



SUPERTOWEL FAQ

Supertowel is an innovative handwashing tool. This document summarizes the evidence and knowledge till date. It is an evolving document that will be updated on a continuous basis.

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Supertowel™ – FAQ

This document is designed to answer common questions humanitarians may have when procuring the Supertowel. It summarises current evidence and learning about the product and will be updated on a regular basis. This version was published on May 26th, 2021.

OVERVIEW

WHAT IS THE SUPERTOWEL?

The Supertowel is designed to be an alternative to handwashing with soap for contexts where water and soap are scarce. It is a product designed and developed by Real Relief and partners.



WHAT ARE THE MAIN BENEFITS OF THE SUPERTOWEL?

- Scientifically proven efficacy as handwashing tool
- Easy access to handwashing everywhere
- Does not require handwashing stations
- No soap required and only very little water
- Low cost
- Well accepted by users
- Seems to improve frequency of handwashing among users

HOW WAS SUPERTOWEL DEVELOPED?

Supertowel was developed in response to a funding call announced by the Humanitarian Innovation Fund in 2017. The call asked applicants to ‘reimagine soap’ and to make hand hygiene more feasible in humanitarian contexts. With funding from the Humanitarian Innovation Fund and USAID’s Bureau for Humanitarian Assistance we have been developing and evaluating the product over the last four years. During this time, we have conducted research and design work with a range of humanitarian and academic partners including the London School of Hygiene and Tropical Medicine (LSHTM), KET’s Scientific Research Centre, Stanford University, Tufts University, Lancon Environmental, Boston University, Biotech Testing Services, the Royal College of Art, The Danish Refugee Council, Action Contre la Faim (ACF), ZOA and the British Red Cross.



USING AND MAINTAINING THE SUPERTOWEL

HOW DO YOU USE SUPERTOWEL FOR HAND CLEANING?

The Supertowel is made from a piece of microfibre cloth which has been treated with a permanent antimicrobial coating. Users should dip the cloth in water, wring it out, and then wipe the cloth on their hands, following similar steps to handwashing as with soap. Once damp, the Supertowel can be carried with a person and re-used multiple times throughout the day.

DOES THE SUPERTOWEL NEED SOAP OR DETERGENT TO WORK?

No. Supertowel will work without soap when used as a hand cleaning product. The Supertowel may however get visibly dirty after having been used several times. It could increase the appeal of the product and frequency of use if the Supertowel is washed at regular intervals.

HOW MUCH WATER DOES SUPERTOWEL REQUIRE FOR HAND CLEANING?

Based on our laboratory studies hand washing for 15 seconds with bar soap uses approximately 760 ml of water. Handwashing for 60 seconds with the same soap consumes about 1,650 ml. The Supertowel consumes an average of 52 ml when soaked and then wrung so that it remains damp. With this water it can be used for the next 3-5 hours while damp. In settings where water is scarce, we commonly observe populations having to prioritise water for tasks other than handwashing (e.g. bathing, laundry, drinking and cooking)^{1,2}. Being able to save this much water on a routine behaviour like handwashing can make a big difference to populations.

WASHING HANDS WITH YOUR SUPERTOWEL™



Figure 1: An illustration of how to clean hands with the Supertowel



HOW SHOULD SUPERTOWEL BE USED OUTSIDE THE HOME?

Since Supertowel is so mobile it can easily be taken with a person when he is leaving the house and are often particularly useful for hand cleaning in public environments where handwashing facilities are not always available. In some settings the Supertowel has been distributed in a small waterproof bag so that it can be stored while damp and outside the house. In other settings people prefer to drape the towel around their shoulders to keep them cool in hot temperatures.



CAN THE SUPERTOWEL BE USED WITH GREY WATER OR SURFACE WATER IN LAKES AND RIVERS?

Yes. If acceptable to populations, the Supertowel can be dipped into contaminated water prior to its use for hand cleaning. The antimicrobial properties of the Supertowel will kill anything in the water leaving the Supertowel clean for handwashing. In laboratory tests we artificially contaminated water with non-pathogenic *E. coli* to a level (2,000 cfu/100 mL) which is double the acceptable level of contamination for handwashing³. Under these conditions both handwashing with soap and hand cleaning with the Supertowel were shown to be equally efficacious⁴.



HOW SHOULD THE SUPERTOWEL BE MAINTAINED?

If Supertowel becomes visibly dirty or smelly it can be washed in clean or soapy water. The Supertowel can be cleaned with all other laundry and does not require special cleaning products or processes. We recommend soaking the towel, then gently rubbing it with soap and water, squeezing it and hanging it to dry in fresh air.

SHOULD I DRY THE SUPERTOWEL AFTER USE?

Drying is not necessary for Supertowel to be efficacious. The Supertowel will disinfect itself while wet. We recommend line drying the towel.



WILL THE SUPERTOWEL STILL WORK IF IT GETS OILY OR MUDDY?

Yes. In laboratory-based tests we artificially contaminated the Supertowel with mud and oil and found that it was as effective as a clean Supertowel⁴. However, when the Supertowel becomes physically dirty it could create barriers to use because it will be less desirable.



THE EFFICACY OF THE SUPERTOWEL FOR REMOVING AND KILLING PATHOGENS

HOW DOES THE SUPERTOWEL REMOVE AND KILL PATHOGENS?

The Supertowel is designed to effectively remove pathogens from hands and other surfaces. It does this through two modes of action:

- The specially designed microfiber fabric is responsible for removing germs from hands and other surfaces. Microfibers are particularly efficacious at removing pathogens because they are comprised of thousands of individual fibres which increase the contact area and storage capacity of the fabric (see illustration 1)



Figure 2: Normal fibers (left) versus microfibers (right) when used to pick up dirt and bacteria from a surface

- The antimicrobial treatment that is applied to the microfibre will kill pathogens that have been removed from the hands or surface. The antimicrobial treatment is non-toxic and is bonded to the microfibre meaning that it does not come off on someone's hands during use. The antimicrobial treatment used on the Supertowel is not new and is used in many other applications from inhibition of smell in sportswear and apparel to prevention of biofilm creation in human implants. The antimicrobial treatment uses positively charged carbon chains which are fixed to the microfibrils. Pathogens are attracted to this positive charge but upon contact the carbon chains disrupt the outer cell wall of the pathogen, thereby killing it.



Figure 3: A visual representation of the mode of action of the antimicrobial treatment on the Supertowel. Pathogens are attracted by the positive charge on the carbon chains, and these then disrupt the cell wall, either physically or electrically, causing pathogens to be eliminated.

WHICH PATHOGENS CAN THE SUPERTOWEL KILL?

The efficacy of the Supertowel in killing certain pathogens has been assessed according to the test standard JIS L 1902/ISO 20743, which are recognised standards for “testing the antibacterial activity and efficacy of textile products”. The test involves adding a small amount of each pathogen on Supertowel samples and evaluating the reduction occurring after 24 hours. These tests were performed on a wide range of bacteria, both gram+ and gram-, as well as fungi. Supertowel displays antimicrobial activity against all strains tested. This includes bacteria like cholera, shigella, and E. coli which are common communicable disease-causing pathogens in humanitarian contexts. For full test results see:

Strain (Gram+)	Log ₁₀ reduction	Strain (Gram-)	Log ₁₀ reduction
S. aureus	>5.52	K. pneumoniae	4.09
C. sporogenes	2.48	V. cholerae	4.05
S. faecalis	2.12	Shigella flexneri	>5.55
MRSA	3.28	P. aeruginosa	2.15
		S. typhi	2.13
		E. coli	3.34
Fungie			
A. Niger	2.35	A. brasiliensis	3.43

Table 1: JIS 1902 :2015 defines that a sample displaying a Log reduction of >3 to have “Full antimicrobial effect” and if Log reduction is between 2 and 3 to have “Antimicrobial effect”

Experimental tests conducted by London School of Hygiene and Tropical Medicine have indicated that the Supertowel may remove and kill Chlamydia trachomatis, the pathogen which causes trachoma. Work on Chlamydia trachomatis in laboratory settings is complex and remains in its infancy. Further work related to trachoma is planned to verify these results.

Further details on the pathogen kill tests can be found in PDF summaries at:

- [Supertowel wash resistance. AATCC 100 - 2012](#)
- [Supertowel antimicrobial efficacy after 0 and 20 washes. JIS L 1920:2015](#)
- [Supertowel efficacy against different strains. JIS L 1920:2015](#)
- [Preliminary studies of the efficacy of Supertowel used as a water filter](#)
- [Supertowel speed of efficacy. Modified AATCC 100 – 2012](#)

IS THE SUPERTOWEL EFFICACIOUS AGAINST VIRUSES?

In theory, the antimicrobial treatment on the Supertowel, is efficacious against incapsulated or enveloped viruses⁵ such as SARS CoV-2. Recent studies at Tufts University have investigated the virucidal efficacy of Supertowel after 15 min of contact time. Results are preliminary and unpublished, but it seems that the Supertowel and the other antimicrobial surface tested, are ineffective at killing SARS-CoV-2. On-going studies at Stanford University, is elaborating on the tests performed by Tufts and further investigating whether the Supertowel is indeed efficacious against SARS CoV-2 in practical application.

HOW LONG DOES THE SUPERTOWEL LAST FOR?

We estimate that a Supertowel will last for 12 months, but it is highly dependent on the intensity of use. This estimate is based on two studies:

1. The first study is a laboratory wash test. In this test the efficacy of Supertowel is assessed when new, showing strong bactericidal efficacy – \log_{10} reduction > 4 meaning $>99,99\%$ reduction, the Supertowel were then repeatedly machine washed. After 100 washes they found the Supertowel could still reduce bacteria by $>80\%$ ⁶.
2. The second test was a natural experiment. Action Contre la Faim distributed the Supertowels as part of hygiene kits distributed within an internal displacement camp in Northern Nigeria. A small sample of towels was collected at 3, 6 and 9 months. These were sent to a laboratory in India where pathogen kill tests were performed. This study is ongoing but initial results indicate that the towels remain efficacious at 3 and 6 months.

Replacing Supertowel after 6-12 months is likely to be necessary as by this time, they may be visually dirty or torn and this could affect the desirability and use of the product.



HOW MUCH TIME DOES IT TAKE TO EFFECTIVELY CLEAN HANDS WITH THE SUPERTOWEL?

We have performed several laboratory-based studies to assess the efficacy of the Supertowel when used for different durations. Just like handwashing with soap, the Supertowel will be more effective the longer it is used for. In general, we would recommend hand cleaning with the Supertowel for 30 seconds. When used for 60 seconds we typically see a \log_{10} reduction in pathogens of 4.11, when used for 30 seconds we see a \log_{10} reduction of 3.50 and when used for 15 seconds we see a \log_{10} reduction of 2.71. These tests were based on non-pathogenic *E. coli*^{4,7}.

IS THE SUPERTOWEL AS EFFECTIVE AS SOAP?

Our laboratory studies have shown that the Supertowel is more effective at removing non-pathogenic *E. coli* from the hands of volunteers than soap and water. These results are based on the European Standard (EN 1499) for testing hand cleaning products and are true when hand cleaning with soap or the Supertowel is practiced for 60 seconds or 30 seconds^{4,7}. However, when explaining the efficacy of the product to populations we recommend that you say that the Supertowel is as effective as hand washing with soap and should be considered as an alternative when soap and water are scarce. The Supertowel is not designed to be completely replacing soap and it is important that people understand that handwashing with soap remains one of the most effective ways to reduce disease transmission.

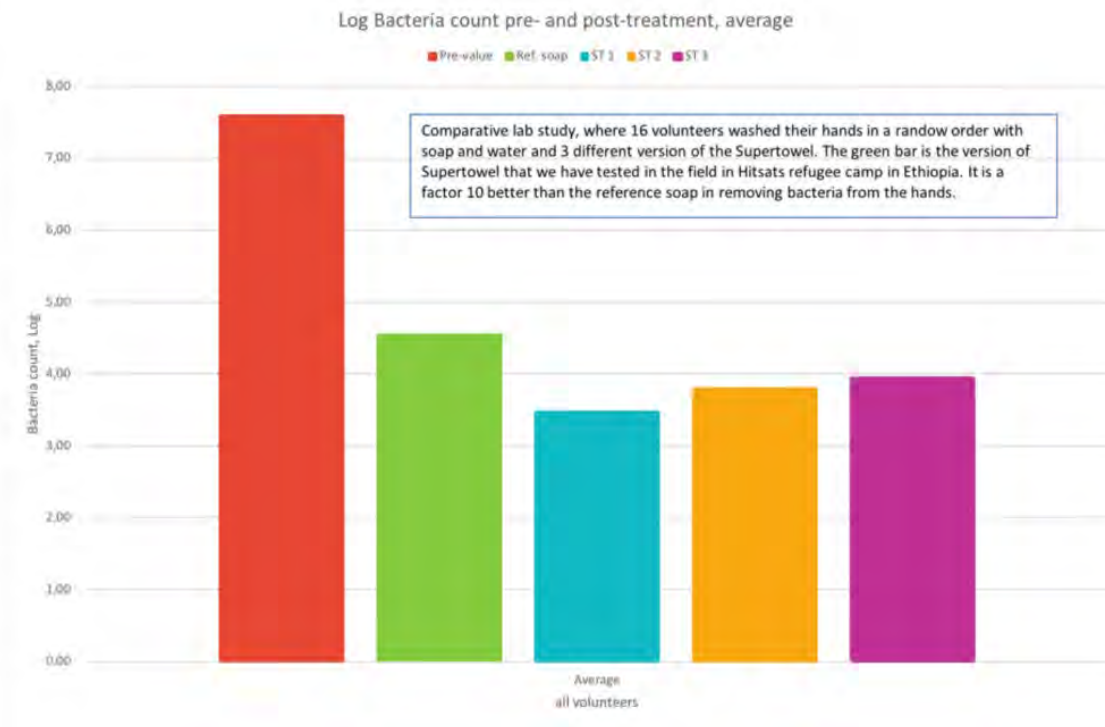


Figure 4: Efficacy of the Supertowel as a handwashing tool as compared to handwashing with water and soap.

OTHER USES OF THE SUPERTOWEL

CAN THE SUPERTOWEL BE USED FOR PERSONAL HYGIENE OR CLEANING SURFACES?

Yes. In fact, our research with displaced populations in Ethiopia⁸ and Nigeria have indicated that the multi-purpose nature of the Supertowel is seen as a key advantage by populations. In addition to hand cleaning, the Supertowel can be used to clean faces or bodies or surfaces (e.g. kitchen surfaces, or frequently touched surfaces mobile phones, doorknobs, water taps etc.). The Supertowel will use the same two mechanisms of action described above to remove and then kill pathogens on these surfaces. In studies so far, the use of the Supertowel for other types of cleaning has not prevented people from using it for handwashing.

CAN THE SUPERTOWEL BE USED FOR WATER PURIFICATION?

The Supertowel was always designed to be a hand cleaning product. However, while testing the product in a refugee camp in Ethiopia⁸, some of our participants asked if it might also work to treat water. Following this we conducted a preliminary laboratory test where contaminated water was poured through the Supertowel either as is or folded to allow the water to pass through two layers of Supertowel fabric. The test showed a very effective bacteria reduction in water contaminated with *E. coli*, *P. aeruginosa* and *V. cholerae*⁹. In all cases the reduction was > 99,999%, only *E. coli* needed the Supertowel to be folded. Further testing would be needed prior to recommending its use for water filtration.

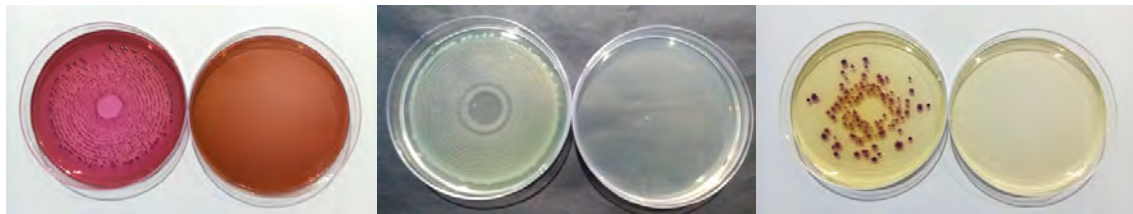


Figure 5: Results from preliminary lab trials using Supertowel for filtration of contaminated water. Left picture shows the reduction after passing water contaminated with *E. coli* through a folded Supertowel. Middle picture and right picture show the same for *P. aeruginosa* and *V. cholerae* respectively, but after passing through only a single layer of Supertowel.

THE ACCEPTABILITY AND EFFECTIVENESS OF THE SUPERTOWEL TO IMPROVE HAND CLEANING BEHAVIOUR

IS THE SUPERTOWEL AN ACCEPTABLE AND FEASIBLE ALTERNATIVE TO HANDWASHING WITH SOAP?

To date our research indicates that the Supertowel is generally acceptable to people of different ages, abilities, ethnicities, and religions. It is also considered to be a feasible product for use in humanitarian crises and contexts where regular handwashing is challenging to practice.

This conclusion is based on research in a refugee camp in Ethiopia, an IDP camp in Nigeria as well as increasing demand for the product in high-income settings. The study in Ethiopia⁸ was specifically designed to understand the acceptability of the product. We distributed 123 Supertowel, one for each

member of 19 households, except babies (approx. <2 years of age). We interviewed each family three times over the course of 14 days about their experiences of using the Supertowel. At the same time, we conducted focus group discussions with people who had not received the Supertowel and in these we asked participants to rate the Supertowel and a range of locally available soap products against a range of criteria. From this research we learned that the participants:

- trusted the efficacy of the product from the outset
- ranked the Supertowel more desirable than all other soap products that were locally available.
- reported feeling that their hands were notably cleaner after using the Supertowel.
- valued the product and liked that it was distributed to each person rather than one per family.
- felt that it saved water and time because it was more convenient than handwashing with soap.
- liked that it was multi-functional (e.g. could be used for hand cleaning and cleaning in the home)

The work in Nigeria is ongoing but indicates similar levels of acceptability as in Ethiopia. For more information on the acceptability of the Supertowel read the research study⁸ done by the London School of Hygiene and Tropical Medicine in partnership with the Danish Refugee Council.

DOES THE SUPERTOWEL IMPROVE THE FREQUENCY OF HAND CLEANING?

The studies to understand the effect of Supertowel on handwashing behaviour performed so far look promising. Below we indicate some of what we know:

- During the study in Ethiopia use of the Supertowel was measured over the course of the two weeks following distribution. Use was gauged through spot checks to see whether the Supertowel within each household were wet or damp (indicating that they had been used that day). In the first week 90% of households were actively using the Supertowel and in week two 100% of households were found to be using it. In interviews participants described being able to adapt to the new behaviour easily and quickly.
- In Nigeria handwashing behaviour is being measured over the course of nine months following the camp-wide distribution of Supertowel. Here we are using a mixture of self-reported behaviour and structured observations. Initial self-reported use appears to be high, and staff report commonly seeing people walking around the camp with their Supertowel. The results from this research will indicate how handwashing behaviour may change over time with the introduction of the Supertowel.
- In Ethiopia and Nigeria participants have reported that the Supertowel particularly makes it easier to wash hands at certain specific occasions. These include when travelling outside the household, while preparing food and while caring for children or others with special needs.

DOES THE SUPERTOWEL REDUCE THE USE OF SOAP?

Handwashing is often not a priority use of soap in settings where soap is a scarce commodity. Instead, soap is prioritized for tasks like bathing, laundry and dishes. Our research indicates that the Supertowel may help families to prioritize soap across their hygiene needs by providing an alternative way of hand cleaning. We know this based on the ongoing operational research in Nigeria. Here they distributed Supertowel to each household through routine hygiene kit distributions. In the two intervention areas, households received the Supertowel in addition to standard amounts of soap. In the control area they received only the standard amount of soap. Initial results indicate that the households in the control area ran out of soap within the first month following distribution, while the households in the intervention arm continued to have a supply of soap for other household tasks for at least three months after distribution.

IS THE SUPERTOWEL INTUITIVE TO USE?

At the moment, it is not always obvious when a person first encounters the Supertowel that it is a product for hand cleaning. This became clear in focus group discussions in Ethiopia when we asked participants who knew nothing about the product to guess what it was used for and how it was supposed to be used. We showed some simple pictograms to the participants (see *Figure 5*) after which they understood what the Supertowel was to be used for. We have been working with the Royal College of Art to adjust the design of the Supertowel and to develop guidance on its use which can be understood even with limited literacy.

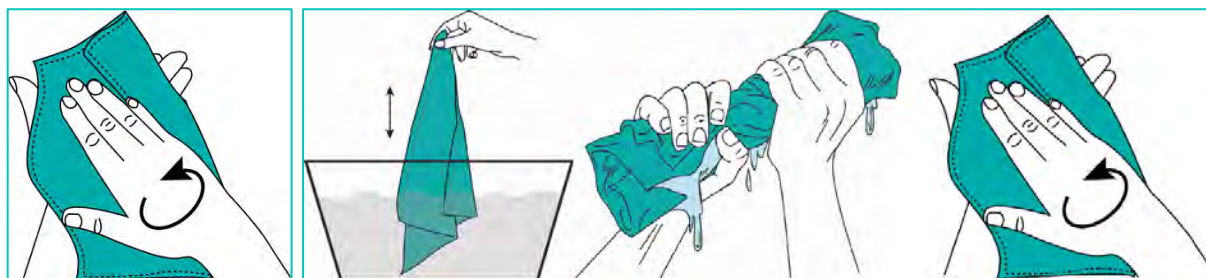


Figure 6: Pictograms used in FGD's as the sole mean to explain the use of the Supertowel to the participants.

DISTRIBUTING AND COMMUNICATING ABOUT THE SUPERTOWEL

IS THERE ANY STANDARD COMMUNICATIONS PACKAGE ABOUT THE SUPERTOWEL?

Yes. We have designed a package that can be used by frontline staff (e.g. Hygiene Promoters). The package includes a fold out poster and a set of activities that are designed to be done in small groups (e.g. by bringing neighbouring households together, or gathering small groups at the distribution point).

- The fold out poster: This has diagrams of how the Supertowel works, how it can interrupt disease transmission and how the Supertowel should be used. The poster is designed to be eye-catching, interactive and has limited wording meaning that most of the content can be understood by people with limited literacy. It is available in English but can easily be translated and edited. All households receiving the Supertowel should receive the poster.
- The communications package for hygiene promoters: This provides a step-by-step guide for how to communicate about the Supertowel. It outlines a set of activities that are designed based on behaviour change principles.

The communications package was co-created with the London School of Hygiene and Tropical Medicine and the Royal College of Art. It is available free of charge in an electronic version by contacting Real Relief.

HOW SHOULD THE SUPERTOWEL BE DISTRIBUTED?

We recommend that one Supertowel is given to all household members above the age of 2. The rationale behind not including children under the age of two is that children of this age typically require their parents support to clean their hands and are therefore likely to share a Supertowel. To facilitate distribution, it is necessary to have an indication of the number of people per household in advance.

Supertowel can be distributed as a separate item or as part of hygiene kits. At the point of distribution, it is essential that populations receive an explanation of the product, how it works and how to use it (e.g. through the communications package). The Supertowel is not designed to fully replace soap. Even if the Supertowel is used for most hand hygiene tasks, soap is still critical for other household tasks and hygiene behaviours.

HOW MUCH DOES SUPERTOWEL COST?

The nominal cost of the Supertowel is relatively easy to calculate. When procured in bulk (<20,000 pcs) and for the purposes of humanitarian use, the price of the Supertowel is 50 US\$ cents. This does not include freight however, so depending on destination another 10 to 20 cents would be added before the Supertowel is on ground. The actual low procurement cost is however only a part of the cost savings that is offered by Supertowel. The savings on distribution cost is probably the bigger part. It is however almost impossible to estimate this cost on a general basis. The cost savings towards soap is best illustrated with an example:

The Sphere standards state that each person needs to access to 250 grams of soap for bathing per person per month and 200 grams of soap for laundry per person per month. They do not actually specific mention handwashing soap per person but just that soap should be provided at the handwashing station (one station per shared toilet or one per household). So, under a set of typical assumptions, in practice this would mean that the cost per household per month of providing soap for handwashing ranges between \$2 and \$9. In comparison the cost per Supertowel in the first month costs \$2.50 per household.

Over a year of displacement and in camp of 1000 families (approx. 5000 people) this would mean handwashing soap costs would be \$24,000 (based on cheapest estimate) and Supertowel costs would be \$5000. This does not include distribution costs.

If you have further questions about the Supertowel or comments to this document please don't hesitate to contact us:



Real Relief ApS

Essen 26

6000 Kolding

Denmark

www.realreliefway.com

Att: Torben Holm Larsen

thl@realreliefway.com

Cell: +45 28 25 25 00

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