Hand Wash Trials using Anolyte Solutions

Introduction

Normal human skin is a complex organ and the bacterial populations associated with it are complex in kind and number. The skin supports the growth of both aerobic and anaerobic bacteria (Evans, 1950; Nester et al., 1995). The most prevalent organisms are the anaerobe, Propionobacter, although Micrococci and Staphylococci were also isolated in most instances Alcamo (2001). Microscopic studies indicated that the ducts of the sebaceous glands were the major sites of growth. Sweat gland ducts contained little or no bacteria. Organism on the surface of the skin may have grown on or in the skin itself or may be casual contaminants picked up from external sources. Quantitation of the bacteria of the skin may be greatl influenced by the method of sampling.

The techniques most commonly employed are the contact plate, swabbing and streaking, scrubbing and flushing (Updegraff et al., 1963) and Tape stripping. Each of these methods determines only a portion of the total population present on or in the skin. The contact plate method is the simplest of the techniques and gives good reproducibility, but only those microorganisms on the surface will be determined. The scrubbing and flushing is a more involved procedure and removes surface bacteria as well as those deeper lying organisms that are more easily brought to the surface. The use of swabs to quantify bacteria on the skin gives variable results unless the method is rigidly controlled and strict attention is given to such details as the pressure applied while swabbing, whether dry or moist swabs are employed, the length of time that an area is swabbed. No one method can give the complete picture of the bacterial population on and in the skin, but a combination of the above procedures can be used to produce a better idea of the bacterial distribution and changes in the population.

While the pattern of distribution is constant, the level of the bacterial population of the skin appears to vary greatly among individuals. Spore formers are not common in adults. Variation in bacterial level among subjects is expected but a single individual tends to maintain a relatively stable level of microbial populations over long periods of time. Although individuals tend to maintain certain microbial populations over long periods of time, it is possible to change the level by a variety of methods. Peculiarly enough, the numbers of bacteria on the skin are significantly increased by ordinary bathing or showering. The numbers of bacteria on the skin can be reduced by scrubbing with germicidal detergents as is employed in a surgical scrub. The objective of this study was to evaluate Anolyte products as a disinfectant hand washing agent.

Materials and Methods

Solutions used in the trial

Sterile water was used as a control. The physicochemical attributes of the disinfectant solutions used in the Hand washing trial were as follows:

- NaC1 derived Anolyte – salt concentration in catalyst solution: 3gm/litre ORP: 840mV, Conductivity – 7400 micro-siemens, pH-NaHCO3 derived Anolyte

- Bicarb concentration in Catalyst solution: 3gm/litre ORP: 780mV, Conductivity – 2400microsiemens, pH – 7.1

Methodology

- ***Contact Plate method:*** The RODAC plate technique was used to sample the palm of the hands of subjects. Samples were taken on unwashed hands and again after washing with the solutions mentioned in 2.1.

- ***Wash and rinse method:*** Subjects washed their hands in 400 ml of the solutions for approximately 60 seconds. The wash water was collected and microbiological analysis conducted.

- ***Microbiological analysis:*** The total bacterial number was determined using Nutrient Agar and incubation at 37°C for 48h. The number of coliforms bacteria were determined using McConkey Agar and incubation ag 37°C or 24h. The number of Salmonella bacteria were determined using Salmonella Agar and incubation at 37°C for 24h.

Results and Discussion

Table 1: Microbiological analysis of the water collected after washing of hands.

Sample	Number of total bacteria cfu/ml	Number of coliforms/ml	Number of Salmonella/ml	TPC/ 25 cm^2
Pre water wash	ND	ND	ND	3.52×10^2
Pre water wash	ND	ND	ND	>300
Pre water wash	ND	ND	ND	>300
Pre water wash	ND	ND	ND	3.6×10^2
Sterile H$_2$O (1)	2.4×10^2	45	0	1.49×10^2
Sterile H$_2$O (2)	1.17×10^4	<100	0	6.24×10^2
Sterile H$_2$O (3)	1.96×10^4	78	0	3.80×10^2
Sterile H$_2$O (4)	2.26×10^2	48	0	2.25×10^2
Bicarb anolyte (1)	5×10^2	0	0	6.48×10^2
Bicarb anolyte (2)	1.4×10^1	0	0	3.48×10^2
Bicarb anolyte (3)	8.2×10^3	<100	0	>300
Bicarb anolyte (4)	7.1×10^3	1.34×10^2	0	2.30×10^2
NaCl anolyte (1)	<10	0	0	2.30×10^2
NaCl anolyte (2)	<10	0	0	0
NaCl anolyte (3)	0	0	0	1.48×10^2
NaCl anolyte (4)	0	0	0	0
NaCl anolyte (5)	0	0	0	79
Container washed with alcohol	ND	ND	ND	0

ND: Not determined
TPC: Total plate count using the RODAC contact plate method
cfu : colony forming unit

Pre water wash

The TPC on the pre wash, as determined using the contact plate method, indicate a high level of contamination, with most of the RODAC plates completely covered with bacterial colonies (Table 1).

Sterile H2O wash

After washing hands with sterile water, the results on the wash water, indicate the removal of bacteria, indicated in the bacterial numbers (Table 1). Coliforms were also present, indicating that the workers hands were contaminated (Table 1). The contact plate results indicate, that the hands washed with sterile water, were not sanitized completely, with between 200 and 700 bacteria/25 cm2 remaining on the hands (Table 1).

Bicarb anolyte

The results obtained with the Bicarb Anolyte were very similar than those for sterile water, whe comparing the TPC determined by the contact plate method, with bacterial numbers ranging between 20 and 600 bacteria/25 cm2 (Table 1). However, when comparing the average number of total bacteria/ml i.

the hand wash solution, the Bicarb Anolyte resulted in a significant 1 log lower bacteria number, than sterile water (3,9 X 103 cfu/ml compared to 7,94 x 104 cfu/ml for sterile water). This indicated, that the Bicarb Anolyte did have some disinfectant properties.

NaCl Anolyte

The NaCl Anolyte virtually sterilized the hands after washing. The total number of bacteria as determined by the contact plate method was 230, 148 and 79 cfu/25 cm2 in three cases and 0 fcu/25 cm2 in two cases (Table 1). The efficacy of NaCl Anolyte as a disinfectant is confirmed by the sterility of the hand wash water sampled (Table 1).

Conclusions

- The Bicarb anolyte was more effective as disinfectant than sterile water

- NaCl Anolyte was very effective as a disinfectant and hand washing agent.

- Workers hands were contaminated with coliforms

- None of the workers hands were contaminated with Salmonella

This entry was posted in *Industry Articles (https://www.radicalwaters.com/category/industry-articles/)*, *Technical Documents (https://www.radicalwaters.com/category/technical-documents/)*. Bookmark the *permalink (https://www.radicalwaters.com/hand-wash-trials-using-anolyte-solutions/)*.

← Microbiological Fingerprinting of Anolyte (https://www.radicalwaters.com/microbiological-fingerprinting-of-anolyte/)

Radical Waters is the global leader in Electrolyzed Water or Electro-Chemically Activated Water (ECA) Technology. → (https://www.radicalwaters.com/electrolyzed-water/)

TO TALK TO A REPRESENTATIVE OR TO PLACE AN ORDER

CONTACT US   (http://www.radicalwaters.com/new-enquiry/)

Categories

About ECA (https://www.radicalwaters.com/category/about-eca/)
Brochures (https://www.radicalwaters.com/category/brochures/)
Industry Articles (https://www.radicalwaters.com/category/industry-articles/)
Media Articles (https://www.radicalwaters.com/category/media-articles/)
Newsletters (https://www.radicalwaters.com/category/newsletter/)
Press Releases (https://www.radicalwaters.com/category/press-releases/)
Technical Documents (https://www.radicalwaters.com/category/technical-documents/)
Uncategorized (https://www.radicalwaters.com/category/uncategorized/)