

A Survey of Microbial Populations in Infilled Synthetic Turf Fields

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Results

Field Samples

The results of total microbial populations are shown in Table 1. While microbes exist in the infill media the number was low compared to natural turfgrass field soils. It should be remembered that microbes tend to be present on most surfaces humans come in contact with and the simple presence of microbes should not be cause for concern. In fact, many products on the market claim to boost the microbial populations of natural turfgrass soils with higher microbial populations considered to be beneficial.

Table 1. Colony forming units (CFU) detected on R2A media per gram of crumb rubber.

Field ID# ¹	Product	CFU/g crumb rubber
¹ H = sample collected from higher use area of field L = sample collected from lower use area of field * = sample collected from indoor field		
1H	100% crumb rubber	20200
1L	100% crumb rubber	32667
2H	Crumb rubber - Sand mix	3533
2L	Crumb rubber - Sand mix	133
3H	Crumb rubber - Sand mix	3467
3L	Crumb rubber - Sand mix	13133
4H	100% crumb rubber	9467
4L	100% crumb rubber	30267
5H	Crumb rubber - Sand mix	18867
5L	Crumb rubber - Sand	8333

	mix	
6H	Crumb rubber - Sand	267
	mix	
6L	Crumb rubber - Sand	28333
	mix	
7H	Crumb rubber - Sand	4800
	mix	
7L	Crumb rubber - Sand	55333
	mix	
8H	Crumb rubber - Sand	4867
	mix	
8L	Crumb rubber - Sand	24133
	mix	
9H	100% crumb rubber	9800
9L	100% crumb rubber	17867
10H*	Crumb rubber - Sand	0
	mix	
10L*	Crumb rubber - Sand	67
	mix	
11H	Crumb rubber - Sand	33200
	mix	
11L	Crumb rubber - Sand	28000
	mix	
12H	100% crumb rubber	333
12L	100% crumb rubber	800
13H	100% crumb rubber	267
13L	100% crumb rubber	67
14H	100% crumb rubber	8267
15H	Crumb rubber - Sand	8600
	mix	
15L	Crumb rubber - Sand	3867
	mix	
16H*	Crumb rubber - Sand	200
	mix	
16L*	Crumb rubber - Sand	0
	mix	
17H	Crumb rubber - Sand	0
	mix	
17L	Crumb rubber - Sand	7267
	mix	

18H	100% crumb rubber	5000
18L	100% crumb rubber	5533
19H	Crumb rubber - Sand mix	53067
19L	Crumb rubber - Sand mix	80000
20H	Crumb rubber - Sand mix	54333
20L	Crumb rubber - Sand mix	8867
Native soil (silt loam)		259500
Sand based soil		309500

Pile fiber samples were also collected from several fields. CFUs for fiber samples range from 200-2933 CFUs per fiber sample (2 fibers approximately 1 cm long) indicating that the fibers alone generally exhibited lower microbial populations compared to the infill.

Microbial colonies isolated from field samples generally included both fungi and bacteria. Some fields had predominantly one organism type while other fields contained a variety of organisms. In order to positively identify the presence of *S. aureus*, three procedures were used. No colonies isolated from any crumb rubber or fiber samples tested positive for *S. aureus* via selective media, gram stain or latex agglutination tests.

Other Surfaces

Surfaces other than athletic playing surfaces were tested for the presence of microbes and *S. aureus*. These surfaces are not granulated and thus the results are listed in Table 2 as total colony number as opposed to CFU per gram of granulated material.

Table 2. Number of colonies per swab detected on R2A media from various sources in public spaces and an athletic training facility.

Source	Colony number
*Sampled immediately after use	
Public areas	
Computer mouse	>600
Elevator button	155
Outside door handle	80
Computer keyboard	33
Athletic training facility	

Cold pool	24
Blocking pads*	130
Sauna	536
Football*	142
Weight equipment 1*	62
Weight equipment 2*	414
Towel hamper	103
Stretching table	14
Used towels*	29
Trash can for drink cups	205

Table 3. Surfaces that tested positive (+) for *S. aureus* colonies per swab detected.

Source	Colony number
*Sampled immediately after use	
Public areas	
Human hands	+
Human faces	+
Computer mouse	-
Elevator button	-
Outside door handle	-
Computer keyboard	-
Athletic training facility	
Natural turfgrass playing field	-
Synthetic turf playing field	-
Cold pool	-
Blocking pads*	+
Sauna	-
Football*	-
Weight equipment 1*	+
Weight equipment 2*	+
Towel hamper	-
Stretching table	+
Used towels*	+
Trash can for drink cups	-

Microbial colonies isolated from surfaces included a mixture of fungi and bacteria. Colonies from the trash can were predominantly fungi. While not specifically identified, all colonies from the sauna swab

appeared to be the same. *S. aureus* was positively identified from several samples including towels, blocking pads, weight equipment, and the stretching table. In addition, *S. aureus* was positively identified from every facial and hand swabs tested.