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Bacteria In Granite

The plastic countertop salesman's pitch

An article by **Maurizio Bertoli**, the founder of the "marble cleaning" company

I am going to break with the "tradition" this time!

Can you believe that?! … I, Maurizio Bertoli, the guy who invented the politically incorrect "ROCKING THE BOAT" column, am going to be on the same side of the "salesmen" that I so passionately fight all the time!

Which goes to prove that, ultimately, I'm not against the stone industry establishment for what it is (I elected to be a part of it myself, after all!) I am simply and exclusively against lies, wherever the may come from. So, at the end, I'm not on the side of the "salesmen". The only difference is that this time I'm fighting "salesmen" from another industry!

And the "**lie of the day**" is: **"Granite Harbors Bacteria!"**

It is a fact that despite all the wrongdoing carried on by the "salesmen" who, unchecked, run the stone show, and the consequent bad reputation that in many cases they eventually get to (deservedly) "enjoy", our ancestral attraction to natural stone is too strong an enticement to dissuade consumers from buying it. Hence, no matter what, the demand for natural stone products is expanding.

This fact, of course, bothers some interest groups that see their market shares cut into by the always imitated but never matched beauty of natural stone. Zeroing in the widespread use of granite as a material for kitchen countertops, I'm talking about manufacturers of competing, manmade products, namely the so called "solid surfaces", which is nothing but a fancy way of saying: PLASTIC. The manufacturers of other materials, such as laminated ("Formica" and such) don't worry too much: they are quite cheaper than natural stone; therefore they cater to a totally different market sector. When it comes to solid plastic ("Corian" and such), however, their makers do worry, and very much so. In fact their prices are not much cheaper than natural granite and, basically they cater to the same market sector. Since comparing the two materials is not a fair fight, to defend the inherently inferior quality of their products they have to fight dirty. And dirty they fight, by making up vicious lies.

The first lie that came around (we go back, I believe, 7 or 8 years ago) was about the Radon emission of granite. It didn't last long, though. I mean, even unsophisticated consumers know

that radon – inasmuch as definitely dangerous – is a very volatile gas that comes from the earth but doesn't stick around, nor is it stored to or into anything. In fact, if a household is "infested" by radon, all it's required to eliminate any possible health hazard, is to keep the basement windows open! Now, even assuming that some granite quarry is sitting on an area rich with radon gas, how much of it can be stored into a slab that goes through the following processing: 1. Quarried off the mountain, in the open air. 2. Hauled on open truck's beds. 3. Sliced into slabs by huge gang-saws featuring incredible blades that cut into the block at a remarkable speed, but at glacier pace (it may take more than one day to slab a large block), while using rivers of water all along. 4. Calibrated, ground, honed and polished on one side, again using rivers of waters. 5. Stored in open yards or huge warehouses. How much radon can still be present in a slab of granite? No instrument known to man could possibly measure it!

I distinctly remember that when an article (unsigned! …) was published by a certain magazine, which, by a "strange" coincidence, was totally sponsored by the solid plastic industry, warning potential consumers against the risk of exposure to radon gas by having a granite counter top installed in their homes, many scientists were outraged by such a malicious blatant lie and gave the stone industry their total support, producing solid scientific evidence. One of those scientists in particular stated that granite, in fact, could be considered the best insulating material to protect any given environment from radon gas!

That took care of that! But the "salesmen" (no matter in which industry they operate) are a resilient species indeed! They had to come up with something else!

Taking the idea from the fact that many a "granite" do have natural fissures and crevices, they started spreading the word that granite harbors bacteria. Did they ever do any serious homework to support that? Of course not! The only homework that "salesmen" do every day is to study easier ways to "sell it"! Like wildfire the word was spread around, and concerned consumers started worrying that there could be some truth in the rumor. Some of them, before making a decision, inquired with a few stone industry web sites that offer forum-like pages, so that consumers can post gripes and ask questions, which in turn will be answered by stone experts (or alleged experts).

The following posting (bulletin #0 of www.stoneindustry.com) was volunteered by a microbiologist and medical technologist. I'm hereby reporting it totally unedited:

I have read several messages in this forum that ask about bacteria with respect to granite countertops Vs "corian"-type countertops. (I am a microbiologist and medical technologist.) There is a web site, http://www.hi-tm.com/Documents/Countertops.html, which shows the results of a study comparing 6 different countertop materials (laminate, wood, tile, concrete, stainless steel, and granite) and how much they retained the bacteria Escherichia coli (E. coli). According to this study, the best two materials were stainless steel and GRANITE. Also, keep in mind that from a microbiological perspective, slab is much better than tile for a countertop. Tile is a poor choice for a countertop because of the tendency of grout (if not sealed religiously) to harbor bacteria.

I have also checked the FDA Food Code for 2001 (at http://www.cfsan.fda.gov/~dms/fc01-4.html) and there is no reference to "corian" type products being specifically endorsed. (If anyone has a specific reference I would like to see it.)

Hope this helps everyone,

--Kim"

Here is also reported the result of the study Kim is making reference to. I took in its entirety from the web site that Kim mentions in her message.

THE REDUCTION OF *E. COLI* ON VARIOUS COUNTERTOP SURFACES

O. Peter Snyder, Jr., Ph.D.
Hospitality Institute of Technology and Management
March 22, 1999

Introduction

The purpose of this study was to determine the cleanability of six countertop surfaces.

1. Laminate
2. Wood
3. Tile
4. Concrete
5. Stainless steel
6. Granite

These materials are commonly used in home kitchen countertop construction. Today, it is understood that many food items that we purchase are highly contaminated with pathogenic microorganisms, and it is necessary for the home cook to make these foods safe. Often, the first step in food preparation is cutting and manipulating the food to get it ready. It is essential that the countertop be cleaned after raw food has touched the surface. Otherwise, there can be cross-contamination, and the people eating the food prepared on the cross-contaminated surface can become ill. This study identifies the cleanability of these six different countertop materials.

Methods

The countertop materials were supplied by Porter Novelli (1120 Connecticut Avenue NW; Washington, DC 20036-3902). The countertop sources are as follows.

1. **Laminate**: Wilson Art #4557-60; color-dakota ridge
2. **Wood**: maple, class 65 woods
3. **Tile**: Daytona tile, grade 5 (no stock information; made in Italy); ceramic clay tile fired from 9-1,300ºC with a single glaze

4. **Concrete**: custom sample; no specific information
5. **Stainless steel**: type 304, number 4 finish
6. **Granite**: custom sample; Lelajaross, 2-cm-thick sample

The procedure for doing the experiments was as follows.

E. coli ATTC# 25922, a non-pathogenic *E. coli*, was used as the marker organism. It was grown overnight at 35ºC in a static culture of M broth (International Bioproducts; 14780 NE 95th Street, Redmond, WA 98052) to an inoculum of approximately 1,000,000,000 organisms per ml.

An area of 81 square inches of each countertop was inoculated with 1 ml of this culture in M broth. The cleaning procedure was as follows. First, the surface was washed with a dishcloth and 2 liters of detergent (Jefco Yellow Dishsoap; Unisource / Jefco Group, Inc.; 1040 North Halsted Street; Chicago, IL 60622) water in a stainless steel bowl. The surface was then rinsed, using a second bowl with 2,000 ml of clear water and a second dishcloth. The cleaning process entailed rubbing the dishcloth left to right over the surface, rinsing it out, then, rubbing up and down and rinsing it out. The rinse step followed the wash step, using the same left-to-right and up-and-down strokes.

After the surfaces were washed and rinsed, they were swabbed, using a sponge swab over the entire 81 square inches of inoculated surface to find the mean reduction. The sponge swab was cultured using Violet Red Bile agar plates (International Bioproducts) and incubated overnight at 35ºC.

Following the wash and rinse, the surfaces were wiped with a 10% solution of white household vinegar (1 cup 5% vinegar in 9 cups tap water). The surfaces were allowed to dry for 15 minutes. They were then sponge-swabbed over the 81 square inches once more, and cultured, using VRB agar to determine how many *E. coli* had been destroyed by the vinegar.

Results

The results of the experiment are shown in Table 1 as logarithms of counts per 81 square inches of surface. In the column, "Real number," the logarithms of the average are converted to real numbers. In each experiment, the first column presents the log mean count of the organisms recovered. The second column under each experiment shows the log reduction in bacteria due to the wash-and rinse process or due to the vinegar application. The results are also shown in Figure 1.

The retention of the *E. coli* was from most retained to most removed as follows.

1. Laminate
2. Wood
3. Tile
4. Concrete
5. Stainless steel
6. Granite

For the **laminate**, washing and rinsing reduced the bacterial counts by about 285 to 1, as shown in the summary column. When the vinegar was applied, the overall reduction was increased to about 500,000 to 1.

For the **wood**, washing and rinsing reduced the bacterial counts by about 500 to 1, as shown in the summary column. When the vinegar was applied, the overall reduction was increased to about 2,000 to 1.

For the **tile**, washing and rinsing reduced the bacterial counts by about 900 to 1, as shown in the summary column. When the vinegar was applied, the overall reduction was increased to about 233,000 to 1.

For the **concrete**, washing and rinsing reduced the bacterial counts by about 2,400 to 1, as shown in the summary column. When the vinegar was applied, the overall reduction was increased to about 30,600 to 1.

For the **stainless steel**, washing and rinsing reduced the bacterial counts by about 4,000 to 1, as shown in the summary column. When the vinegar was applied, the overall reduction was increased to about 230,000,000 to 1.

For the **granite**, washing and rinsing reduced the bacterial counts by about 36,000 to 1, as shown in the summary column. When the vinegar was applied, the overall reduction was increased to about 80,000,000 to 1.

Discussion

This experiment has shown that every countertop will have a different cleanability. This experiment was done with new samples. When some of these samples become worn, the reduction will probably not be as significant, except for stainless steel, which should change the least.

While granite showed the greatest reduction in washing, overall, after the vinegar sanitizing, the stainless steel had the greatest reduction.

Conclusion

It is very important in food safety for the designer to consider the countertop material. In this case, the stainless steel counter showed the greatest overall reduction after the wash, rinse, and sanitize processes.

Figure 1. Rdtn = reduction 0 = <100

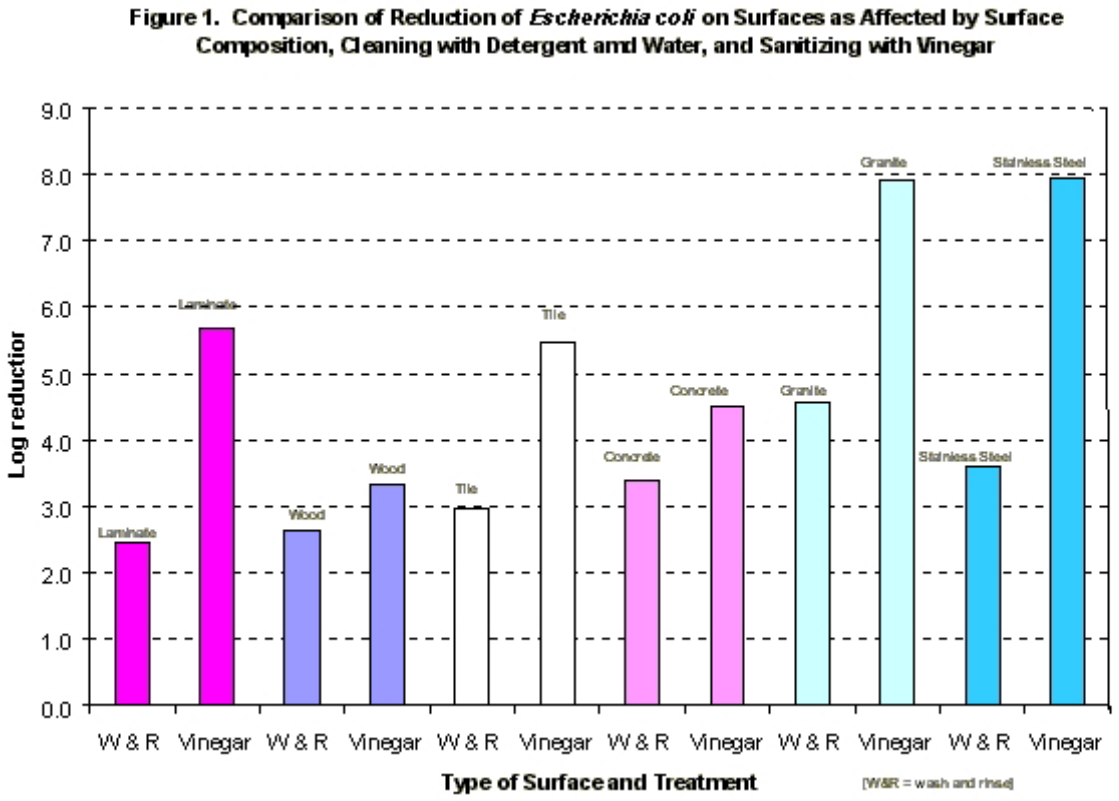

Table 1. Log Reduction Comparison of Non-pathogenic *Escherichia coli* on Surfaces [CFU / 81 sq. in.] as Affected by Surface Composition, Washing and Rinsing, and Sanitizing with Vinegar

		Expt. 1		Expt. 2		Expt. 3		Expt. 4		Expt. 5		Summary		
Material	**Trmt.**	**Mean**	**Rdtn.**	**Mean**	**Rdtn.**	**Mean**	**Rdtn.**	**Mean**	**Rdtn.**	**Mean**	**Rdtn.**	**Log avg. rdtn.**	**Numerical value**	**Std. dev. of log av. rdtn.**
Innoculum		9.18		9.33		9.34		9.25		9.26		9.27	1,862,087,137	0.07
Laminate	W & R	4.85	4.33	6.38	2.95	6.25	3.09	8.35	0.90	8.25	1.01	2.46	286	1.32
	Vinegar	3.65	5.53	3.43	5.90	3.25	6.09	3.84	5.41	3.70	5.56	5.70	498,884	0.25
Wood	W & R	6.38	2.80	6.89	2.44	6.76	2.58	6.62	2.63	6.55	2.71	2.63	429	0.12
	Vinegar	5.82	3.36	6.00	3.33	5.98	3.36	6.04	3.21	5.93	3.33	3.32	2,080	0.06
Tile	W & R	6.23	2.95	6.19	3.14	6.41	2.93	6.34	2.91	6.39	2.87	2.96	912	0.09
	Vinegar	4.33	4.85	3.28	6.05	2.30	7.04	4.51	4.74	4.60	4.66	5.47	293,765	0.94
Concrete	W & R	5.81	3.37	5.89	3.44	6.29	3.05	5.80	3.45	5.69	3.57	3.38	2,377	0.18
	Vinegar	4.28	4.9	4.73	4.60	4.85	4.49	4.92	4.33	5.00	4.26	4.52	32,810	0.23
Granite	W & R	4.86	4.32	4.26	5.07	4.76	4.58	4.78	4.47	4.93	4.33	4.55	35,810	0.28
	Vinegar	0	9.18	1.24	8.09	0	9.34	2.88	6.37	2.74	6.52	7.90	79,432,823	1.26
Stain.Stl.	W & R	5.22	3.96	6.28	3.05	5.84	3.5	5.48	3.77	5.55	3.71	3.60	3,963	0.31
	Vinegar	0	9.18	1.30	8.03	3.26	6.08	0	9.25	2.15	7.11	7.93	85,113,804	1.22