



RESULTS WHISKER TESTING

Abstract:

Conduct testing for Whisker to determine differences in the home environment between a traditional litter box and a Litter Robot 4. Testing was conducted on several different factors:

- Amount of litter dispersed by the cats during the testing period
- Amount of litter used during each testing period
- Amount of microbes on surfaces in main areas
- Bacterial formations in areas

Set Up:

- Four cats were used for the duration of the test.
- Testing for traditional litter box was performed from September 14 through September 25
- Testing for the Litter Robot 4 was performed from September 26 through October 7
- Sterile booties were worn in the testing room every time Director entered. The exact testing areas were not walked on by any persons, just the subject cats.
- Cameras were positioned at testing areas 24/7 during testing periods.
- A lab bench was positioned outside of the room and testing areas in order to weigh and measure litter and hold gloves and booties.

Sanitization: Enspra utilizes a 3 step sanitizing process.

- a.Clean: Floors are washed with hot water and a Mr. Clean cleaner.
- b.Disinfect: After drying, Smart Touch, a hospital grade disinfectant is used and left until dry.
- c.Sanitize: Pure water in the form of steam is used prior to equipment going back into the room. This kills any remaining bacteria and removes any build up of cleaning residue. It is safer for the cats.



Subject Cat Information

Cat Information

- Four cats were used for the duration of the testing period
- They range in age from 3 years to 16 years
- They have been living together their entire lives, eliminating the risk of territorial behaviors
- Their weights are varied
- Prior to the testing period, all visited the veterinary hospital for a physical examination and all were deemed healthy. Documentation was provided to Whisker.
- None are on medication, special diets, or accommodations.



Hambone: Minuet (Munchkin/Persian)

DOB: 10/10/2007 male/neutered

Weight: 4.9lb



Mocha: Tonkinese

DOB: 3/20/2015 male/neutered

Weight: 12lb



Freya: Scottish Straight

DOB: 10/1/2019 female/spayed

Weight: 13lb



Pinky: Minuet (Munchkin/Persian)

DOB: 10/13/2020 female/spayed

Weight: 4.9lb



Litter Usage 1

Litter Basic Info

- [REDACTED] unscented with charcoal was used
- Scooping was conducted every third day on traditional litter boxes
- Litter change was conducted when the Litter Robot notified that it was full
- Scattered litter on the floor was only taken from the area of testing
- Litter measured in a container and weighed at 26 ounces per cup. Each cup was counted.
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Traditional Litter Box Usage

- Two large rectangular litter boxes were used
- On set up day, box boxes had to be filled to a depth of 3", as recommended by veterinarians, litter manufacturer, and research data
- Larger amount noted in set up to account for initial fill of box

Total Litter Used: Traditional Boxes

Date	Amount in Ounces
9/14	540
9/17	156
9/20	156
9/23	156
9/25	104

Total

1112 Ounces



Litter Usage 2

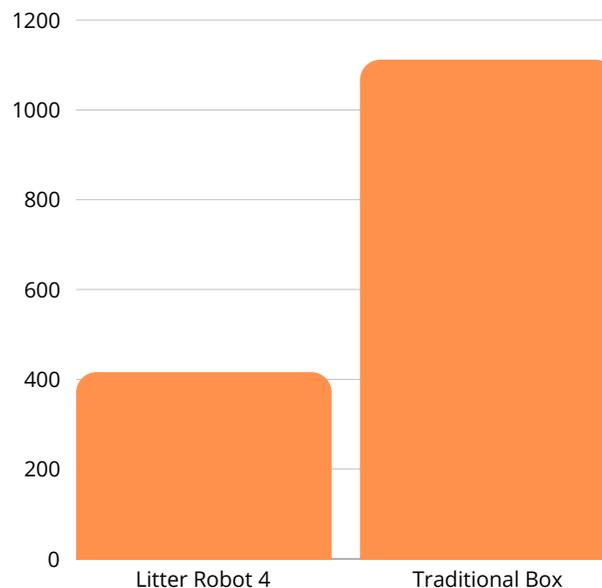
Litter Robot Usage

- One Litter Robot 4 was used during the testing period
- On set up day, a brand new unit was unboxed and set up

Date	Amount in Ounces
9/26	156
9/28	52
10/1	52
10/4	52
10/7	52
Total	416 Ounces

FINDINGS:

IN THE TESTING PERIOD, IT WAS DETERMINED THAT THE LITTER ROBOT HAD A USAGE OF 37% OF THE LITTER VERSUS A TRADITIONAL LITTER BOX.





Cost of Ownership

With a reduction of 63% in litter usage between a Litter Robot 4 and traditional litter boxes with two boxes being used in this study, the cost savings in litter over one year would be approximately **\$769**.

This number was determined by the following:

We took the current price of the top five best selling clumping litters at a cost per pound:



Which came out to an average of \$.68/lb

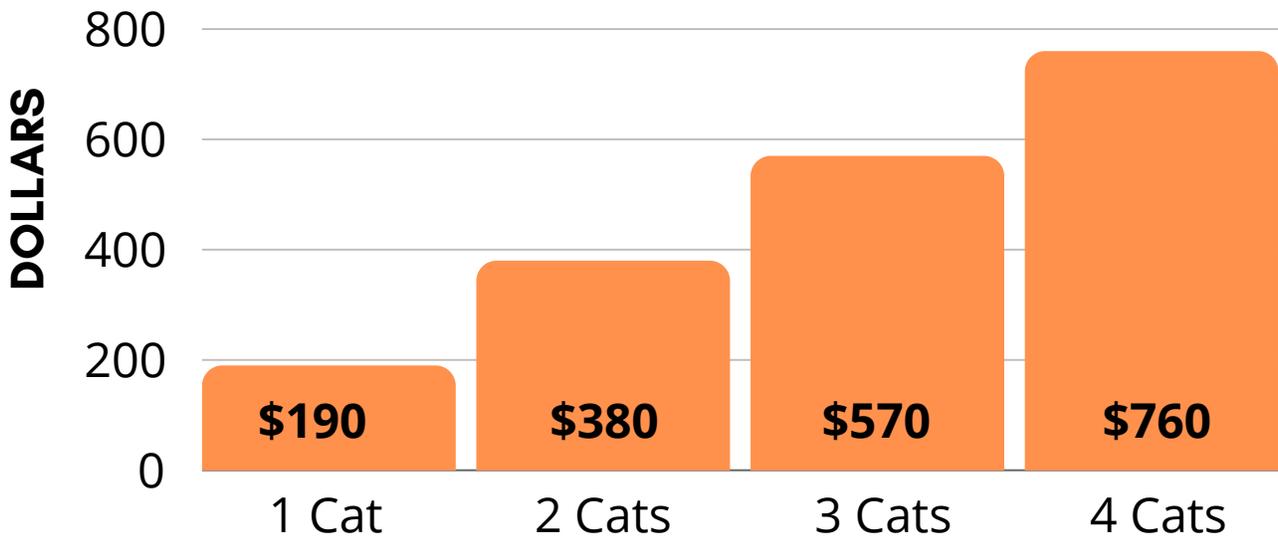
Litter Robot Usage: **\$459.68/year**

Traditional box & scooping: **\$1228.76/year**

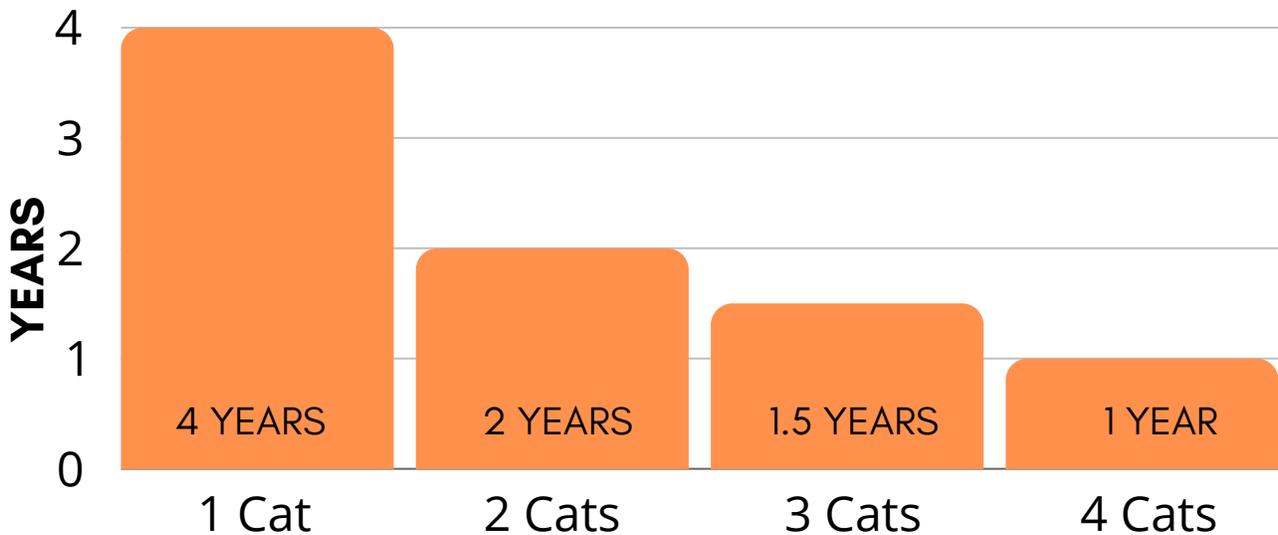
This makes an assumption of a full box dump and clean every 2 weeks for the traditional box. The total savings is assumed under the two week conditions, actual numbers may fluctuate depending on usage.



COST SAVINGS IN LITTER IN ONE YEAR



ROI IN LITTER VS. \$699 LR4

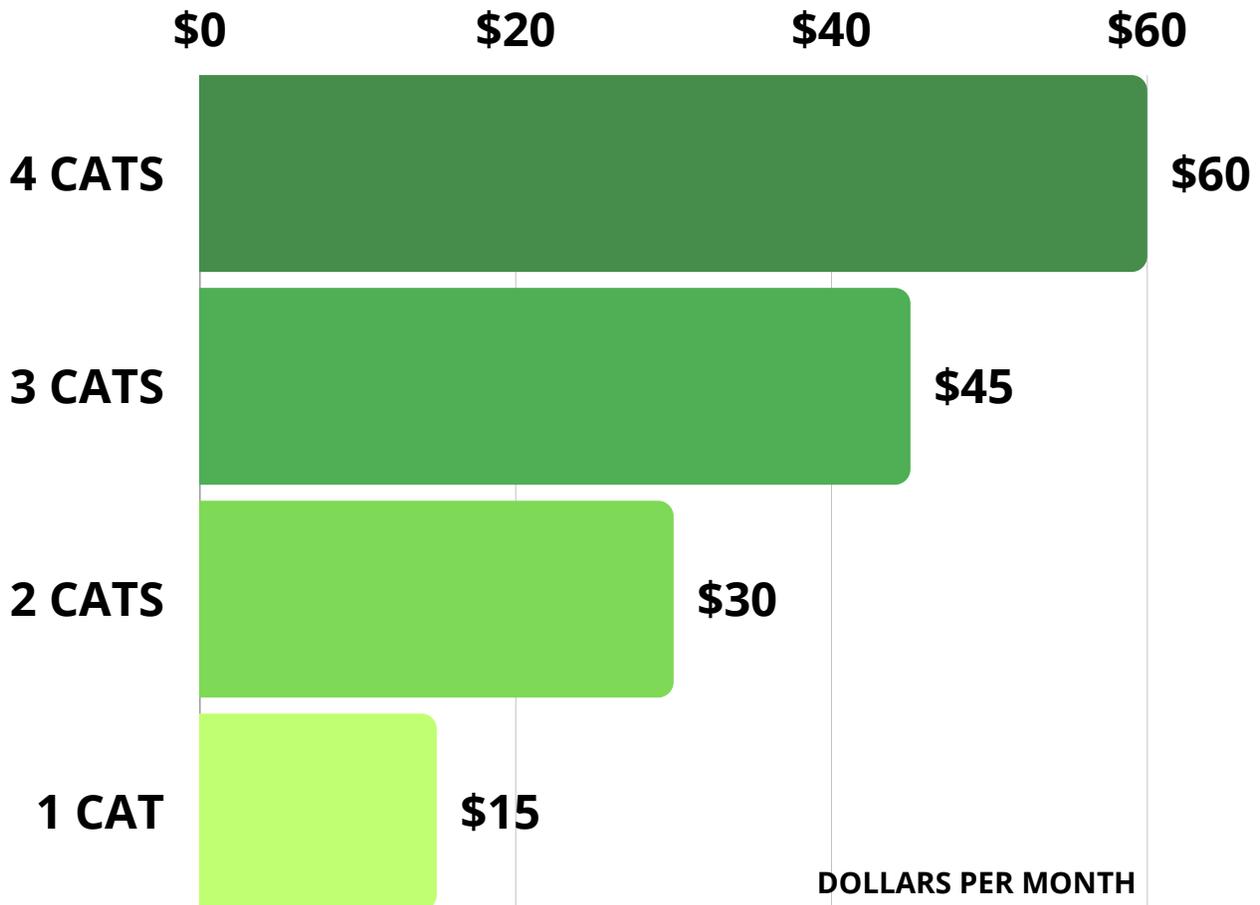


Dollar amounts based on the assumption of 1/4 usages, broken down per cat, as test was conducted with 4 cats.



COST SAVINGS PROJECTIONS IN LITTER COSTS PER MONTH

Information based on usage by 4 cats, divided by 4 for a per cat usage





SCOOPING TIME COMPARAISON

The time spent scooping litter was measured and the results recorded.

Traditional litter box procedure:

- Gather large bag to collect waste
- Bend down to scoop boxes
- Transfer waste from litter box to bag
- Refill litter into boxes to optimal level
- Take bag to trash
- Clean scoop before placing it in house

Total time:

7 minutes every 3 days
851 minutes per year OR
14 hours 20 minutes every year

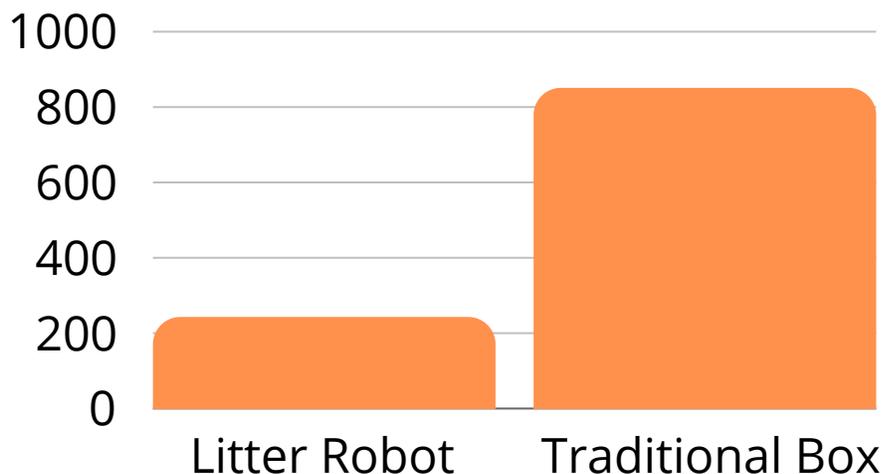
Litter Robot Procedure:

- Open drawer
- Tie bag
- Replace bag
- Refill litter to optimal level
- Take bag to trash

Total time:

2 minutes every 3 days
243 minutes per year OR
4 hours 2 minutes every year

Time savings of over 10 hours per year of handling feces and urine.





Litter Tracking

Litter Tracking Method Info

- Scattered litter on the floor was only taken from the area of testing and included the entire room and the area of testing outside the litter room
- Collected by pan and hand brush, then transferred into a small metal dish before being weighed on a scale.
- No other cleaning/vacuuming/collection method was used in the area during the entirety of the testing
- No litter mat or item was on the floor to control the spread of litter during either testing

Traditional Litter Boxes

Date	Amount in Grams
9/15	126
9/18	156
9/21	170
9/23	232
9/25	262

Total 946 Grams

Litter Robot 4

Date	Amount in Grams
10/1	140
10/5	148
10/7	72

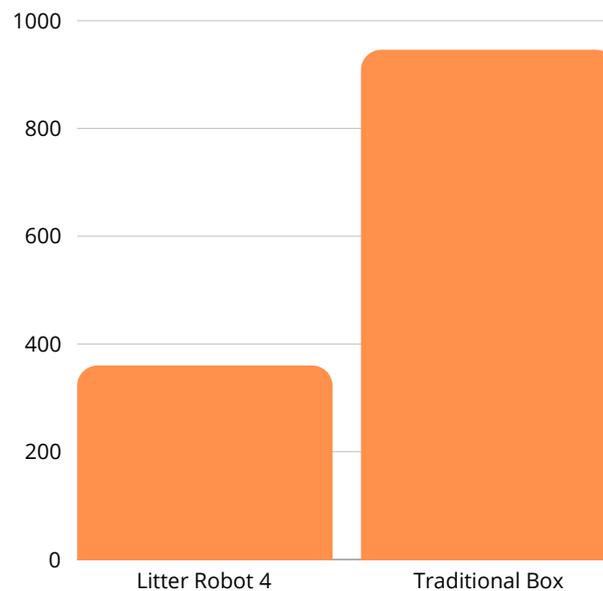
Total 360 Grams



Litter Tracking 2

FINDINGS:

IN THE TESTING PERIOD, IT WAS DETERMINED THAT THE LITTER ROBOT HAD A REDUCTION OF SCATTERED LITTER by 62%



Litter Dispersal Analysis

- The litter that is dispersed throughout the testing area has been in contact with fecal matter and urine, dispersed by the cats' feet.
- Since the amount of microbes found in the space rises with the amount of litter measured in the space, it can be determined that less litter dispersion helps to maintain a cleaner environment than more litter dispersion.



Scattered Litter

Traditional Litter Box



Litter Robot





Microbial Count On Surfaces

Testing Microbial Counts

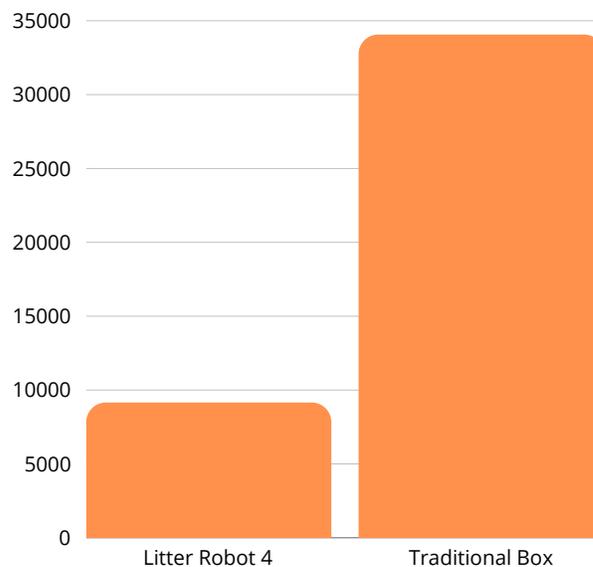
Samples were taken in 5 areas each day for each segment of testing. These areas were noted and visible on camera as being in the blue boxes. Areas were as follows:

- Outside the litter box on the floor
- In the food/water area on the floor
- The hood of the Litter Robot and side walls of the Traditional Box
- The step or lip of the boxes
- The area just outside of the cat room on the floor

Important notes:

- Litter Robot 4 was factory sealed and new prior to testing
- Litter Robot bags were used during testing
- Traditional litter boxes were unboxed and new prior to testing
- A factory new scoop was used during testing of traditional boxes

Total Microbial Count on surfaces for duration of testing periods



Microbial Count On Surfaces

TRADITIONAL LITTER BOXES 1/2

Plan Name	Result Date	Location	Count
TRADITIONAL BOX	9/14/2023, 9:38 AM	FLOOR OUTSIDE ROOM	101
TRADITIONAL BOX	9/14/2023, 9:39 AM	FLOOR NEAR FOOD	0
TRADITIONAL BOX	9/14/2023, 9:40 AM	FLOOR NEAR BOX	2
TRADITIONAL BOX	9/14/2023, 9:41 AM	HOOD/SIDE	0
TRADITIONAL BOX	9/14/2023, 9:42 AM	LITTER STEP	0
TRADITIONAL BOX	9/15/2023, 10:09 AM	FLOOR OUTSIDE ROOM	113
TRADITIONAL BOX	9/15/2023, 10:14 AM	FLOOR NEAR FOOD	0
TRADITIONAL BOX	9/15/2023, 10:15 AM	FLOOR NEAR BOX	0
TRADITIONAL BOX	9/15/2023, 10:15 AM	HOOD/SIDE	25
TRADITIONAL BOX	9/15/2023, 10:16 AM	LITTER STEP	0
TRADITIONAL BOX	9/16/2023, 7:30 AM	FLOOR NEAR BOX	166
TRADITIONAL BOX	9/16/2023, 7:31 AM	FLOOR NEAR FOOD	64
TRADITIONAL BOX	9/16/2023, 7:32 AM	HOOD/SIDE	13
TRADITIONAL BOX	9/16/2023, 7:33 AM	LITTER STEP	32
TRADITIONAL BOX	9/16/2023, 7:34 AM	FLOOR OUTSIDE ROOM	200
TRADITIONAL BOX	9/17/2023, 9:12 AM	FLOOR NEAR BOX	26
TRADITIONAL BOX	9/17/2023, 9:13 AM	FLOOR NEAR FOOD	150
TRADITIONAL BOX	9/17/2023, 9:14 AM	HOOD/SIDE	35
TRADITIONAL BOX	9/17/2023, 9:14 AM	LITTER STEP	45
TRADITIONAL BOX	9/17/2023, 9:15 AM	FLOOR OUTSIDE ROOM	360
TRADITIONAL BOX	9/18/2023, 10:18 AM	FLOOR NEAR BOX	153
TRADITIONAL BOX	9/18/2023, 10:19 AM	FLOOR NEAR FOOD	40
TRADITIONAL BOX	9/18/2023, 10:20 AM	HOOD/SIDE	42
TRADITIONAL BOX	9/18/2023, 10:21 AM	LITTER STEP	458
TRADITIONAL BOX	9/18/2023, 10:21 AM	FLOOR OUTSIDE ROOM	822
TRADITIONAL BOX	9/19/2023, 1:18 PM	FLOOR NEAR BOX	1,162
TRADITIONAL BOX	9/19/2023, 1:19 PM	FLOOR NEAR FOOD	861
TRADITIONAL BOX	9/19/2023, 1:20 PM	HOOD/SIDE	160
TRADITIONAL BOX	9/19/2023, 1:21 PM	LITTER STEP	272

Microbial Count On Surfaces

TRADITIONAL LITTER BOXES 2/2

TRADITIONAL BOX	9/19/2023, 1:22 PM	FLOOR OUTSIDE ROOM	2,680
TRADITIONAL BOX	9/20/2023, 12:33 PM	FLOOR NEAR BOX	587
TRADITIONAL BOX	9/20/2023, 12:34 PM	FLOOR NEAR FOOD	497
TRADITIONAL BOX	9/20/2023, 12:35 PM	HOOD/SIDE	380
TRADITIONAL BOX	9/20/2023, 12:35 PM	LITTER STEP	593
TRADITIONAL BOX	9/20/2023, 12:35 PM	FLOOR OUTSIDE ROOM	5,077
TRADITIONAL BOX	9/21/2023, 10:51 AM	FLOOR NEAR BOX	477
TRADITIONAL BOX	9/21/2023, 10:51 AM	FLOOR NEAR FOOD	773
TRADITIONAL BOX	9/21/2023, 10:52 AM	HOOD/SIDE	256
TRADITIONAL BOX	9/21/2023, 10:53 AM	LITTER STEP	621
TRADITIONAL BOX	9/21/2023, 10:54 AM	FLOOR OUTSIDE ROOM	290
TRADITIONAL BOX	9/22/2023, 9:11 AM	FLOOR NEAR BOX	840
TRADITIONAL BOX	9/22/2023, 9:12 AM	FLOOR NEAR FOOD	551
TRADITIONAL BOX	9/22/2023, 9:13 AM	HOOD/SIDE	12
TRADITIONAL BOX	9/22/2023, 9:14 AM	LITTER STEP	501
TRADITIONAL BOX	9/22/2023, 9:15 AM	FLOOR OUTSIDE ROOM	457
TRADITIONAL BOX	9/23/2023, 9:58 AM	FLOOR NEAR BOX	939
TRADITIONAL BOX	9/23/2023, 9:58 AM	FLOOR NEAR FOOD	161
TRADITIONAL BOX	9/23/2023, 9:59 AM	HOOD/SIDE	78
TRADITIONAL BOX	9/23/2023, 10:00 AM	LITTER STEP	456
TRADITIONAL BOX	9/23/2023, 10:01 AM	FLOOR OUTSIDE ROOM	3,331
TRADITIONAL BOX	9/24/2023, 4:16 PM	FLOOR NEAR BOX	793
TRADITIONAL BOX	9/24/2023, 4:17 PM	FLOOR NEAR FOOD	390
TRADITIONAL BOX	9/24/2023, 4:17 PM	HOOD/SIDE	84
TRADITIONAL BOX	9/24/2023, 4:19 PM	LITTER STEP	98
TRADITIONAL BOX	9/24/2023, 4:20 PM	FLOOR OUTSIDE ROOM	854
TRADITIONAL BOX	9/25/2023, 11:49 AM	FLOOR NEAR BOX	2,459
TRADITIONAL BOX	9/25/2023, 11:50 AM	FLOOR NEAR FOOD	213
TRADITIONAL BOX	9/25/2023, 11:50 AM	HOOD/SIDE	98
TRADITIONAL BOX	9/25/2023, 11:52 AM	LITTER STEP	3,808
TRADITIONAL BOX	9/25/2023, 11:52 AM	FLOOR OUTSIDE ROOM	410
		TOTAL	34066

Microbial Count On Surfaces

LITTER ROBOT 1/2

Plan Name	Result date	Location	Count
LITTER ROBOT	9/26/2023, 5:31 PM	FLOOR NEAR FOOD	0
LITTER ROBOT	9/26/2023, 5:32 PM	HOOD/SIDE	8
LITTER ROBOT	9/26/2023, 5:33 PM	LITTER STEP	0
LITTER ROBOT	9/26/2023, 5:35 PM	FLOOR OUTSIDE ROOM	15
LITTER ROBOT	9/27/2023, 5:46 PM	FLOOR NEAR BOX	3
LITTER ROBOT	9/27/2023, 5:47 PM	FLOOR NEAR FOOD	5
LITTER ROBOT	9/27/2023, 5:48 PM	HOOD/SIDE	0
LITTER ROBOT	9/27/2023, 5:49 PM	LITTER STEP	4
LITTER ROBOT	9/27/2023, 5:49 PM	FLOOR OUTSIDE ROOM	43
LITTER ROBOT	9/27/2023, 7:52 PM	FLOOR NEAR BOX	30
LITTER ROBOT	9/27/2023, 7:52 PM	FLOOR NEAR FOOD	191
LITTER ROBOT	9/27/2023, 7:54 PM	HOOD/SIDE	15
LITTER ROBOT	9/27/2023, 7:55 PM	LITTER STEP	143
LITTER ROBOT	9/27/2023, 7:55 PM	FLOOR OUTSIDE ROOM	385
LITTER ROBOT	9/29/2023, 8:16 AM	FLOOR NEAR BOX	125
LITTER ROBOT	9/29/2023, 8:17 AM	FLOOR NEAR FOOD	13
LITTER ROBOT	9/29/2023, 8:19 AM	HOOD/SIDE	34
LITTER ROBOT	9/29/2023, 8:20 AM	LITTER STEP	11
LITTER ROBOT	9/29/2023, 8:21 AM	FLOOR OUTSIDE ROOM	558
LITTER ROBOT	9/30/2023, 9:34 AM	FLOOR NEAR BOX	40
LITTER ROBOT	9/30/2023, 9:35 AM	FLOOR NEAR FOOD	337
LITTER ROBOT	9/30/2023, 9:36 AM	HOOD/SIDE	56
LITTER ROBOT	9/30/2023, 9:36 AM	LITTER STEP	82
LITTER ROBOT	9/30/2023, 9:37 AM	FLOOR OUTSIDE ROOM	143
LITTER ROBOT	10/1/2023, 11:08 AM	FLOOR NEAR BOX	50
LITTER ROBOT	10/1/2023, 11:08 AM	FLOOR NEAR FOOD	32
LITTER ROBOT	10/1/2023, 11:09 AM	HOOD/SIDE	11
LITTER ROBOT	10/1/2023, 11:10 AM	LITTER STEP	244
LITTER ROBOT	10/1/2023, 11:11 AM	FLOOR OUTSIDE ROOM	337

Microbial Count On Surfaces

LITTER ROBOT 2/2

LITTER ROBOT	10/2/2023, 12:21 PM	FLOOR NEAR BOX	50
LITTER ROBOT	10/2/2023, 12:22 PM	FLOOR NEAR FOOD	21
LITTER ROBOT	10/2/2023, 12:23 PM	HOOD/SIDE	21
LITTER ROBOT	10/2/2023, 12:24 PM	LITTER STEP	33
LITTER ROBOT	10/2/2023, 12:24 PM	FLOOR OUTSIDE ROOM	3,436
LITTER ROBOT	10/3/2023, 12:00 PM	FLOOR NEAR BOX	30
LITTER ROBOT	10/3/2023, 12:01 PM	FLOOR NEAR FOOD	126
LITTER ROBOT	10/3/2023, 12:02 PM	HOOD/SIDE	64
LITTER ROBOT	10/3/2023, 12:02 PM	LITTER STEP	22
LITTER ROBOT	10/3/2023, 12:03 PM	FLOOR OUTSIDE ROOM	321
LITTER ROBOT	10/4/2023, 9:31 AM	FLOOR NEAR BOX	3
LITTER ROBOT	10/4/2023, 9:32 AM	FLOOR NEAR FOOD	437
LITTER ROBOT	10/4/2023, 9:33 AM	HOOD/SIDE	0
LITTER ROBOT	10/4/2023, 9:33 AM	LITTER STEP	52
LITTER ROBOT	10/4/2023, 9:34 AM	FLOOR OUTSIDE ROOM	198
LITTER ROBOT	10/5/2023, 10:54 AM	FLOOR NEAR BOX	2
LITTER ROBOT	10/5/2023, 10:55 AM	FLOOR NEAR FOOD	7
LITTER ROBOT	10/5/2023, 10:56 AM	HOOD/SIDE	4
LITTER ROBOT	10/5/2023, 10:57 AM	LITTER STEP	108
LITTER ROBOT	10/5/2023, 10:57 AM	FLOOR OUTSIDE ROOM	184
LITTER ROBOT	10/6/2023, 11:41 AM	FLOOR NEAR BOX	64
LITTER ROBOT	10/6/2023, 11:41 AM	FLOOR NEAR FOOD	273
LITTER ROBOT	10/6/2023, 11:42 AM	HOOD/SIDE	39
LITTER ROBOT	10/6/2023, 11:43 AM	LITTER STEP	16
LITTER ROBOT	10/6/2023, 11:43 AM	FLOOR OUTSIDE ROOM	394
LITTER ROBOT	10/7/2023, 10:53 AM	FLOOR NEAR BOX	2
LITTER ROBOT	10/7/2023, 10:54 AM	FLOOR NEAR FOOD	42
LITTER ROBOT	10/7/2023, 10:54 AM	HOOD/SIDE	0
LITTER ROBOT	10/7/2023, 10:55 AM	LITTER STEP	33
LITTER ROBOT	10/7/2023, 10:55 AM	FLOOR OUTSIDE ROOM	258
		TOTAL	9,155



Bacteria Results

Samples were taken at planned intervals at designated areas:

- **BASELINE**

- 1A Floor outside litter box
- 1B Floor near food
- 1C Side of Traditional litter box
- 1D Step of litter box
- 1E Floor outside of room

- **AFTER TRADITIONAL BOX TEST**

- 2A Floor outside litter box
- 2B Floor near food
- 2C Side of Traditional litter box
- 2D Step of litter box
- 2E Floor outside of room

- **BASELINE**

- 3A Floor outside litter box
- 3B Floor near food
- 3C Side of Traditional litter box
- 3D Step of litter box
- 3E Floor outside of room

- **AFTER LITTER ROBOT TEST**

- 4A Floor outside litter box
- 4B Floor near food
- 4C Side of Traditional litter box
- 4D Step of litter box
- 4E Floor outside of room



Bacteria swab results attached

- The baseline samples were found to contain less than 10 cfu/ml, which is below normal range for a clean, porous surface.
- There were no significant changes in bacterial growth between traditional boxes and Litter Robot 4 testing periods. Most likely this was due to sanitizing every 12 days for a controlled environment.

Bacterial Colony Info

Although the levels were low across all results, several bacteria strains were found. Below is a partial list with description:

- **Micrococcus luteus** - is commonly found in natural environments like soil and water. It's also considered a normal inhabitant of skin and oropharynx mucosa
- **Staphylococcus epidermidis** - microorganism that is naturally found on human skin.
- **Enterococcus faecalis** - bacterium that is commonly found in the human gastrointestinal tract
- **Staphylococcus argenteus** - In most situations is harmless. However, if it enters the body through a cut in the skin, it can cause a range of mild to severe skin and soft tissue infections such as abscesses (boils), furuncles, and cellulitis. This reaction is dependant upon the health of the host immune system.
- **Staphylococcus xylosus** - a species of bacteria that is a commensal on the skin of humans and animals and typically harmless
- **Kocuria rhizophila** - a bacterium commonly found in soil and not particularly harmful to healthy humans and animals, but can cause infections in those who are immunocompromised.



- **Staphylococcus hominis** - a bacterium that is commonly found on human and animal skin. It is usually harmless, but can sometimes cause infections in people with weakened immune systems
- **Brevibacillus agri** - motile bacterium that is often found in soil, air, water, and decaying matter
- **Dermacoccus nishinomiyaensis** - bacteria that is generally non-pathogenic to humans and is a skin commensal
- **Moraxella osloensis** - commensal organism that can be found on the skin, respiratory tract and mucosa of healthy mammals

Synopsis

Overall, nothing alarming was found in the bacteria swabs. There were strains that could be harmful to a human or animal that is injured or has a weakened immune system, as with all non sterile environments.

If there are immunocompromised humans or animals cohabitating, it is highly recommended to clean and disinfect all surfaces frequently. Frequent cleaning of litter boxes and scattered litter will help to maintain a healthier environment.

Constant cleaning of pet waste will help to reduce the total amount of potentially harmful microbes in a space, therefore, utilizing an automatically sifted litter box will reduce the amount of times the pet steps into waste, allowing for these microbes to be dispersed throughout the home.