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RDT&E PROJECT NO. ______

(16) USATECOM-PROJECT NO. 7-7-0924-01
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(6) PRODUCT IMPROVEMENT TEST, (CATEGORY II), MESS TRAY, PLASTIC 5-COMPARTMENT.

(9) FINAL LETTER REPORT.

(11) DECEMBER 1969 (12) 22p.

U S ARMY
GENERAL EQUIPMENT TEST ACTIVITY
FORT LEE, VIRGINIA

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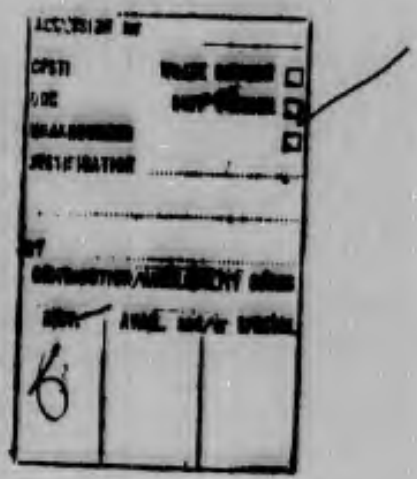


DEPARTMENT OF THE ARMY
U.S. ARMY GENERAL EQUIPMENT TEST ACTIVITY
FORT LEE, VIRGINIA 23801

STEGE-TE-E

27 DEC 1968

SUBJECT: Final Letter Report of Product Improvement Test, (Category II), Mess Tray, Plastic, 5-Compartment, USATECOM Project No. 7-7-0924-01 - Phase I

Commanding General
U. S. Army Natick Laboratories
ATTN: AMXRES-EQ
Natick, Massachusetts 01760

1. References:

a. Letter, U. S. Army Natick Laboratories, AMXRE-COP, 10 April 1967, subject: "Request for Product Improvement Test of 5-Compartment, Plastic Mess Trays."

b. Letter, U. S. Army Test and Evaluation Command, AMSTE-GE 7-7-0924-01, 4 May 1967, subject: "Test Directive, Product Improvement Test, (Category II), Mess Tray, Plastic, 5-Compartment, USATECOM Project No. 7-7-0924-01."

c. Test Plan for Product Improvement Test (Category II) of Mess Tray, Plastic, 5-Compartment, USATECOM Project No. 7-7-0924-01, U. S. Army General Equipment Test Activity, Fort Lee, Virginia, July 1967.

2. Background:

a. Prior to the conversion to individual place settings of toughened glass dinnerware in Army messes, the standard 5-compartment mess tray was used. The compartmented mess tray was retained as a component of Food Service and Preparation Sets for use in Field Hospitals. The standard compartmented mess trays used and currently available are made of either

corrosion resistant steel or plastic (phenol modified melamine formaldehyde resin with chopped cloth filler).

b. Studies ~~conducted~~ under the supervision of the Office of The Surgeon General revealed that deterioration of the surface of plastic trays led to difficulty in cleaning and resulted in retention of food and moisture after normal mechanical washing. This is considered by The Surgeon General as being a potential health problem. In this connection, the plastic industry announced that a new surface treatment had been developed for plastic dinnerware, including the 5-compartment plastic mess tray, which in the industry's opinion, would overcome the occurrence of severe knife cutting, degradation, and unsightly appearance observed in the standard plastic tray after short periods of use. Tests were performed

c. In-house tests of the new 5-compartmented plastic tray, conducted by the U. S. Army Natick Laboratories, showed that the new finish was sufficently improved over the standard plastic tray to warrant the Product Improvement Test reported herein which was conducted at Fort Lee, Virginia, during the period July 1967 to December 1968. Testing was conducted in accordance with the test directive and plan cited in paragraph 1b and c above. This report pertains to phase 1 of this project which covers only plastic mess trays. Phase 2 pertaining to plastic bowls, cups, and tumblers, which were added to the project after the initiation of the test, is scheduled for completion in March 1970.

3. Objective:

To determine:

a. The resistance of the new plastic tray to knife cutting and degradation during normal use conditions;

b. If the mess tray surface is sufficiently durable to permit proper cleansing of the trays after prolonged use under normal conditions;

c. Troop and mess personnel preference for standard and experimental plastic compartmented mess trays; and

d. The service life of the experimental plastic compartmented trays under normal use conditions.

4. Method:

a. Fifty experimental compartmented plastic mess trays (25 tan and 25 pastel green color) were tested on a comparative basis with fifty standard plastic compartmented mess trays (brown color) under normal use conditions in company size messes at Fort Lee, Virginia. Standard detergents in approved quantities were used in washing the trays. Participating messes were equipped with either the standard plastic or metal compartmented mess trays and all messes had essentially the same type of facilities and equipment.

b. Experimental and standard test trays, marked with code numbers for identification purposes, were rotated between participating messes during the test period. A daily record was maintained by the mess steward in each mess as to the number of times each tray was used. Trays were visually inspected weekly by representatives of USAGETA and results recorded. At approximately 2-week intervals, both types of trays were examined by the project officer for cuts, scratches, and other degradation of the surface using the starch-iodine test procedures. Special emphasis was placed on the meat compartment since this area is subjected to the greatest amount of abuse. Each tray (meat compartment) was graded based on the absence or presence and degree of discoloration due to any starch-iodine reaction and the results recorded. In addition to the inspections conducted by USAGETA, periodic inspections of the test trays were made by a representative of the U. S. Army Environmental Hygiene Agency who was designated to represent The Surgeon General in this test. Damaged trays were removed from use when, in the opinion of the project officer, they were obviously unservicable from a sanitary standpoint; however, the overall determination of unserviceability of trays was the responsibility of The Surgeon General's representative.

c. Each individual subsisting in participating messes completed a questionnaire in which they responded as to the importance of color of mess trays and stated a preference from the user standpoint with regard to color of the test trays, i.e. brown (standard), tan (experimental), or pastel green (experimental) by ranking the trays in ascending order. Further, the mess personnel of each unit completed a questionnaire indicating their preference for the standard and experimental mess trays.

d. At the end of the test, all standard and experimental green-colored plastic trays had been removed from use as unserviceable. Of the experimental

tan-colored plastic item, only 12 trays were still in use and it was considered neither necessary nor practical to extend the test beyond the scheduled completion date with such a small sample size.

5. Results:

a. Although inspections were made more frequently, the data in most instances are shown in 4-week use intervals except when a significant change occurred. Shown in Figure 1 is the percentage of failures by tray type and types of failures. Figure 2 shows the percentage of failures in relationship to the number of uses for each tray type when combined across all types of failures and losses. A summary of tray removals due to total failures and losses is shown in Appendix I. The results of the starch-iodine tests are shown in Table I. Damages incurred during the conduct of the test by the standard and experimental trays broken down by tray type and extent and frequency of damages are summarized in Appendix II. The chronological degradation of the meat compartment of one each of the standard brown, the experimental tan, and the experimental green trays observed during the starch-iodine test is depicted as shown in Appendices III, IV, and V.

b. With regard to troop preference, approximately 56 percent of the test participants completing a preference questionnaire responded that they did not consider the color of the plastic mess trays to be important. Based on participants ranking of trays in ascending order according to color preference, the average rank obtained for each tray was as follows:

Experimental tan - 1.8

Experimental green - 1.9

Standard brown - 2.3

No appreciable difference in preference by mess personnel was found.

The service life of the trays was found to be as follows:

Standard brown - 353 uses

Experimental green - 671 uses

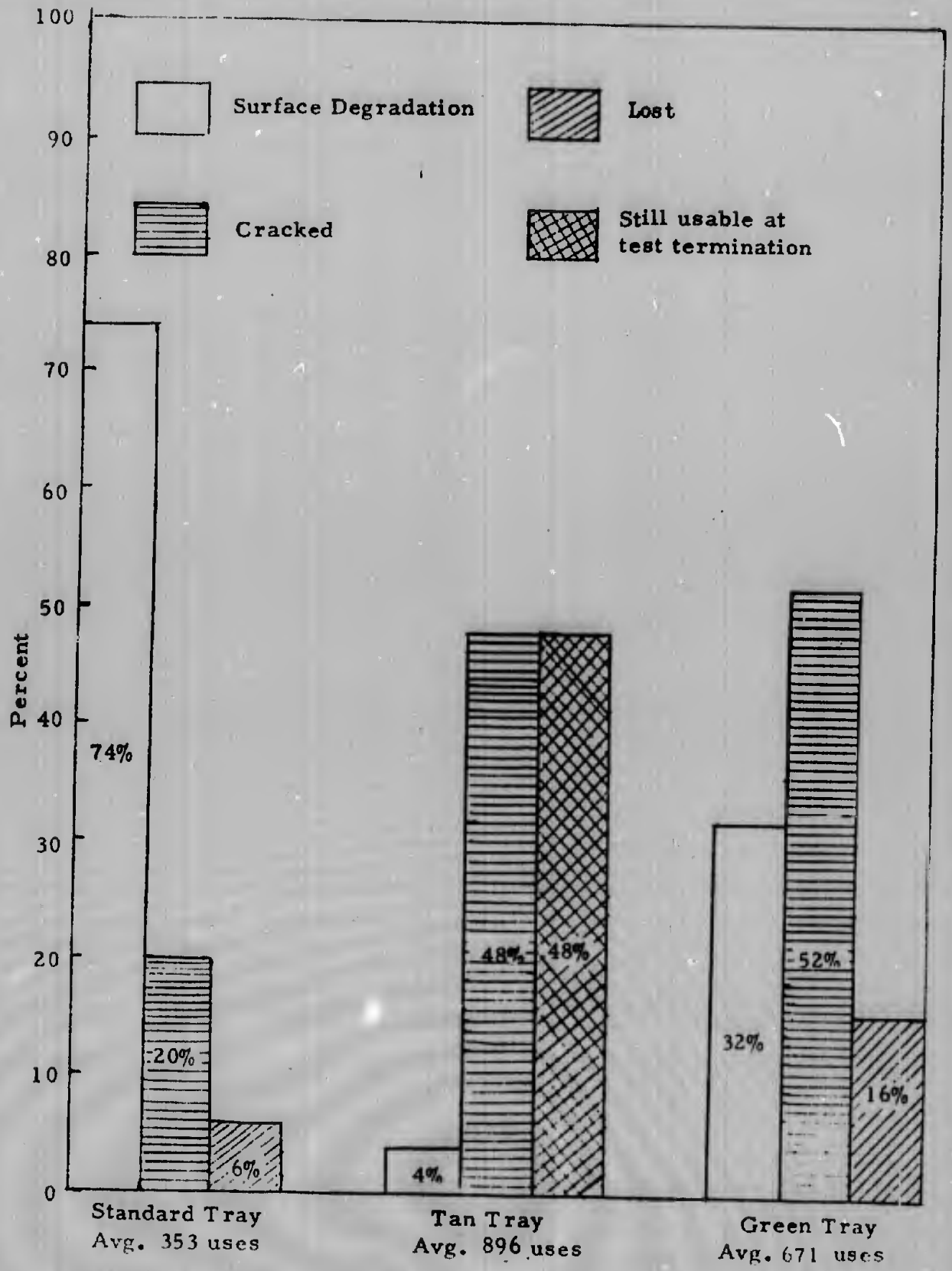


Figure 1. Percentage of failures (by tray type and type of failure.

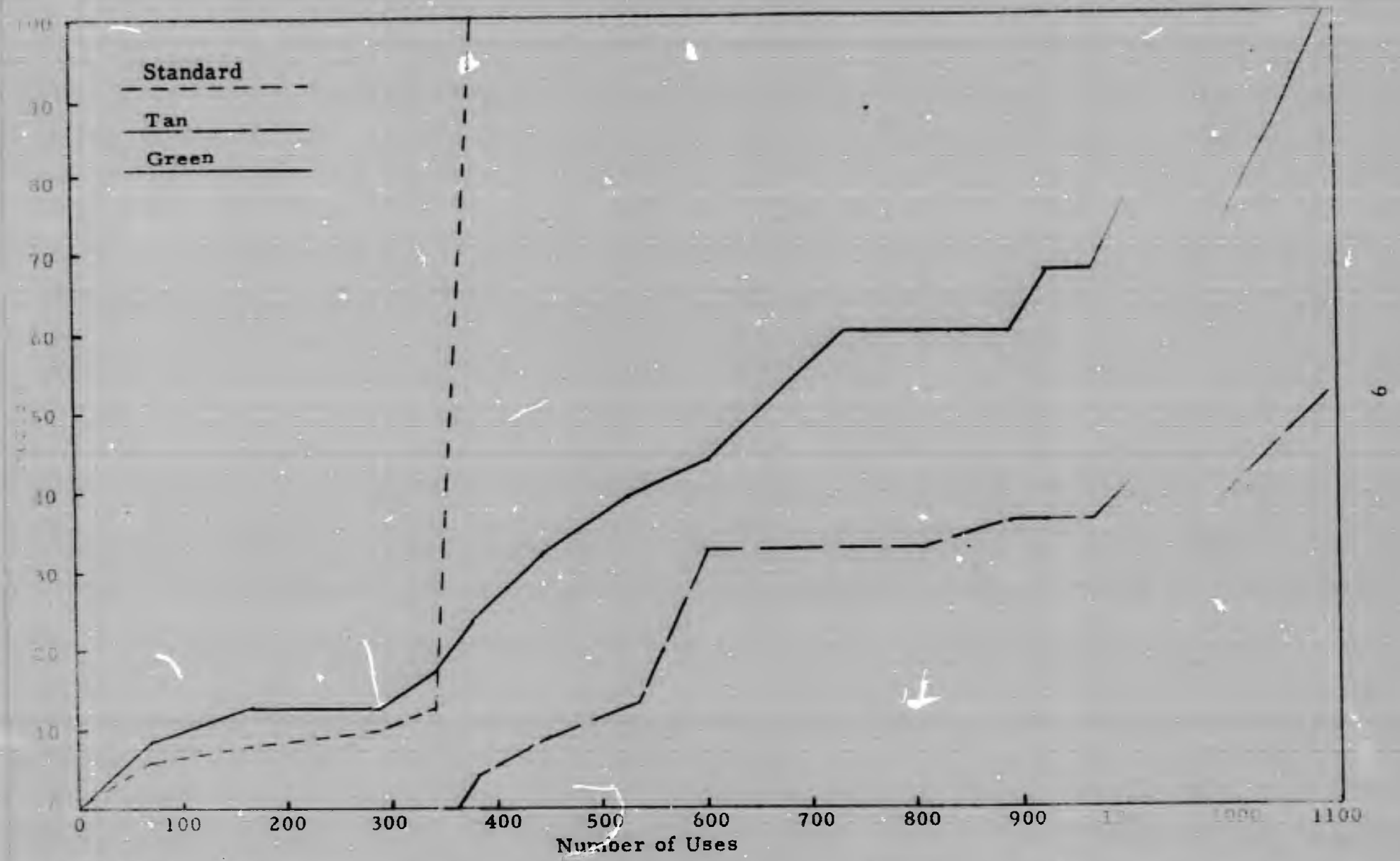


Figure 2. Percentage of failures (by tray type combined across types of failures)

TABLE I

SUMMARY OF RESULTS - STARCH-IODINE TEST

Inspection Date	Avg. No. Uses[a]	Type Tray	No. Tested	Degree of Discoloration				Avg. Grade
				None (Grade1)	Slight (Grade2)	Moderate (Grade3)	Pro-nounced (Grade4)	
31 Aug 67	70	Std. Brown	47	0	20	27	0	2.57
		Exp. Tan	25	14	11	0	0	1.44
		Exp. Green	23	0	23	0	0	2.00
9 Oct 67	170	Std. Brown	46	0	0	12	34	3.74
		Exp. Tan	25	1	24	0	0	1.96
		Exp. Green	23	0	3	20	0	2.87
21 Nov 67	290	Std. Brown	45	0	0	0	45	4.00
		Exp. Tan	25	0	25	0	0	2.00
		Exp. Green	21	0	0	21	0	3.00
19 Dec 67	340	Std. Brown	44	0	0	0	44	4.00
		Exp. Tan	25	0	25	0	0	2.00
		Exp. Green	21	0	0	21	0	3.00
18 Jan 68	379	Std. Brown	43	0	0	0	43	4.00
		Exp. Tan	25	0	19	6	0	2.24
		Exp. Green	21	0	0	17	4	3.19
13 Feb 68	450	Exp. Tan	24	0	12	12	0	2.50
		Exp. Green	19	0	0	8	11	3.58
14 Mar 68	536	Exp. Tan	22	0	6	15	1	2.77
		Exp. Green	15	0	0	0	15	4.00
12 Apr 68	604	Exp. Tan	18	0	2	15	1	2.94
		Exp. Green	14	0	0	0	14	4.00
5 Jun 68	738	Exp. Tan	17	0	1	13	3	3.12
		Exp. Green	10	0	0	0	10	4.00
18 Jul 68	808	Exp. Tan	17	0	1	12	4	3.18
		Exp. Green	10	0	0	0	10	4.00
28 Aug 68	892	Exp. Tan	16	0	1	12	3	3.12
		Exp. Green	10	0	0	0	10	4.00
12 Sep 68	928	Exp. Tan	16	0	1	12	3	3.12
		Exp. Green	8	0	0	0	8	4.00
3 Oct 68	967	Exp. Tan	16	0	1	12	3	3.12
		Exp. Green	8	0	0	0	8	4.00
22 Nov 68	1093	Exp. Tan	12	0	0	7	5	3.42
		Exp. Green	8	0	0	0	8	4.00

a. Average number of uses for trays in use on inspection date.

Experimental tan - 1,064 uses

The service life for the standard brown and experimental green trays is based on the actual service life obtained for these trays during this test. Since some of the experimental tan trays were still serviceable at the termination of the test, the service life for this type tray is based on the actual service life during this test plus a statistically projected service life expectancy.[1]

6. Analysis:

a. Durability

Examination of Figures 1 and 2, Table I, and Appendices I through V shows the surface of the experimental tan and green-colored plastic trays to be substantially more resistant to degradation than that for the standard plastic trays. Further, the data show that the performance of the experimental tan-colored trays was considerably better than that for the experimental green-colored trays. Specifically, Figure 1 shows tray failures due to surface degradation to be 74, 32, and 4 percent for the standard brown, experimental green, and experimental tan, respectively. The high percentage of surface failures in the standard trays occurred in spite of the face that these trays were subjected to a substantially lower average number of uses. The average number of uses shown in Figure 1 is based on the average for all trays of a specific type used in the test, regardless of when they were removed.

With regard to failures due to cracking, the percentages of failures due to this factor in the experimental green and tan-colored trays were 24 and 4 percent, respectively, for a comparable length of time and uses in which 20 percent of the standard trays failed from cracking. This indicates that the experimental tan-colored trays were more resistant to cracking than either the standard or experimental green-colored trays.

Examination of the results of the starch-iodine test (Table I) shows the average grade for the standard tray to be greater than that for the experimental

[1] A. Clifford Cohen, Jr, "Simplified Estimators for the Normal Distribution When Samples are Singly Censored or Truncated," Technometrics, Vol. 1, No. 3, 1959.

trays with that for the tan-colored trays being the lowest. Low grades in the starch-iodine tests are indicative of good surface characteristics which contribute to improve cleansing and sanitizing qualities of plastic trays. Photographs shown in Appendices III, IV, and V were taken at various intervals during the starch-iodine tests and they show a gradual degradation of the surface of the trays (meat compartment) due to knife cutting, scratching, abrasion, and a general deterioration of the finish of the trays. These photographs further attest the improved qualities of the experimental trays with the experimental tan-colored trays being the most improved.

Data in Appendix II show, in general, no substantial differences in the frequency of minor damages between the standard and the experimental trays for a comparable period of time and usage. There was some evidence of staining, particularly in the experimental green-colored trays, during the test. Trays were destained as often as considered necessary using standard procedures and destaining compound. Warping of the experimental trays was observed after approximately 6-months' use (subsequent to the removal of the standard trays). However, the serviceability and the service life of either type of tray were not adversely affected due to staining or warping.

b. Troop Preference

A majority of the test participants responded that they did not consider the color of the trays to be important. When asked to rank the trays with respect to color, there was a slight preference for the experimental trays over the standard trays. However, in view of the responses pertaining to importance of color as stated above, the slight differences in the ranking of trays by color are of no practical importance. No appreciable difference in preference by mess personnel was found.

c. Service Life

The service life of the respective trays shown in paragraph 5 above was based on a total of 50 standard and 25 each of the experimental tan and green-colored trays, and takes into account those lost or failued prior to the end of the test. Therefore, the number of uses shown in paragraph 5 above is not to be confused with the average number of uses for trays in use at time of inspections at various intervals as shown elsewhere in this report. Examination of the data pertaining to the service life of trays (Par. 5) shows the expected service life of the experimental green- and tan-colored trays to be,

27 DEC 1965

respectively, approximately 90 and 190 percent greater than that for the standard trays. The new finish of the experimental trays does increase the service life of the trays. Thus, based on the results of this test, it appears that the experimental tan-colored trays are sufficiently durable to permit proper cleansing and use under normal use conditions for a period equivalent to 11 months of constant use.

7. Conclusions:

a. The experimental plastic mess trays are more resistant to knife cutting and degradation than the standard plastic mess trays under normal use conditions.

b. The surface of the experimental plastic mess trays is more durable than that for the standard plastic mess trays and permits proper cleansing and use of the experimental items after prolonged use under normal conditions.

c. There is no difference of any practical importance in troop preference for the standard brown, experimental tan, and experimental green-colored plastic mess trays. The standard and experimental plastic mess trays are equally preferred for use by mess personnel.

d. The service life of the experimental plastic mess trays is substantially longer than that of the standard plastic mess trays.

e. The overall performance of the experimental tan-colored plastic mess trays is superior to that for the experimental green-colored or the standard plastic mess trays.

8. Recommendations:

None.

HOWARD W. HEMBREE, Ph.D.
Technical Director

C. R. CHURCH
Colonel, QMC
Commanding

5 Incl
Appendices I through V

CF:
CG, USATECOM, ATTN: AMSTE-GE (2)

APPENDIX I

SUMMARY OF TRAY REMOVALS

(Total Failures and Losses)

Test Period	Avg. No. Uses[a]	Type of Tray: Std. Brown (50)					Exp. Tan (25)					Exp. Green (25)				
		No. in use[b]	No. failed[c]	No. lost[c]	Accum No. failed or lost	Accum %	No. in Use[b]	No. failed[c]	No. lost[c]	Accum No. failed or lost	Accum %	No. in Use[b]	No. failed[c]	No. lost[c]	Accum No. failed or lost	Accum %
31 Jul - 31 Aug 67	70	47	2	1	3	6	25	0	0	0	0	23	2	0	2	9
1 Sep - 9 Oct 67	170	46	1	0	4	8	25	0	0	0	0	22	1	0	3	12
10 Oct - 21 Nov 67	290	45	1	0	5	10	25	0	0	0	0	21	1	0	4	16
22 Nov - 19 Dec 67	340	44	0	1	6	12	25	0	0	0	0	21	0	0	4	16
20 Dec67-18 Jan 68	379	0	43	1	50	100	24	1	0	1	4	19	2	0	6	24
19 Jan - 13 Feb 68	450						23	1	0	2	8	17	2	0	8	32
14 Feb - 14 Mar 68	536						22	1	0	3	12	15	1	1	10	40
15 Mar - 12 Apr 68	604						17	5	0	8	32	14	1	0	11	44
13 Apr - 5 Jun 68	738						17	0	0	8	32	10	1	3	15	60
6 Jun - 18 Jul 68	908						17	0	0	8	32	10	0	0	15	60
19 Jul - 28 Aug 68	892						16	1	0	9	36	10	0	0	15	60
29 Aug - 12 Sep 68	928						16	0	0	9	36	8	2	0	17	68
13 Sep - 3 Oct 68	967						16	0	0	9	36	8	0	0	17	68
4 Oct - 22 Nov 68	1093						12	4	0	13	52	0	8	0	25	100

a. Average number of uses for trays in use at end of period.
b. Number of trays in serviceable condition after inspections at end of period.
c. Number failed or lost at time of inspection or during respective period.

APPENDIX II

SUMMARY OF TRAY DAMAGE
(By Tray Type to Include Type, Extent, and Frequency of Damage)

Test Period	Avg. No.[a] Uses	Tray Type[b] & No. In Use	Type of Damage	Extent and Frequency of Damage[c] None	Slight	Moderate	Excess	Removals & Reasons Therefore	No. Serviceable Trays at End of Period
31 Jul - 31 Aug 67	70	Std. Brown (50)	Scratching	0	47	3	0	Lost - 1 Cracking - 2	47
			Cracking	48	0	0	2		
		Exp. Tan (25)	Scratching	0	25	0	0	0	25
			Chipping	24	1	0	0		
		Exp. Green (25)	Scratching	0	25	0	0		
			Chipping	22	3	0	0	Cracking - 2	23
			Cracking	23	0	0	2		
1 Sep - 9 Oct 67	170	Std. Brown (47)	Abrasion	9	25	13	0	Cracking - 1	46
			Scratching	0	17	30	0		
		Exp. Tan (25)	Abrasion	23	2	0	0		
			Scratching	0	9	16	0	0	25
			Chipping	24	1	0	0		
		Exp. Green (23)	Scratching	0	22	1	0		
			Chipping	18	5	0	0	Cracking - 1	22
			Cracking	21	1	1	0		
			Staining	21	2	0	0		

a. Average number of uses for trays in use at end of period.
b. Number trays in use at start of period.
c. Includes evaluation of maximum number of trays in use during period.

APPENDIX II

Test Period	Avg. No.[a] Uses	Tray Type & No.[b] in use	Type of Damage	Extent and Frequency of Damage[c] None	Slight	Moderate	Excess	Removals & Reasons Therefor	No. Serviceable Trays at End of Period
10 Oct - 21 Nov 67	290	Std. Brown (46)	Abrasion	0	2	44	0	Cracking - 1	45
			Scratching	0	2	44	0		
			Chipping	45	1	0	0		
			Cracking	43	2	0	1		
		Exp. Tan (25)	Abrasion	19	4	2	0	0	25
			Scratching	0	3	22	0		
			Chipping	20	5	0	0		
		Exp. Green (22)	Scratching	0	19	3	0	Cracking - 1	21
			Chipping	6	16	0	0		
			Cracking	16	2	3	1		
			Staining	11	11	0	0		
22 Nov - 19 Dec 67	340	Std. Brown (45)	Abrasion	0	0	45	0	Lost - 1	44
			Scratching	0	0	45	0		
			Chipping	39	4	0	2		
			Cracking	41	3	1	0		
		Exp. Tan (25)	Abrasion	19	4	2	0	0	25
			Scratching	0	1	24	0		
			Chipping	10	13	2	0		
		Exp. Green (21)	Scratching	0	18	3	0	0	21
			Chipping	3	18	0	0		
			Cracking	18	0	3	0		
			Staining	9	12	0	0		
20 Dec 67 - 19 Jan 68	379	Std. Brown (44)	Abrasion	0	0	44	0	Surface Degradation 37 Cracking - 6 Lost - 1	0
			Scratching	0	0	42	2		
			Chipping	38	4	0	2		
			Cracking	33	5	0	6		
		Exp. Tan (25)	Abrasion	19	4	2	0	Cracking - 1	24
			Scratching	0	1	24	0		
			Chipping	8	15	2	0		
			Cracking	24	0	0	1		
		Exp. Green (21)	Scratching	0	5	16	0	Cracking - 2	19
			Chipping	4	17	0	0		
			Cracking	17	1	3	0		
			Staining	2	19	0	0		

APPENDIX II

Test Period	Avg. No.[a] Uses	Tray Type & No.[b] In Use	Type of Damage	Extent and Frequency of Damage[c] None	Slight	Moderate	Excess	Removals & Reasons Therefor	No. Serviceable Trays at End Of Period
19 Jan - 13 Feb 68	450	Exp. Tan (24)	Abrasion	0	22	2	0	Surface Degradation - 1	23
			Scratching	0	1	23	0		
			Chipping	2	17	5	0		
			Cracking	22	2	0	0		
			Staining	22	2	0	0		
		Exp. Green (19)	Abrasion	0	17	2	0	Cracking - 2	17
			Scratching	0	4	15	0		
			Chipping	5	13	1	0		
			Cracking	14	3	1	1		
			Staining	1	18	0	0		
14 Feb - 14 Mar 68	536	Exp. Tan (23)	Warping	6	17	0	0	Cracking - 1	22
			Abrasion	0	17	6	0		
			Scratching	0	0	23	0		
			Chipping	2	16	5	0		
			Cracking	19	4	0	0		
			Staining	21	2	0	0		
		Exp. Green (17)	Warping	5	12	0	0	Lost - 1 Cracking - 1	15
			Abrasion	0	15	2	0		
			Scratching	0	4	13	0		
			Chipping	0	16	1	0		
			Cracking	15	1	1	0		
			Staining	1	16	0	0		
15 Mar - 12 Apr 68	604	Exp. Tan (22)	Warping	0	11	11	0	Cracking - 5	17
			Abrasion	0	0	22	0		
			Scratching	0	0	22	0		
			Chipping	1	15	6	0		
			Cracking	13	4	3	2		
			Staining	19	3	0	0		
		Exp. Green (15)	Warping	0	1	14	0	Cracking - 1	14
			Abrasion	0	0	15	0		
			Scratching	0	0	15	0		
			Chipping	0	12	3	0		
			Cracking	11	3	1	0		

APPENDIX II

Test Period	Avg. No. Uses [a]	Tray Type & No. In Use [b]	Type of Damage	Extent and Frequency of Damage [c]				Removals & Reasons Therefor	No. Serviceable Trays at End Of Period
				None	Slight	Moderate	Excess		
13 Apr - 5 Jun 68	738	Exp. Tan (17)	Fading	0	17	0	0	0	17
			Warping	0	6	11	0		
			Abrasion	0	0	17	0		
			Scratching	0	0	17	0		
			Chipping	1	11	5	0		
			Cracking	12	4	1	0		
			Discoloration	15	2	0	0		
		Exp. Green (14)	Fading	4	10	0	0	Lost - 3 Cracking - 1	10
			Warping	0	0	14	0		
			Abrasion	0	0	14	0		
			Scratching	0	0	14	0		
			Chipping	0	10	4	0		
			Cracking	7	6	0	1		
6 Jun - 18 Jul 68	808	Exp. Tan (17)	Fading	0	17	0	0	0	17
			Warping	0	6	11	0		
			Abrasion	0	0	17	0		
			Scratching	0	0	17	0		
			Chipping	0	10	7	0		
			Cracking	11	4	2	0		
			Discoloration	15	2	0	0		
		Exp. Green (10)	Fading	0	10	0	0	0	10
			Warping	0	0	10	0		
			Abrasion	0	0	10	0		
			Scratching	0	0	10	0		
			Chipping	0	6	4	0		
			Cracking	4	4	2	0		

APPENDIX II

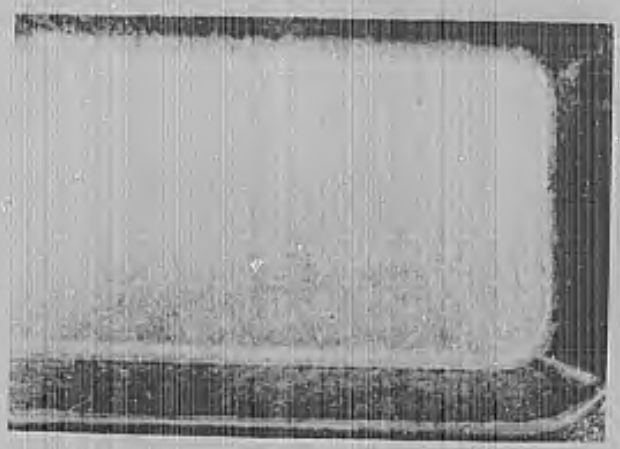
Test Period	Avg.No.[a] Uses	Tray Type & No.[b] In Use	Type of Damage	Extent and Frequency of Damage[c] None	Slight	Moderate	Excess	Removals & Reasons Therefor	No. Serviceable Trays at End Of Period
17 Jul - 28 Aug 68	892	Exp. Tan (17)	Fading	0	17	0	0	Cracking - 1	14
			Warping	0	9	8	0		
			Abrasion	0	0	17	0		
			Scratching	0	0	17	0		
			Chipping	0	11	6	0		
			Cracking	11	1	4	1		
			Discoloration	14	3	0	0		
		Exp. Green (10)	Fading	0	10	0	0	0	10
			Warping	0	0	10	0		
			Abrasion	0	0	10	0		
			Scratching	0	0	10	0		
			Chipping	0	6	4	0		
			Cracking	4	4	2	0		
29 Aug - 12 Sep 68	928	Exp. Tan (16)	Fading	0	16	0	0	0	16
			Warping	0	9	7	0		
			Abrasion	0	0	16	0		
			Scratching	0	0	16	0		
			Chipping	0	11	5	0		
			Cracking	11	1	4	0		
			Discoloration	10	5	1	0		
		Exp. Green (10)	Fading	0	10	0	0	Cracking - 2	8
			Warping	0	0	10	0		
			Abrasion	0	0	10	0		
			Scratching	0	0	10	0		
			Chipping	1	5	4	0		
			Cracking	3	3	2	2		

APPENDIX II

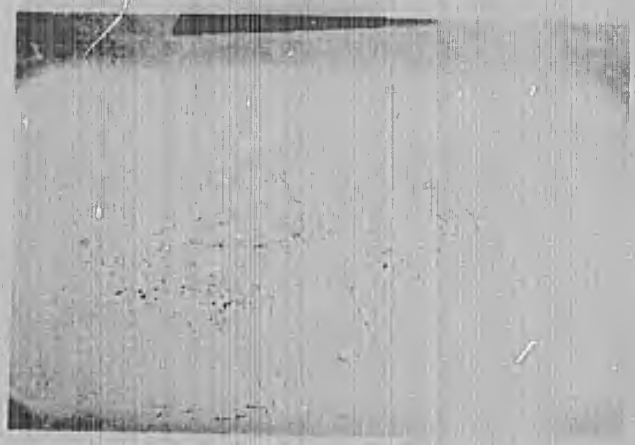
Test Period	Avg. No.[a] Uses	Tray Type & No.[b] In Use	Type of Damage	Extent and Frequency of Damage[c]				Removals & Reasons Therefor	No. Serviceable Trays at End Of Period
				None	Slight	Moderate	Excess		
13 Sep - 3 Oct 68	967	Exp. Tan (16)	Fading	0	16	0	0	0	16
			Warping	0	5	11	0		
			Abrasion	0	0	16	0		
			Scratching	0	0	16	0		
			Chipping	0	11	5	0		
			Cracking	10	1	5	0		
			Discoloration	9	5	2	0		
		Exp. Green (8)	Fading	0	8	0	0	0	8
			Warping	0	0	8	0		
			Abrasion	0	0	8	0		
			Scratching	0	0	8	0		
			Chipping	5	5	3	0		
			Cracking	3	3	2	0		
4 Oct - 22 Nov 68	1093	Exp. Tan (16)	Fading	0	16	0	0	Cracking - 4	12
			Warping	0	5	11	0		
			Abrasion	0	0	16	0		
			Scratching	0	0	16	0		
			Chipping	0	11	5	0		
			Cracking	9	1	2	4		
			Discoloration	7	8	1	0		
		Exp. Green (8)	Fading	0	8	0	0	Surface Degradation -8	0
			Warping	0	0	8	0		
			Abrasion	0	0	8	0		
			Scratching	0	0	8	0		
			Chipping	0	5	3	0		
			Cracking	3	3	2	0		

APPENDIX III

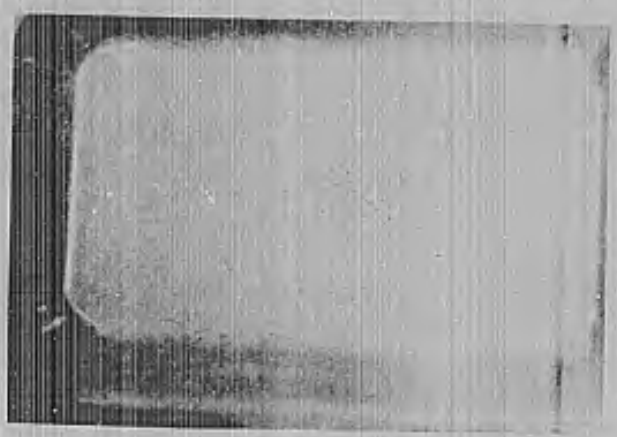
PHOTOGRAPHS DEPICTING CHRONOLOGICAL DEGRADATION OF STANDARD PLASTIC MESS TRAY MEAT COMPARTMENT



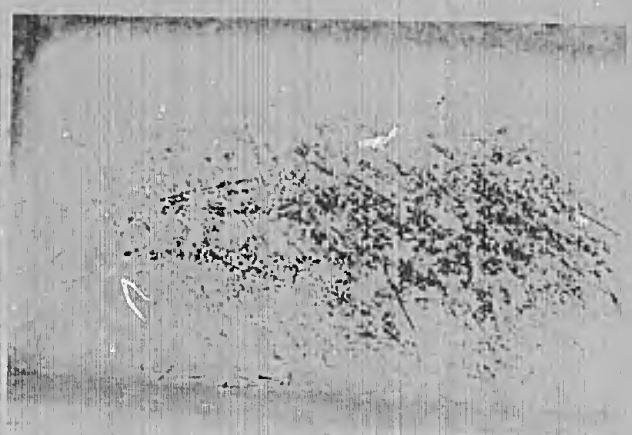
STANDARD UNUSED



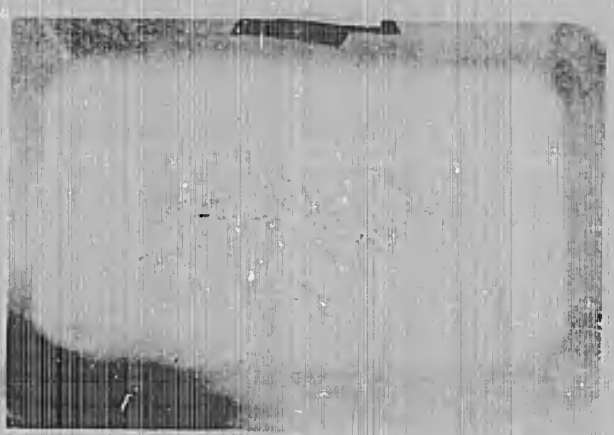
213 USES



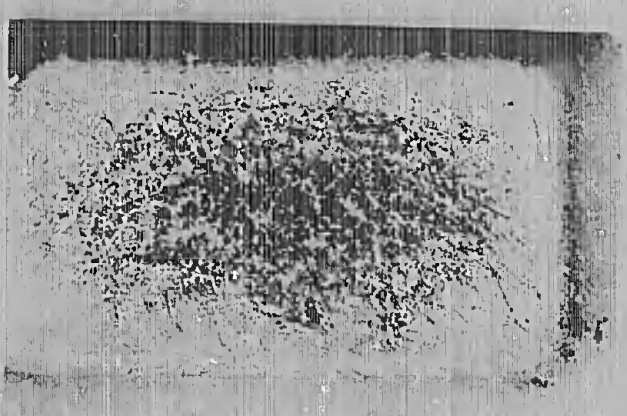
74 USES



284 USES



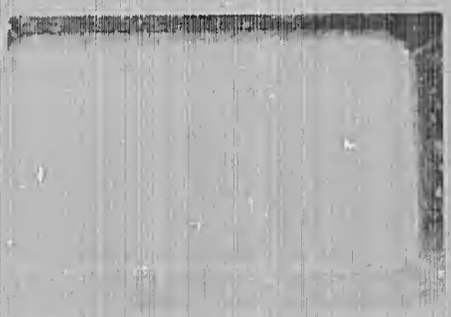
118 USES



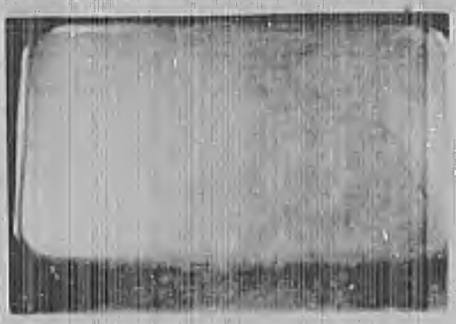
384 USES

APPENDIX IV

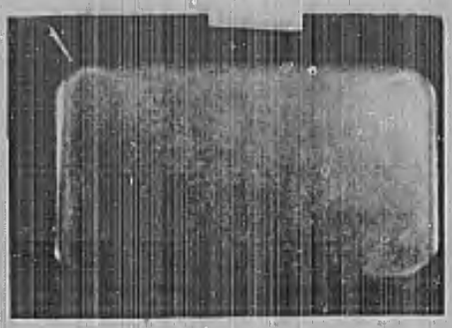
PHOTOGRAPHS DEPICTING CHRONOLOGICAL DEGRADATION OF EXPERIMENTAL TAN-COLORED PLASTIC MESS TRAY MEAT COMPARTMENT



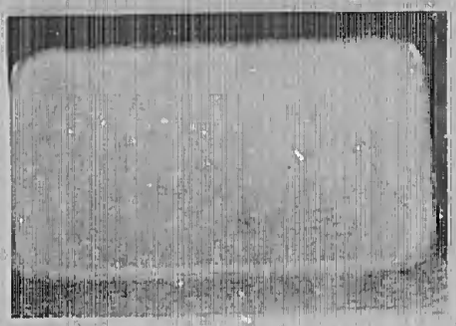
TEST TAN UNUSED



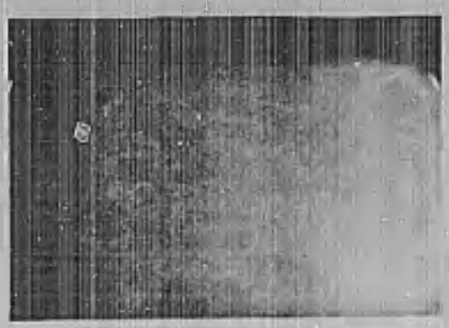
772 USES



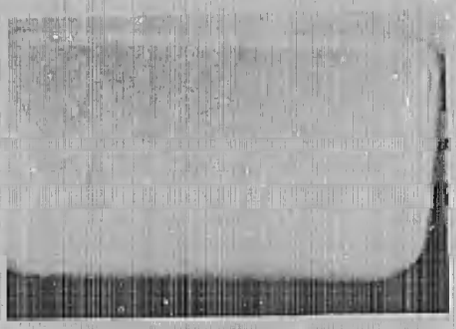
120 USES



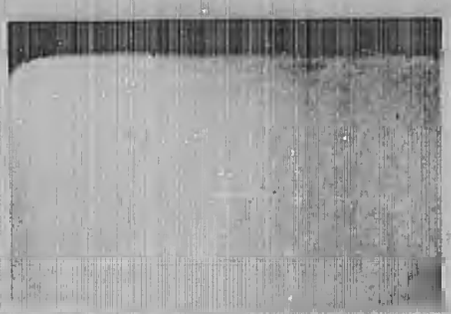
849 USES



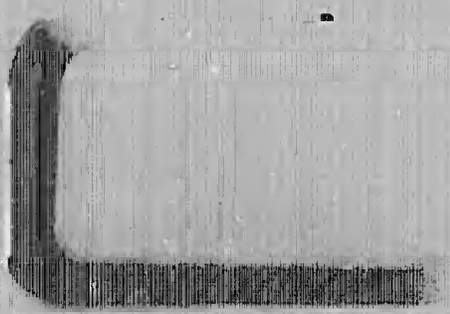
216 USES



909 USES



535 USES

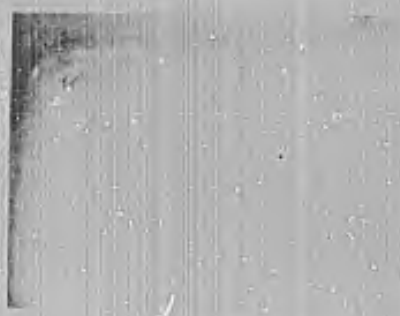


1092 USES

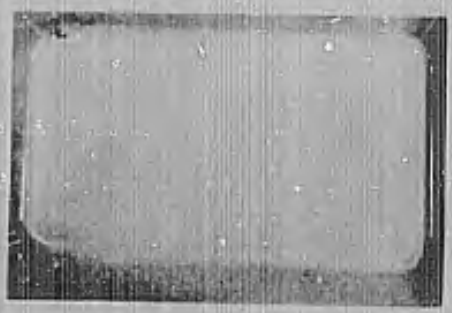
APPENDIX V

PHOTOGRAPHS DEPICTING CHRONOLOGICAL DEGRADATION OF EXPERIMENTAL GREEN-COLORED PLASTIC MESS TRAY MEAT COMPARTMENT

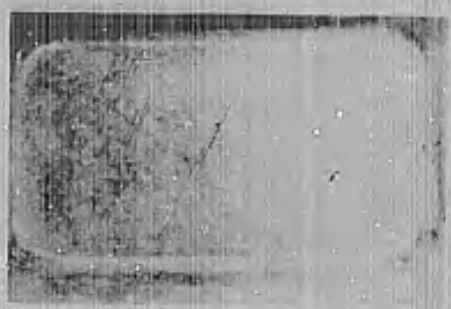
TEST GREEN UNUSED



453 USES

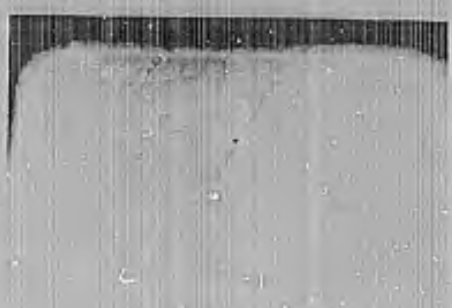


79 USES



854 USES

123 USES



914 USES

289 USES

1097 USES