# ANALYSIS OF THE EFFECTIVENESS OF THE TYPES OF SOAP AND THE WAY OF WASHING YOUR HANDS

I. Ruiz[1], S. Ojeda[1], E. León[2]
[1] IES Fidiana from Córdoba students
[2] Teaching stuff IES Fidiana from Córdoba

Coordinating IES professor: Dra Elena León Rodríguez
email: eleorod661@iesfidiana.es

## INTRODUCTION

Infection in hospitals and at home continues being a serious public health problem throughout the world. Among its main prevention and control measures is hand washing. Soap is a very important product for our hygiene, and more so in times of pandemic, in which cleaning our hands is essential to prevent diseases and prevent the spread of infections to other people. People often touch their eyes, nose, or mouth, and microorganisms use these pathways to invade the body. On the other hand, unwashed hands can get onto food and drinks and spread disease on them and make people get sick (respiratory infections, skin infections, etc.).
It is evident that a good education in hand washing and choosing the right soap benefits the health of the community.

## OBJECTIVES

The main objective of this project is to determine the most effective type of soap (glycerine soap, chemical soap, hydroalcoholic gel or natural soap) in order to eliminate the greatest number of bacteria on our hands.

Moreover, the effectiveness of washing hands incorrectly or correctly, as it is indicated by the WHO, will be determined

## MATERIALS AND METHODS

1st session

Understanding the project with the teacher's help.


3rd session

Samples taken from different people from our class who washed their hands in different ways and used different soaps, Petri dishes were sealed and incubated at 37 ° C

*Figure 1: Impression of the hands in the culture medium for collecting of the samples*

*Figure 2: Sealing the Petri dishes with Paraffin*

*Figure 6: Different samples with colonies of bacteria*

*Figure 3: Incubation at 37ºC*

*Figure 5: Cultivation chamber*

2nd session

Preparation of materials:
.21 Petri dishes
.Paraffin film (to seal Petri dishes)
.Bacterial incubator
.Soaps (glycerine, chemical –Agrado brand -, natural – Lagarto brand- and hydroalcoholic gel)
.LB (Luria-Bertani) culture medium for bacteria.

4th session

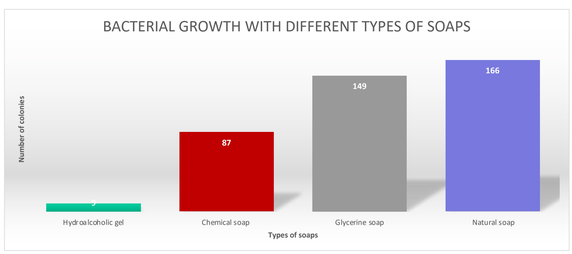
Observation and counting of the resulting colonies, calculation of the average to obtain the data

*Figure 7: Colonies of bacteria grown after fingerprinting on LB medium*

## RESULTS

| Types of soap | Hydroalcoholic gel | Chemical soap | Glycerine soap | Natural soap |
|---|---|---|---|---|
| Number of colonies | 9 | 87 | 149 | 166 |

*Table 1 and Graph 1: Bacterial colonies grown with the different soaps tested*




The results of the first table show us how, by washing our hands in the correct way (the one indicated by the WHO), the most effective soap in order to eliminate bacteria is the hydroalcoholic gel and secondly the chemical soap. Also, It is observed that natural soap is the least effective, a fact that may surprise, but which is logical, because it does not contain bactericide products, to kill microorganisms, or colourants or synthetic components.

| Way to wash hands | Unwashed | Badly washed | Well washed (recommended by WHO) |
|---|---|---|---|
| Number of colonies | 303 | 122 | 86 |

*Table 2 and Graph 2: Bacterial colonies grown according to the washing process*


On the other hand, this table shows us the results obtained with hands without washing for hours and washing them badly or well. The number of grown colonies decreases as the washing process is carried out more correctly. We conclude the importance of washing hands correctly (the one indicated by the WHO) in order to eliminate as many colonies as possible. In all cases, the washing process was carried out with natural soap, Lagarto brand.

## CONCLUSIONS

- The hydroalcoholic gel showed the greatest bactericidal effect, so for good hand cleaning it is the most advisable among the soaps studied.
- Glycerine soap and Lagarto natural soap showed less effectiveness for hand hygiene, probably due to the absence of added synthetic products.
- On how to wash hands, the difference in values obtained between well-washed hands (86 colonies) and poorly washed hands (122 colonies), or directly without washing (303 colonies), show that the recommended way by WHO removes more germs from hands.

## ACKNOWLEDGMENTS

.To the teachers and Elena León and Mª Ángeles Gutiérrez
.To all of our classmates who have participated.
.To the IES Fidiana center.
.To the R + D + i Department
.To the Educational Innovation Project FIDICIENCIA
.To the Ministry of Education