

FEASIBILITY REPORT ON PRODUCTION OF HAND SANITIZER

PREPARED BY OSANYINTUYI OLUWATOBI

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MECHANICAL DEPARTMENT

FOR HURO INTERNATIONAL, CALIFORNIA

USA, AMERICA

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EXECUTIVE SUMMARY

With the recent virus outbreak leading to panic buying and the resultant shortage of hand sanitizers worldwide, the industry is currently witnessing manufacturers from other industries using their production expertise and facilities to contribute to hand sanitizer manufacturing to help mitigate the supply shortage.

With the current state of COVID-19 worldwide, hand sanitizer has been in high demand and has become a necessity. This study is about setting up of hand sanitizer production firm. Hand sanitizers main purpose is to kill germs instantly without water. Due to the high demand there is a rise in the market for it, the study is to identify what to differentiate this production firm from this vast growing market. It contains alcohol, such as ethyl alcohol as an active ingredient that acts as an antiseptic. It kills almost all bacteria, viruses and fungi within a few seconds. Barely a day after the Federal Government confirmed the first case of Coronavirus in the country, owners of pharmaceutical stores and supermarkets have increased the prices of hand sanitizers between 150% and 300%.

The global hand sanitizer market size valued at USD 2.7 billion in 2019 and is expected to grow at a compound annual growth rate (CAGR) of 22.6% from 2020 to 2027. Shifting consumer preference towards convenient hygiene products is expected to drive the market. In addition, recent COVID-19 pandemic in the beginning of 2020 have spurred the market for hand sanitizer. The demand for hand hygiene products has been exceeding the supply in both online as well as brick and mortar sale channels worldwide owing to the global outbreak of the virus in a short time span. The outbreak has reinforced the significance of regular hand sanitizing and cleaning practices among consumers and is among the prominent factor driving the market.

LOCATION

This company is planned to be international, its head quarters will be located in California, united states of America. This location is considered because of its land space.

GENERAL INFORMATION

Anyone who has been in a child's play area has witnessed it. As the children come off of the play equipment, the mothers reach into their purse to grab their hand sanitizer. Each child gets a dab of sanitizer to rub into her hands in order to eliminate the germs that have been transferred to her skin. The hope is that this practice will keep the children, and therefore their families, healthier.

Hand sanitizers can now be found in the entrances to nursing homes and hospitals and in many public washrooms. We all know the importance of proper hand-washing in reducing harmful germ transmission. However, there are times when there is no access to soap and water or not enough time to wash thoroughly. Can a hand sanitizer serve as a suitable alternative to hand washing? Will using a hand sanitizer decrease your chance of getting sick?

THE HISTORY OF HAND SANITIZER

The Centers for Disease Control and Prevention do note that, when it comes to preventing the spread of coronavirus, “if soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol.”

And indeed, that is the primary ingredient in hand sanitizer: alcohol. Most hand sanitizers contain anywhere from 60% to 95% isopropyl or ethyl alcohol mixed with water and gels like glycol and glycerin in order to prevent drying out users' skin. The resulting product is typically sold in a hand gel or liquid spray under brand names such as Purell or GermX.

But while alcohol has been in use as an antiseptic since the late-1800s at least, the exact origins of hand sanitizer are up for debate.

One version of the story points to Lupe Hernandez, a nursing student in Bakersfield, California in 1966, as the inventor of hand sanitizer after combining alcohol and gel for use by doctors in situations where they don't have time to access soap and warm water before treating patients.

However, a recent investigation by the Smithsonian Institution historian Joyce Bedi was unable to turn up any trace of Hernandez, or any evidence of a U.S. patent for hand sanitizer under that name from the 1960s.

There's also Sterillium, which the German company Hartmann claims was "the world's first marketable alcohol-based hand disinfectant" when it hit European shelves in 1965. It's made with glycerin and 75% alcohol.

Still, others trace modern hand sanitizer back to Goldie and Jerry Lippman, the married couple that developed a waterless hand cleaner in 1946 for rubber plant workers who previously used harsh chemicals like kerosene and benzene to remove graphite and carbon black from their hands at the end of their shifts. The product, which they called Gojo (a portmanteau of their names) is a mix of petroleum jelly, mineral oil and less than 5% alcohol that's still used today by auto mechanics and other workers to clean off substances like grease and oil.

The Lippman's mixed their first batches of Gojo in a washing machine in the basement of Goldie's parents' Akron, Ohio home, where the couple was living at the time, according to *The New Yorker*. They put the resulting product in pickle jars and sold it out of the trunk of their car.

Over the ensuing decades, Gojo continued selling their products as industrial cleaners. Then, in 1988, the company invented the hand gel Purell, which consists of 70% ethyl alcohol as its primary ingredient, along with propylene glycol. While Purell is now the world's best-selling hand sanitizer, it took some time for stores to carry the product that most everyday customers weren't really asking for. As such, Gojo did not release Purell onto the consumer market until 1997.

That same year, Vi-Jon Industries followed Gojo's lead by introducing GermX, which is now the second best-selling hand sanitizer in America, after Purell, according to Nielsen.

It wasn't a thing at first, despite Purell and GermX entering the consumer market in the late-1990s, hand sanitizer sales did not start taking off until the 2000s. First of all, it wasn't until 2002 that the CDC first revised its hand hygiene guidelines to recommend alcohol-based hand sanitizer as a possible alternative for both health care personnel and the average person looking to eliminate germs when soap and warm water are not available, or as a time-saving solution.

“Alcohol-based hand rubs take less time to use than traditional hand washing,” the CDC wrote in 2002. “In an eight-hour shift, an estimated one hour of an ICU nurse’s time will be saved by using an alcohol-based hand rub.”

Throughout the 2000s, hospitals around the world started the widespread practice of placing hand sanitizer pumps throughout medical facilities.

And in 2009, the World Health Organization followed suit, when Swiss epidemiologist and infectious diseases expert Dr. Didier Pittet wrote new WHO guidelines promoting the use of alcohol-based hand sanitizer among health care professionals, especially those in resource-poor countries with limited access to clean water.

That year also happens to be when consumer sales of hand sanitizer first spiked in the wake of the H1N1 swine flu that infected more than 60 million people just in the U.S., killing an estimated 151,700 to 575,400 people around the world.

The combination of consumers’ fears of contracting H1N1 and health experts increasingly recommending alcohol-based hand sanitizers as an option to fight the spread of germs in recent years likely contributed to the first significant spike in hand sanitizer sales, which surged by 70% during that period in the U.S., according to Nielsen’s Executive Vice President of U.S. Manufacturer Client Success, Laura McCullough.

“When we had the H1N1 virus we saw a big spike with hand sanitizers...,” McCullough tells CNBC Make It. “Since then, we’ve seen a very steady continued growth and progression of the category as consumers have continued to adopt [hand sanitizer].”

Today, U.S. consumers spend hundreds of millions of dollars on hand sanitizer each year. Globally, the market for hand sanitizer products could top \$2.1 billion by 2027, according to one estimate by market research firm Fior Markets, which was released on Thursday and notes the lasting effects of the coronavirus pandemic on the market’s growth potential.

For the average American consumer, who hopefully doesn’t have to worry about finding clean water and soap, and isn’t facing a time crunch that an emergency room doctor might have to deal

with, hand sanitizer is an attractive option, especially now, for on-the-go situations where they might not be able to duck into a bathroom to wash their hands.

“For example, you’re out and about in New York City, you’re using a Port-a-Potty, or maybe you’re somewhere where you just don’t have a chance to wash your hands. Hand sanitizer is a good alternative for hand-washing in those situations,” Dr. Anjali Bharati, an emergency medicine physician at New York City’s Lenox Hill Hospital, tells CNBC Make It.

IMPORTANCE OF HAND SANITIZER

Alcohol-based hand sanitizers help to deter the spread of germs and illness-causing bacteria, particularly in busy environments like schools and offices:

1. **Stop the Spread of Germs:** According to studies, 1 in 5 people don’t regularly wash their hands. Of those who do, 70% don’t use soap. Providing hand sanitizer in key areas (including bathrooms and kitchens) makes it more likely that people will use it to kill harmful bacteria.
2. **Promote Good Hygiene and Health:** A healthy building is a productive one. One study in the American Journal of Infection Control (AJIC) found that encouraging the use of hand sanitizers in schools reduced absenteeism by almost 20%.
3. **Reduce Waste:** As an extra precaution, many people will use paper towels to open doors when leaving bathrooms or kitchens. Placing hand sanitizers near exits makes it easy for people to defend themselves from germs without needing to create additional mess.

BENEFITS AND LIMITATIONS OF HAND SANITIZERS

Benefits of hand sanitizers are as follows:

1. Hand sanitizers are convenient, portable, easy to use and not time consuming.
2. Several studies have concluded that the risk of spreading gastrointestinal (stomach) and respiratory infection is decreased among families who use hand sanitizers.
3. Commercially prepared hand sanitizers contain ingredients that help prevent skin dryness. Using these products can result in less skin dryness and irritation than hand-washing.

4. Studies show that adding hand sanitizers to classrooms can reduce student absenteeism due to illness by 20 per cent. What's more, many kids think instant hand sanitizers are fun to use.

Limitations of hand sanitizers are as follows:

1. Not all hand sanitizers are created equally. Check the bottle for active ingredients. The alcohol content may be in the form of ethyl alcohol, ethanol or isopropanol. All of those are acceptable forms of alcohol. Be certain that no matter which type of alcohol is listed, its concentration is between 60 and 95 per cent. An alcohol content of less than 60 per cent isn't enough to be effective.
2. Alcohol does not cut through grime. All dirt, blood and soil must be wiped or washed away first if the alcohol in the sanitizer is to be effective. In such cases, hand-washing with soap and water is advised.
3. Hand sanitizers are not cleaning agents and are not meant as a replacement for soap and water, but as a complementary habit. Sanitizers are most effective when used in conjunction with diligent hand-washing.

The use of hand sanitizers is a habit that can help keep us all exposed to fewer germs, and therefore may decrease our chance of illness. Whether you are on the playground, using someone else's computer or visiting a friend in the hospital, take the time to rub some on your hands. It is an easy step toward a healthy winter season.

PROJECT OBJECTIVES

The following are what to be expected of the project progress:

- a. Ease in the stable manufacturing of high-quality hand sanitizers in the production plant
- b. Best approach to reduce the production gap from production line to consumers.
- c. To build a growing market on the huge demand supply of alcohol-based hand sanitizer and also for years to come.
- d. To validate our data in terms of accuracy and acceptability.

- e. To gain an insight in to the current market and future expectations.

MANAGEMENT RESEARCH

The below chart is considered for current market and future forecast:

Perspective	Primary research	Secondary research
Supply side	Manufacturers Technology distributors and wholesalers	Company reports and publications Government publications Independent investigations Economic and demographic data
Demand side	End-user surveys Consumer surveys Mystery shopping	Case studies Reference customers

PLANT ORGANIZATION

The manufacturing plant organization depends on the nature of the business. For example, short runs of high-quality customized products require a different emphasis than long runs of standard products. Despite these differences, the organizational structure has to satisfy basic manufacturing requirements and fulfill common operational functions. Once set up, the organization has to meet these basic needs, you can fine tune it to improve performance for your particular business.

MANAGEMENT ORGANIZES THE WORK

A small management group, the exact size depending on the size of the plant and ranging from a single plant manager to several managers taking on specific tasks, assigns the work, tracks costs, implements policies and procedures and prepares plans for facility utilization. The plant manager is responsible for achieving the manufacturing goals of the company. If the company implements a low-cost strategy, the plant manager has to find ways to cut costs. When the management work is too much for one person, the plant manager can delegate work and responsibilities to others, such as a manager for inventory or one for personnel and payroll.

PRODUCTION IS THE HEART OF YOUR PLANT

To manufacture the products, the manufacturing plant organization must have someone in charge of production. The production supervisor or manager reports to the plant manager and oversees the employees who carry out the production work. Depending on the type of product and the size of the operation, there might have additional supervisors responsible for parts of the production line or you might have teams, each with a team leader and each responsible for her part of production. For small operations you might have up to a dozen workers reporting directly to the production supervisor.

PROCUREMENT SUPPLIES PARTS AND MATERIALS

When your manufacturing plant creates or assembles the products your company sells, it has to buy the required components and materials and store them until they are needed. The employees responsible for procurement and inventory control report to the plant manager and are responsible for ensuring the production line receives the parts and raw materials it needs to meet its production quotas. For small companies, a single employee may be able to take care of purchasing and storage. Larger operations separate the procurement and inventory functions under two managers who may have purchasing clerks and warehouse staff reporting to them.

QUALITY ASSURANCE EVALUATES OPERATIONS

While manufacturing plant organizations often work under a traditional hierarchical structure, the quality assurance function has to use a matrix structure to function effectively. The quality assurance manager must report directly to the plant manager, and the quality assurance manager or his staff must also have access to the other management functions and the working level. That way, all aspects of the plant's operations are open to inspection by quality assurance personnel, and if there are problems, the quality assurance manager can report them at the highest plant level to get the required corrective action implemented.

MARKET RESEARCH

The Global Hand Sanitizer Market size was valued at \$919 million in 2016 to reach \$1,755 million by 2023, and is anticipated to grow at a CAGR of 9.9% from 2017 to 2023. Hand sanitizer is an antiseptic solution, which is used as an alternative to soap and water. It is used to prevent the transmission of infection, which is majorly caused through hand transmission, further causing several diseases such as nosocomial food-borne illness and others.

Consumer inclination towards health & wellness and product innovation such as addition of fragrances in formulation of sanitizers are projected to boost the growth of the global hand sanitizer market. Furthermore, improvement in living standards, rise in health expenditure, increase in awareness about hand hygiene, and support from organization such as WHO, FDA, and others towards the need for sanitation augment the demand for hand sanitizers. However, health hazards associated with chemical ingredients are anticipated to hamper the market growth during the forecast period.

The report segments the global hand sanitizer market based on product, distribution channel, end use, and geography. On the basis of product, the market is classified into gel, foam, spray, and others. Gel hand sanitizers accounted for the maximum share in 2016. By distribution channel, it is divided into online store, departmental store, pharmacy store, and others. Depending on end use, it is fragmented into restaurants, schools, hospitals, household purpose, and others.

Hand sanitizers have an advantage over conventional hand washing products as they can be applied directly without water. Also, renowned manufacturing companies such as Henkel Corporation, Unilever, and Procter and Gamble have been offering hand sanitizers in convenient packaging such as sachet and mini bottles, which can easily be carried in a bag or a pocket by the consumers. These factors have widened the scope for the market.

LABOUR COSTS

The major four management in the company:

DEPARTMENT SECTION	AVERAGE SALARY
Production Management	\$5,000

Operations Management	\$3,900
People Management	\$10,500
Quality Assurance/Quality Control Management	\$4,000

The below are other jobs in the production that are taken into considerations:

Jobs	Average salary
Operations Manager	\$437.50-\$30,000
General / Operations Manager	\$2,500-\$57,500
Country Manager	\$670-\$120,000
Chief Operating Officer (COO)	\$170,000-\$117,500
Chief Executive Officer (CEO)	\$337.50-\$150,000
Maintenance Manager	\$1,875-\$22,500
Facility Manager	\$1,222.50 -\$12,500
Area Sales Manager	\$1,955-\$25,000
Logistics Supervisor	\$5,000-\$7,500
General Manager	\$2,500-\$32,500

MARKET STUDY

Panic buying over the coronavirus pandemic has led to a variety of household products flying off the shelves at your local grocery store.

That includes staples, like bread and toilet paper, as well as one product that's only been commercially available for a few decades, but which many people clearly now view as a necessity: hand sanitizer.

Purchases of the disinfecting gel have skyrocketed in the U.S. ever since the first case of COVID-19 hit the country. During the last week of February, a period that saw the first American death from COVID-19, hand sanitizer sales in the U.S. were up by 300% compared to the same week a year earlier, according to market research from Nielsen.

The following week, the first week of March, hand sanitizer sales shot up by 470% compared to the same week a year earlier, Nielsen tells CNBC Make It. That's in an industry that already sees more than \$200 million in annual sales of hand sanitizer products in the U.S., according to Nielsen.

Supermarkets and pharmacies across the country have sold out of hand sanitizer, leaving only empty shelves where disinfectant products would normally be found.

With some consumers even hoarding hand sanitizer amid the shortage, online prices for the products soared, leading law enforcement officials in many states to threaten prosecution for price-gouging against third-party sellers on sites like Walmart and Amazon (where an 8-ounce bottle of Purell that would normally cost \$2.50 was briefly on sale for \$90 before being removed by Amazon in early March).

What's more, the run on hand sanitizer also came as health officials across the country have remained adamant that the best way for people to combat the spread of potentially dangerous germs is simply through diligent hand-washing with soap and water. (For what it's worth, the U.S. soap industry is worth more than \$2 billion per year. Sales of hand soap in the U.S. have jumped by "double-digit" percentage points during the coronavirus pandemic, but nowhere near the increase of hand sanitizer sales, according to Nielsen's research.)

COMPETITOR STANCE IN THE HAND SANITIZER MARKET

Geographically, it is analyzed across North America, Europe, Asia-Pacific, and LAMEA. In addition, the report highlights various factors that impact the growth of the global hand sanitizer industry, such as key drivers, restraints, growth opportunities, and the role of different key players.

North America dominates the global hand sanitizer market, owing to high hygiene standards among the U.S. population. Moreover, Asia-Pacific is expected to witness the highest growth rate from 2017 to 2023, owing to increase in concern towards health and wellness. Furthermore, improvement in living standards and rise in disposable income are expected to boost the growth of the Asia-Pacific hand sanitizer market.

According to findings, there is a preference for using hand sanitizer by 77.0% of the population covered in a survey, while 23.0% claim to not to use the product. The 77.0% population in the favor of using hand sanitizer is comprised of 37.5% male users and 62.5% of female users. Moreover, key manufacturers are adding to their product line in order to increase their market share with increasing awareness. For instance, as per findings, 62.0% of population surveyed in 2017 claims to use Dettol hand sanitizer, 21.0% use Lifebuoy hand sanitizer, and 17.0% use Himalaya hand sanitizer.

MARKET OUTLOOK

Increasing awareness towards hand hygiene is gaining prominence on account of being an important measure to restrict the occurrence of nosocomial infections. Therefore, hand hygiene forms the most important element of personal care, thereby driving the popularity of hand sanitizers. In addition, government further promotes the usage of hand care products in order to increase awareness as well as avoid health issues among consumers. For instance, WHO and FDA have taken initiatives in order to make people aware about hand hygiene and the risks associated with not maintaining the hygiene.

Moreover, rising influence of social media and online advertisements have exposed people to the recent trends of personal care and hygiene which is also accelerating the usage of hand sanitizers among consumers. These advertisements also allow people to get exposed to information regarding cleansers and healthy lifestyles. Key companies such as Reckitt Benckiser Group plc and Hindustan Unilever are also leading among consumers with their initiatives on spreading awareness about basic hand hygiene.

Hand sanitizers come across as a beneficial product to consumers in various aspects. The extent to which it is easy to use as well as portable and convenient has made the product popular among consumers. According to studies, this product also minimizes the risk of gastrointestinal and respiratory infections among consumers. Moreover, hand sanitizers also contain ingredients which help in reducing skin dryness and irritation compared to hand washing. Furthermore, according to studies, classroom application of hand sanitizers is expected to reduce absenteeism of students due to illness by 20%. However, growth of the market can be hampered by the usage of chemical ingredients associated with the product causing allergies to some people. While product innovation and new product development strategies adopted by the companies to introduce organic and natural ingredients in the manufacturing of hand sanitizers, which will gain the trust of consumers.

PRODUCT INSIGHTS

The following is the different form in which the hand sanitizer can come in:

1. Gel
2. Foam
3. Spray
4. Others

The gel-based hand sanitizer segment dominated with a share of more than 49.0% of global market in 2019. Gel sanitizers are usually thin and watery in formulation and therefore provide the convenience of getting spread easily and penetrate into the skin to kill most of the bacteria. Easy product availability and wider access to this type of hand sanitizer are driving the growth of the segment in the market in last few years. The product results in decreased microbial populations in different ways. Moreover, inclusion of different flavors affecting the fragrance is driving segment growth in the hand sanitizer market. For instance, in 2017, Himalaya Wellness has launched new sanitizers which are available in fruit flavors including strawberry, green apple, litchi, and orange.

The foam-based hand sanitizer segment is expected to dominate the market with a revenue based CAGR of 23.1% from 2020 to 2027. The product is gaining prominence in the market owing to its ability to penetrate the skin and stay there for longer period of time. Foam based sanitizers provide easy application on hands as it does not need to get rubbed off and thus provides the convenience

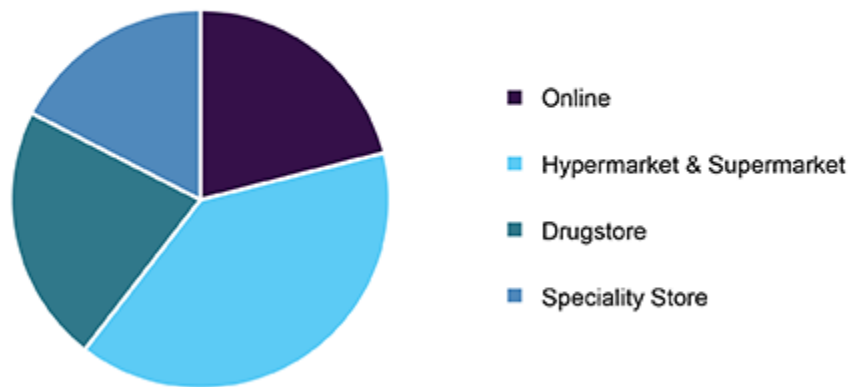
of saving time. This product is expected to witness surge in demand owing to its greater convenience of handling. For instance, in April 2018, Arrow Solutions launched KR10 Hand Sanitizer Foam, which is an alcohol-free foam sanitizer designed for frequent use.



Figure 1: Hand Sanitizer Market of Different Types

DISTRIBUTION CHANNEL INSIGHTS

Hypermarket and supermarket channel accounted for the largest share of more than 39.3% of the market in 2019. Increasing number of hypermarkets and supermarkets across various regions have experienced surge in the distribution of hand sanitizers in the market. However, this channel provides the consumers with an advantage of scanning the product before buying which helps them choose the right product. Moreover, this channel also supplies quick access to the product compared to online channels where consumers are made to wait for the delivery of the product.



Source: www.grandviewresearch.com

Figure 2: Distribution Chart Of global Hand Sanitizer Chart

Online distribution channel is projected to witness a CAGR of 23.2% from 2020 to 2027 owing to increasing influence of digital media and marketing. Increasing internet penetration in various countries such as India, China, Mexico, and Brazil have developed the market for online sales channel from the last three to four years. Moreover, online retailers including Amazon, Walmart, Alibaba and other such service providers are focusing on continuous availability of personal care products across the globe. Online retail channels are widely used in developed countries such as U.S., Germany, and U.K., for purchasing consumer goods and unique personal care products. It is poised to emerge as a steady revenue generating source for these product categories over the forecast period. Promising growth exhibited by e-commerce platforms in emerging countries, including India and China, is compelling manufacturers to reorient their retail strategies for these countries.

REGIONAL INSIGHTS

North America dominated the market and accounted for revenue share of 32.2% in 2019. Growing concern for health and hygiene maintenance by majority of the population in the region is expected to drive the market. Wider product availability with increased penetration of online as well as offline channels is driving the growth of the market in the region. This region with greater number of market players' witnesses' highest penetration of different forms of hand sanitizers such as gel

based, foam based, spray, and wipes. Moreover, U.S. dominates the market with more willingness of consumers to spend on personal care and hygiene products.

Asia Pacific is expected to witness the fastest CAGR of 23.5% from 2020 to 2027. The growth is attributed to the growing awareness about hygiene among consumers. Therefore, innovative and different types of personal care and hygiene products are available in the market stressing on convenience factor for consumers. The increasing dominance of online shopping has reshaped the growth of the market in the region and is expected to fuel the demand for hand sanitizers in the future years. For instance, online websites such as Amazon, Flipkart, Grofers, and other such online delivery service firms are offering different types of hand hygiene products.

KEY COMPANIES & MARKET SHARE INSIGHTS

The market is highly competitive in nature. Companies are focusing on expanding their production capacity and are adopting innovative technologies to meet consumer demand for hand sanitizers. Some of the prominent players in the hand sanitizer market include:

- a. Reckitt Benckiser Group plc
- b. Procter and Gamble
- c. The Himalaya Drug Company
- d. GOJO Industries, Inc.
- e. Henkel AG and Company
- f. Unilever
- g. Vi-Jon
- h. Chattem, Inc.
- i. Best Sanitizers, Inc.
- j. Kutol

HAND SANITIZER MARKET REPORT SCOPE

Report Attribute	Details
Market size value in 2020	USD 3.3 billion
Revenue forecast in 2027	USD 13.7 billion
Growth Rate	CAGR of 22.6% from 2020 to 2027
Base year for estimation	2019
Historical data	2016 - 2018
Forecast period	2020 - 2027
Quantitative units	Revenue in USD million and CAGR from 2020 to 2027
Report coverage	Revenue forecast, company ranking, competitive landscape, growth factors, and trends
Segments covered	Product, distribution channel, region
Regional scope	North America; Europe; Asia Pacific; Central & South America; Middle East & Africa
Country scope	U.S.; Germany; U.K.; China; India; Brazil
Key companies profiled	Reckitt Benckiser Group plc; Procter and Gamble; The Himalaya Drug Company; GOJO Industries, Inc.; Henkel AG and Company; Unilever; Vi-Jon; Chattem, Inc.; Best Sanitizers, Inc.; Kutol
Customization scope	Free report customization (equivalent up to 8 analysts working days) with purchase. Addition or alteration to country, regional & segment scope.
Pricing and purchase options	Avail customized purchase options to meet your exact research needs.

TECHNICAL FEASIBILITY

HOW THEY WORK

Hand sanitizers were developed for use after washing hands or for those times when soap and water are not available. They are gels that contain alcohol in order to kill the germs present on the skin. The alcohol works immediately and effectively in order to kill bacteria and most viruses. Alcohol can be very drying to the skin, so most brands of sanitizers also contain a moisturizer to minimize skin dryness and irritation.

HOW MUCH SHOULD BE USED

To use hand sanitizers effectively, place a small amount, the size of your thumbnail, on the palm of your hand and rub it over your entire hand, including in your nailbeds. If the gel completely evaporates in less than 15 seconds, you have not used enough product.

HOW IT WORKS: CLEANING HANDS WITH WATERLESS HAND SANITIZER

Components to cleaning hands with waterless hand sanitizers (also known as handrubs), the proper technique, and how hand sanitizers work.

COMPONENTS OF HAND SANITIZER

Two components

1. Waterless hand sanitizer
2. Friction

TECHNIQUES FOR HAND SANITIZER

Four steps:

1. Make sure all organic matter is removed from hands. All visible organic matter (for example: dirt) must be removed from hands prior to applying waterless hand sanitizer.
2. Apply a dime sized amount of waterless hand sanitizer to the palm of one hand or use a waterless hand sanitizer type.

3. Rub hands together covering all surfaces of hands and fingers.
4. Rub until waterless hand sanitizer is absorbed.

HOW IT WORKS

1. Waterless hand sanitizer provides several advantages over hand washing with soap and water.
However, they are not effective if organic matter (dirt, food, or other material) is visible on hands.
2. Benefits of waterless hand sanitizer:
 - a. require less time than hand washing.
 - b. act quickly to kill microorganisms on hands.
 - c. are more accessible than sinks.
 - d. reduce bacterial counts on hands.
 - e. do not promote antimicrobial resistance.
 - f. are less irritating to skin than soap and water.
 - g. some can even improve condition of skin.

REFERENCES

1. <https://www.alliedmarketresearch.com/hand-sanitizer-market><https://www.advancemarketanalytics.com/reports/17144-global-hand-sanitizer-market>
2. <https://commercialjanitorialservices.ca/why-hand-sanitizer-is-important-and-how-to-use-it/>
3. <https://www.health.state.mn.us/people/handhygiene/clean/howrub.html>
4. <https://www.cnbc.com/2020/03/27/coronavirus-the-history-of-hand-sanitizer-and-why-its-important.html>