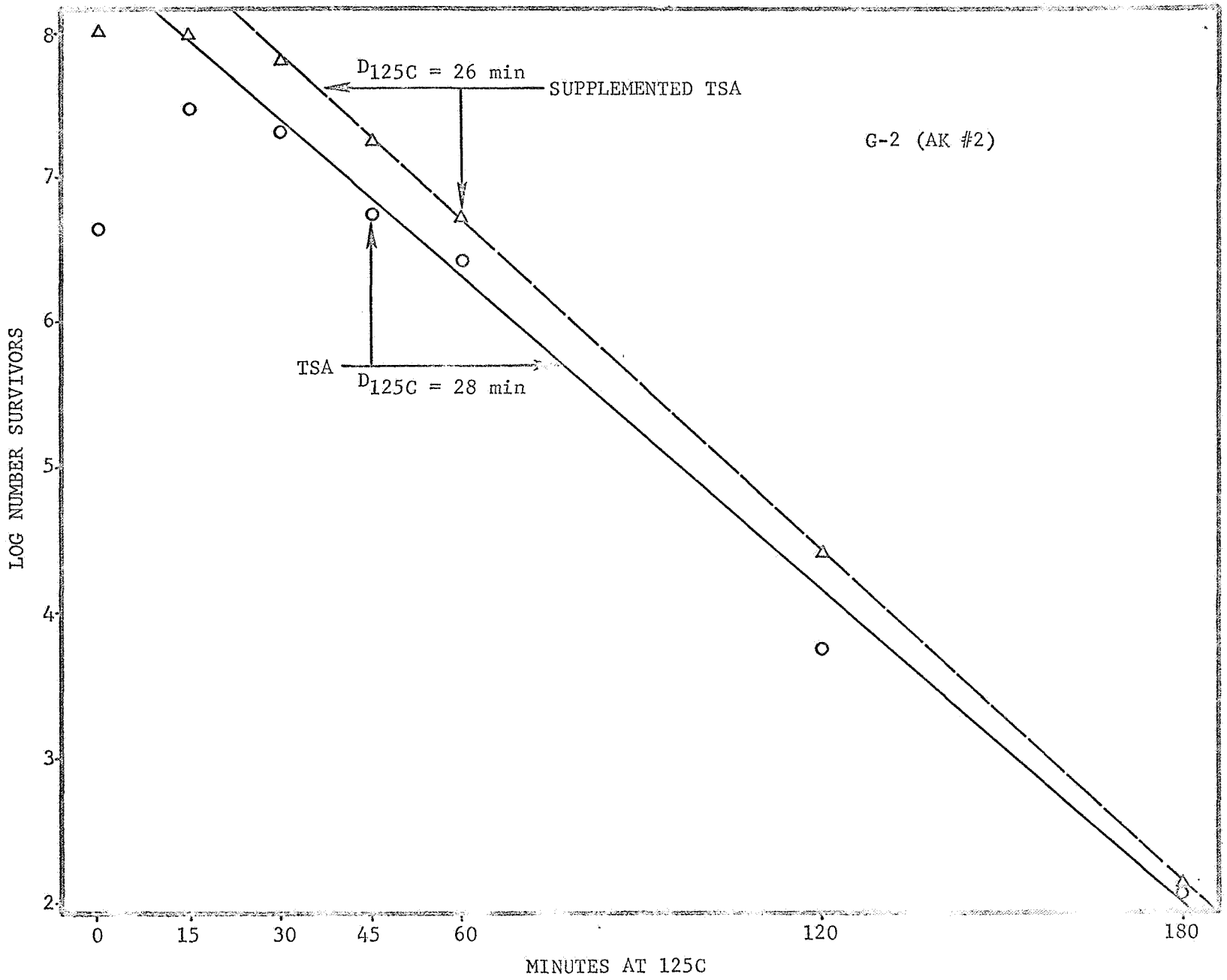

FIGURE 1. COMPARATIVE DRY HEAT SURVIVOR CURVES OF SPORE ISOLATE G-2 SPORULATED ON AK #2 AND WITH TSA AND SUPPLEMENTED TSA.

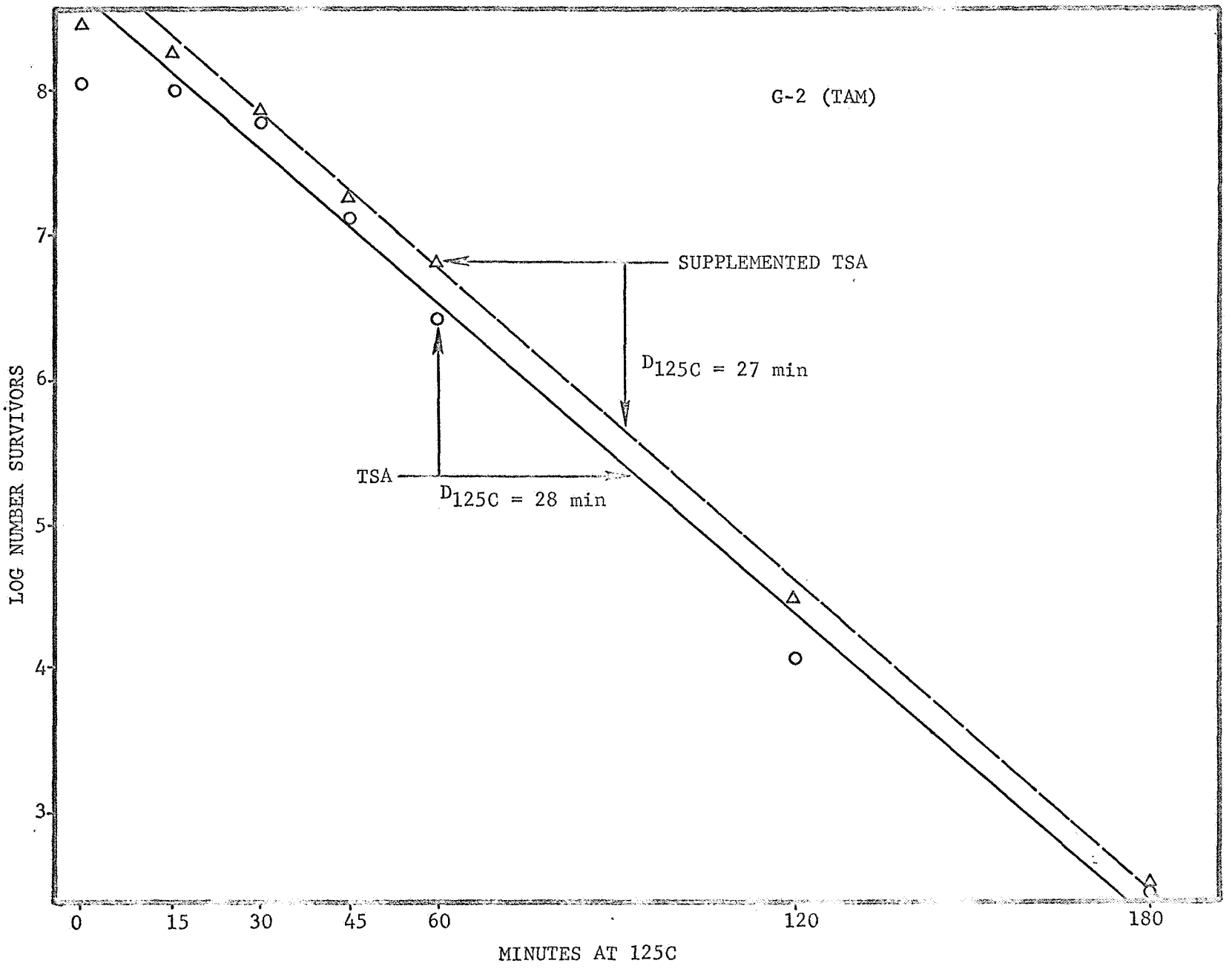

FIGURE 2. COMPARATIVE DRY HEAT SURVIVOR CURVES OF SPORE ISOLATE G-2 SPORULATED ON TAM AND RECOVERED WITH TSA AND SUPPLEMENTED TSA.

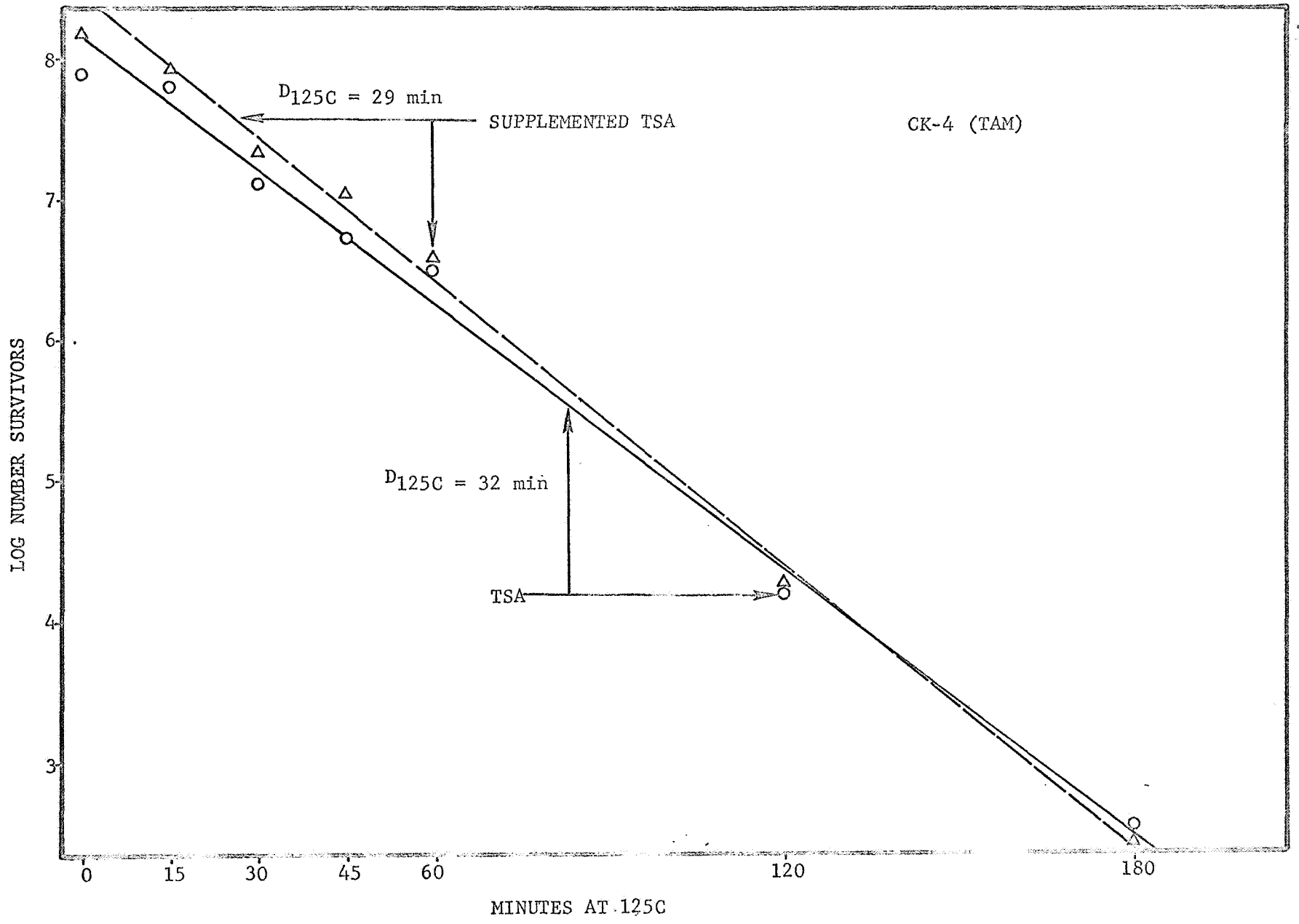

FIGURE 3. COMPARATIVE DRY HEAT SURVIVOR CURVES OF SPORE ISOLATE CK-4 SPORULATED ON TAM AND RECOVERED WITH TSA AND SUPPLEMENTED TSA.

TABLE 1. SURVIVAL OF VARIOUS TYPES OF BACTERIAL POPULATIONS EXPOSED TO FILTRATION, DRYING AND AIRFLOW.

Organism	No. of tests	% surviving filtration	% surviving drying	% surviving airflow
Bacillus subtilis var. *niger* (vegetative cells)	2	10	50	94
Staphylococcus aureus	2	93	94	84
Escherichia coli	1	41	56	0
Streptococcus faecium	1	100	94	100
Pseudomonas alcaligenes	1	76	30	0

TABLE 2. COMPARATIVE RECOVERY OF SPORES BY TSA AND TSA SUPPLEMENTED WITH 0.2% YEAST EXTRACT AND 0.1% SOLUBLE STARCH.

Min. of Exposure to 125 C	Test	Ratio of colony counts. Supplemented TSA:TSA		
		Isolate G-2 (AK #2)[1]	Isolate G-2 (TAM)[2]	Isolate CK-4 (TAM)
0	1	12.8:1	14.0:1	2.4:1
	2	9.5:1	13.2:1	2.1:1
30	1	2.5:1	4.2:1	1.8:1
	2	2.5:1	4.2:1	2.2:1
60	1	2.4:1	3.2:1	2.5:1
	2	2.3:1	3.3:1	2.2:1
120	1	2.3:1	2.8:1	2.1:1[3]
	2	2.3:1	2.8:1	1.5:1[3]

[1]Sporulated on AK Medium #2 (BBL) supplemented with 80 ppm calcium chloride and 20 ppm magnesium sulfate.

[2]Sporulated on TAM Sporulation Agar (Difco) supplemented with 80 ppm calcium chloride and 20 ppm magnesium sulfate.

[3]With the exception of this result all differences were statistically significant; $P < .01$.

TABLE 3. MICROBIAL CONTAMINATION DETECTED ON APOLLO COMMAND MODULES 7 (CSM-101) AND 8 (CSM-103).

Source	Date Sampled	Area Sampled[1] (Sq. In.)	Microorganisms Per Square Foot			
			Aerobes	Anaerobes	Aerobic Spores	Anaerobic Spores
Command Module (CSM-101)	6-06-68[2]	120	12,306	5,897	36	30
	6-27-68[3]	120	17,562	4,914	12	12
	8-19-68[3]	120	27,066	5,376	408	30
	9-20-68[3]	120	19,296	7,920	163	48
	10-04-68[3]	120	26,928	4,982	324	55
Command Module (CSM-103)	8-23-68[2]	120	7,502	4,867	127	6
	9-06-68[2]	112	9,418	3,629	52	26
	9-18-68[2]	108	27,245	13,838	134	13
	10-02-68[2]	116	11,765	3,658	49	19
	10-16-68[4]	116	12,643	4,522	43	6
	11-05-68[4]	108	31,680	9,720	99	40
	11-22-68[4]	112	25,200	8,237	58	0
	12-03-68[5]	56	15,120	5,241	232	65
	12-14-68[5]	48	109,008	8,942	120	0

[1]Swab-rinse technique.

[2]Samples taken from interior surfaces while located in the Manned Spacecraft Operations Building (MSOB).

[3]Samples taken from interior surfaces while located at Launch Complex 34.

[4]Samples taken from interior surfaces while located at Launch Complex 39A.

[5]Final samples taken by engineering technicians at Launch Complex 39A, seven days prior to launch.

TABLE 4. MICROBIAL CONTAMINATION DETECTED ON THE INTERIOR SURFACES OF THE INSTRUMENT UNIT (I.U.) AND THE SATURN S-4B (THIRD STAGES).

Source	Date Sampled	Area Sampled[1] (Sq. In.)	Microorganisms Per Square Foot				Percent[2]	
			Aerobes	Anaerobes	Aerobic Spores	Anaerobic Spores	Aerobic Spores	Molds
Instrument Unit[3]	12-03-68	56	17,352	3,902	1,051	389	6.1	3.5
	12-13-68	60	93,485	12,802	1,469	302	1.6	1.1
S-4B[3]	12-03-68	56	42,825	20,030	1,570	374	3.6	0.7
	12-13-68	40	131,746	20,952	1,454	274	1.1	0.6

[1]Swab-rinse technique.

[2]Percentage of total aerobic mesophilic microorganisms.

[3]Samples taken from interior surfaces while located at Launch Complex 39A.

TABLE 5. MICROBIAL CONTAMINATION DETECTED ON THE APOLLO 9 COMMAND MODULE (CSM-104).

Source	Date Sampled	Area Sampled[1] (Sq. In.)	Microorganisms Per Square Foot			
			Aerobes	Anaerobes	Aerobic Spores	Anaerobic Spores
Command Module (CSM-104)	10-29-68[2]	108	12,053	3,845	158	43
	11-14-68[2]	104	18,086	5,484	27	14
	11-26-68[2]	120	11,865	7,747	24	30
	12-19-68[3]	56	52,949	19,872	115	0

[1]Swab-rinse technique.

[2]Samples taken from the interior of Command Module while located in the Manned Spacecraft Operations Building (MSOB).

[3]Samples taken from the interior of Command Module while located in the Vehicle Assembly Building (VAB).

TABLE 6. MICROBIAL CONTAMINATION DETECTED ON THE INTERIOR SURFACES OF THE LUNAR MODULE 3 (LM-3) AND LUNAR MODULE 4 (LM-4).

Source	Date Sampled	Area Sampled[1] (Sq. In.)	Microorganisms Per Sq. Ft.		Percent[2] Spores
			Aerobes	Aerobic Spores	
Lunar Module 3	9-13-68[3]	92	82,987	157	0.2
	9-24-68[3]	92	54,187	94	0.2
	10-10-68[3]	100	57,744	151	0.3
	11-29-68[4]	112	17,654	86	0.49
	12-20-68[5]	116	61,603	173	0.28
Lunar Module 4	10-22-68[3]	104	29,246	144	0.5
	11-15-68[3]	100	41,674	172	0.41

[1]Swab-rinse technique.

[2]Percentage of total aerobic mesophilic microorganisms.

[3]Samples taken while Lunar Module was located in the Manned Spacecraft Operations Building (MSOB).

[4]Samples taken five days after LM-3 was placed in the Spacecraft Lunar Module Adapter (SLA).

[5]Samples taken while LM-3 was located in the Vehicle Assembly Building (VAB).

TABLE 7. LEVELS OF MICROBIAL CONTAMINATION DETECTED ON THE EXTERIOR SURFACES OF THE LUNAR MODULE 3 (LM-3) AND LUNAR MODULE 4 (LM-4) ASCENT AND DESCENT STAGES.

Source	Date Sampled	Area Sampled[1] (Sq. In.)	Microorganisms Per Sq. Ft. Aerobic	Microorganisms Per Sq. Ft. Aerobic Spores	Percent[2] Spores
Lunar Module 3 Ascent Stage	9-13-68[3]	120	15,293	379	2.5
	9-26-68[3]	116	13,579	266	2.0
	10-09-68[3]	120	11,722	72	0.6
	11-29-68[4]	120	21,096	475	2.3
	12-19-68[5]	120	10,570	30	0.3
Lunar Module 3 Descent Stage	9-13-68[3]	104	15,350	187	1.2
	9-26-68[3]	104	47,246	346	0.7
	10-09-68[3]	120	8,323	158	1.9
	11-29-68[4]	48	33,120	965	2.9
	12-19-68[5]	48	19,598	60	0.3
Lunar Module 4 Ascent Stage	10-22-68[3]	120	16,099	187	1.2
	11-05-68[3]	116	65,362	245	0.4
	11-18-68[3]	120	6,552	96	1.5
Lunar Module 4 Descent Stage	10-22-68[3]	116	3,283	115	3.4
	11-05-68[3]	100	41,760	187	0.4

[1]Swab-rinse technique.

[2]Percentage of total aerobic mesophilic microorganisms.

[3]Samples taken while Lunar Module was located in the Manned Spacecraft Operations Building (MSOB).

[4]Samples taken five days after LM-3 was placed in the Spacecraft Lunar Module Adapter (SLA).

[5]Samples taken while LM-3 was located in the Vehicle Assembly Building (VAB).

TABLE 8. MOLD CONTAMINATION DETECTED ON SURFACES OF THE APOLLO COMMAND MODULES 7 (CSM-101), 8 (CSM-103) AND 9 (CSM-104).

Source	Sample Number	Date Sampled	Area Sampled[1] (Sq. In.)	Number Per Sq. In.	Percent[2]
Apollo 7 (CSM-101)	1	6-06-68	120	0.04	0.08
	2	6-27-68	120	0.00	0.00
	3	8-19-68	120	0.33	0.18
	4	9-20-68	120	0.17	0.12
	5	10-04-68	120	0.21	0.11
Apollo 8 (CSM-103)	1	8-23-68	120	0.04	0.08
	2	9-06-68	112	0.31	0.05
	3	9-18-68	108	0.36	0.19
	4	10-02-68	116	0.22	0.27
	5	10-16-68	116	0.04	0.05
	6	11-05-68	108	0.14	0.06
	7	11-22-68	112	0.13	0.07
	8	12-03-68	56	0.18	0.17
	9	12-14-68	48	0.00	0.00
Apollo 9 (CSM-104)	1	10-29-68	108	0.14	0.17
	2	11-14-68	104	0.05	0.04
	3	11-26-68	120	0.17	0.20
	4	12-19-68	56	0.18	0.05

[1]Swab-rinse technique.

[2]Percentage of total aerobic mesophilic microorganisms.

TABLE 9. MOLD CONTAMINATION DETECTED ON SURFACES OF THE APOLLO LUNAR MODULE 3 (LM-3).

Source	Sample Number	Date Sampled	Area Sampled[1] (Sq. In.)	Number Per Sq. In.	Percent[2]
Ascent Stage (Interior)	1	9-13-68	92	0.00	0.00
	2	9-24-68	92	0.22	0.06
	3	10-10-68	100	0.40	0.10
	4	11-29-68	112	0.18	0.15
	5	12-20-68	116	0.26	0.06
Ascent Stage (Exterior)	1	9-13-68	120	16.50	15.58
	2	9-26-68	116	0.17	0.18
	3	10-09-68	120	0.38	0.47
	4	11-29-68	120	3.10	2.10
	5	12-19-68	120	0.17	0.20
Descent Stage (Exterior)	1	9-13-68	104	2.02	1.90
	2	9-26-68	104	1.15	0.35
	3	10-09-68	120	0.33	0.57
	4	11-29-68	48	2.80	1.20
	5	12-19-68	48	1.40	1.00

[1]Swab-rinse technique.

[2]Percentage of total aerobic mesophilic microorganisms.

TABLE 10. TYPES OF AEROBIC MESOPHILIC MICROORGANISMS ISOLATED FROM THE APOLLO COMMAND MODULES 7 (CSM-101) AND 8 (CSM-103).

Microorganisms	(Interior) No.	%	(Interior) No.	%	Total No.	%
Staphylococcus epidermidis	230	38.3	155	33.3	385	36.2
Staphylococcus aureus	8	1.3	3	0.6	11	1.0
Micrococcus spp.	283	47.2	257	55.4	540	50.7
Corynebacterium Brevibacterium Group	14	2.3	12	2.6	26	2.4
Miscellaneous Gram negative rods	3	0.5	1	0.2	4	0.4
Bacillus spp.	33	5.5	13	2.8	46	4.3
Molds	11	1.9	7	1.5	18	1.7
Sarcina spp.	1	0.2	1	0.2	2	0.2
Graffkya spp.	12	2.0	16	3.4	28	2.6
Streptococcus spp.	3	0.5	0	0.0	3	0.3
Yeasts	2	0.3	0	0.0	2	0.2
TOTAL	600	100.0	465	100.0	1,065	100.0

TABLE 11. TYPES OF AEROBIC MESOPHILIC MICROORGANISMS ISOLATED FROM THE APOLLO LUNAR MODULE 3 (LM-3).

Microorganisms	LM-3 (Ascent) (Interior) No.	%	LM-3 (Descent) (Exterior) No.	%	LM-3 (Ascent) (Exterior) No.	%	Total No.	%
Staphylococcus epidermidis	206	33.8	128	17.5	123	22.1	457	24.1
Staphylococcus aureus	0	0.0	2	0.3	1	0.2	3	0.2
Micrococcus spp.	356	58.5	479	65.5	374	67.3	1209	63.7
Corynebacterium Brevibacterium Group	7	1.1	23	3.1	17	3.0	47	2.5
Miscellaneous Gram negative rods	4	0.6	5	0.7	2	0.4	11	0.6
Bacillus spp.	5	0.8	24	3.3	17	3.0	46	2.4
Molds	15	2.5	27	3.7	11	2.0	53	2.8
Sarcina spp.	0	0.0	2	0.3	2	0.4	4	0.2
Graffkya spp.	15	2.5	28	3.8	6	1.1	49	2.6
Streptococcus spp.	1	0.2	1	0.1	0	0.0	2	0.1
Yeasts	0	0.0	11	1.6	3	0.5	14	0.7
Actinomycetes	0	0.0	1	0.1	0	0.0	1	0.1
TOTAL	609	100.0	731	100.0	556	100.0	1896	100.0

TABLE 12. EFFECT OF EXTENDED INCUBATION ON RECOVERY OF MOLDS FROM SURFACES OF SPACE HARDWARE.

Number of Culture Plates	No. of Mold Colonies Per Plate after Incubation at 32 C			
	No. of Days 3	No. of Days 7	No. of Days 14	No. of Days 21
	No Increase in Colony Count			
288	0	0	0	0
36	1	1	1	1
16	2	2	2	2
7	3	3	3	3
2	4	4	4	4
2	5	5	5	5
1	6	6	6	6
1	7	7	7	7
1	8	8	8	8
1	12	12	12	12
1	16	16	16	16
	Increase in Colony Count			
1	0	0	0	1
2	0	0	1	1
2	1	1	2	2
1	2	2	2	3