

GREEN BIOSCIENCE
BY HYGIENE OF SWEDEN

ENVIRONMENTAL BENEFITS OF BIOPOLYMER™ PLUS

Biopolymer™ Plus
consume less
green living O_2
eco-friendly
Hygiene of Sweden
climate smart

“

THE MINDSET

‘WE HAVE ALWAYS DONE IT THIS WAY’

IS JUST AS DANGEROUS AS SOME

OF THE CHEMICALS. ”

-PHILIP WILHELMSSON, BIOCHEMIST AND CHIEF OF R&D

OUR PHILOSOPHY

Our lab is dedicated to find and innovate new solutions to eliminate and minimize existing hazardous chemicals used in our daily life.

With a holistic perspective we question all the steps in the supply chain, from raw materials to the final product.

INTRODUCTION

Biopolymer™plus, our alcohol free antibacterial formula is disrupting the hygiene industry.

Designed to be fully effective and functional, we are extremely proud to be able to present a solution with several advantages compared to traditional hand sanitisers and at the same time being a more sustainable solution.

Our goal with this Green Bioscience document is to highlight the environmental impact you make when selecting the Biopolymer™plus formula as your preferred protector against germs.

CERTIFICATES

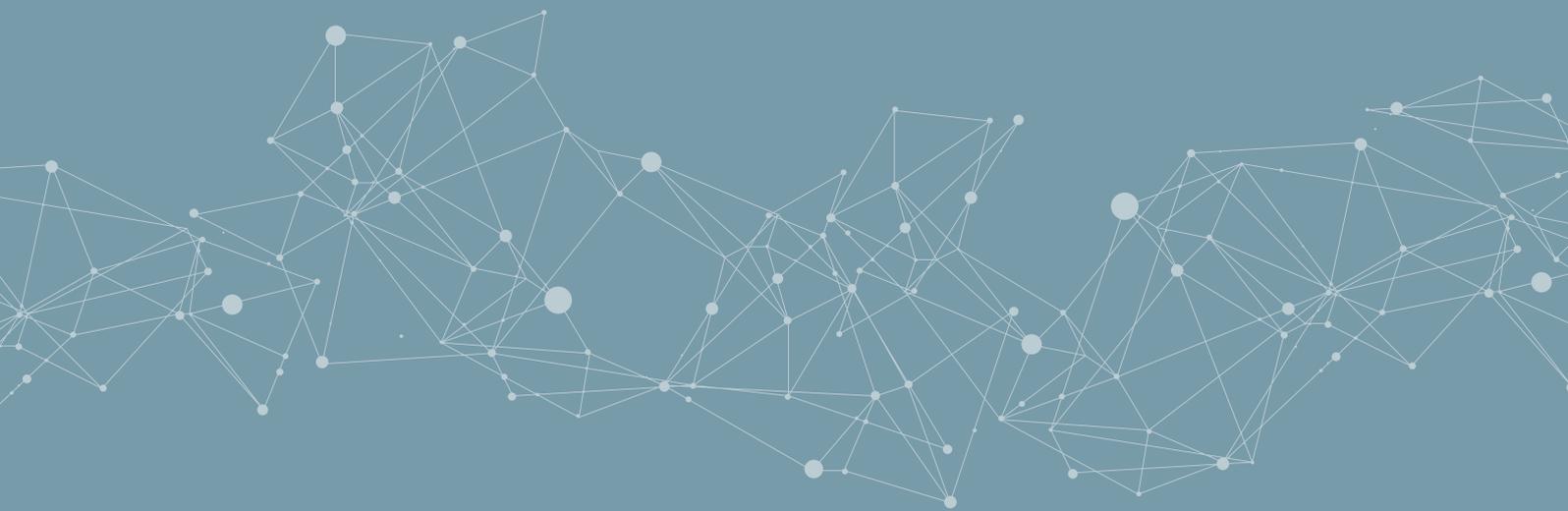
Our production facilities are accredited with the following certificates:



ISO 9000 is today the most widely used common standard in terms of quality. ISO 9001 deals with development, production, installation and service. ISO 9001 is the most comprehensive standard in the ISO 9000 series.



ISO 14001 is an international standard for environmental management. The standard is the most dominant environmental management standard in the world.



THE ENVIRONMENTAL CONCERNS OF ETHANOL

FROM PRODUCTION TO CONSUMPTION
AND BEYOND.

ENVIRONMENTAL CONCERNS

ETHANOL PRODUCTION

As in any debate it is challenging to quantify environmental benefits from a holistic perspective. Here is a comparison of the most widely used alternative to hand sanitising - ethanol. Not all ethanol is equal, but the main points are always true. It creates a lot of waste product since it is a high energy solvent that comes most often from biomass. Also, you can't concentrate it, more than it already is.

<p>DEFORESTATION</p> <p>The ethanol industry is expanding in Brazil, with growing concerns of deforestation of the Amazon rainforest in favor of sugar cane crops.</p>	Deforestation, air pollution, disturbing the ecosystem.
<p>FERTILIZING AND THE USE OF PESTICIDES</p> <p>There are growing concerns how sugar cane plantations around the world affect water sources and the soil.</p>	Water pollution, soil erosion, nitrogen pollution.
<p>CROP BURNING</p> <p>It is common, but controversial practice to burn sugar cane fields before harvest to reduce mass and use the ashes as nutrients.</p>	Air pollution.
<p>MECHANICAL HARVESTING</p> <p>Fossil fuel powered machines harvest the crop and transport it to fermentation.</p>	Air pollution, CO ₂
<p>FERMENTATION</p> <p>1000 l of water is added to every 150 kg of sugar. Yeast is added and the mash is allowed to ferment to a 15% alcohol mixture. CO₂ is a byproduct that is often captured for use in other areas.</p>	CO ₂
<p>DISTILLATION</p> <p>Only about 15% of the fermented mash is converted to ethanol. The rest is considered waste and is discarded.</p>	Energy consumption, waste.

WASTE

140 dried residue
86 kg cellulose
800 liters of stillage

YIELD

80 liters of 95.5% proof ethanol

WASTE TO ETHANOL RATIO

10 : 1

ENVIRONMENTAL CONCERNS

ETHANOL TRANSPORT

Main transportation challenge is that the liquid is highly flammable and it cannot be concentrated further than 95,5%, meaning you have to ship nearly the full volume of ethanol all the way to the end user.

<p>SHIPPING Shipping accounts for over 10% of transport CO2 emissions and is a major source of air pollution.</p>	<p>Air pollution, CO₂</p>
<p>MANUFACTURING OF SPECIAL EQUIPMENT Class 3 materials require special safety equipment and training.</p>	<p>Energy consumption, waste.</p>
<p>LAND TRANSPORTS Since ethanol is not a concentrate the full volume needs to be loaded, transported and offloaded multiple times before reaching the end user.</p>	<p>Air pollution.</p>
<p>RISK OF ACCIDENTS Accidents involving ethanol transports have already happened with a great risk for the environment and rescue personnel at the accident scene.</p>	<p>Pollution, personal injury.</p>



YIELD

80 liters of 95,5% proof ethanol

END PRODUCT

100 liters of 80% proof ethanol

**ETHANOL OFFERS ONLY 20% SAVINGS
IN SHIPPING VOLUME**

ENVIRONMENTAL CONCERNS

ETHANOL CONSUMPTION

Not only has ethanol been proven to not being able to stop the spread of germs, it has caused major damage to people's skin, destroyed equipment and the packaging has not being properly disposed of. On top of all this, the people responsible for safety are ignoring the danger and the constant risk of accidents, involving fire and children ingesting the dangerous liquid.

<p>MANUFACTURING OF SPECIAL STORAGE Class 3 materials require special storage.</p>	Energy consumption, waste.
<p>ADDITIONAL SECURITY MEASURES A plentitude of resources, in equipment and manpower, are required to keep alcohol in safe hands.</p>	Energy consumption, waste, risk.
<p>IGNORING SAFETY PROTOCOLS Safety protocols are there to prevent accidents, fire and injuries. Yet we can see large quantities of ethanol stored in one place, hand sanitizers sharing tables with candles, unlabeled hand sanitizers, ethanol in reach of children etc.</p>	CO ₂ , personal injury.
<p>REPLACEMENT OF DAMAGED MATERIALS Alcohol damages sensitive medical instruments, other equipment, floors, fabrics, leather etc. All of these materials need to be replaced or fixed.</p>	Energy consumption, waste.
<p>RECYCLING CHALLENGES Both the discarded ethanol and the plastic container should be discarded in special recycling facilities for solvents. Empty hand sanitizer bottles are rarely, if ever, recycled properly.</p>	Pollution, waste.
<p>LONG TERM CONCERNS As ethanol evaporates and reacts with the environment it offers no long term protection. The only solution is to use more alcohol, which causes an even bigger burden on the environment.</p>	Increased consumption, more damage.
<p>CREATING MULTI RESISTANT BACTERIA Using only a single active ingredient may cause the bacteria to become resistant, causing strains that require even higher concentrations of active ingredients to kill.</p>	Personal injury.

THE ENVIRONMENTAL IMPACT OF HEALTH SERVICES

“ A 10% REDUCTION IN EMISSIONS FROM JUST THE US HEALTH SYSTEM WOULD HAVE THE SAME ATMOSPHERIC IMPACT AS A 10% REDUCTION IN EMISSIONS FROM THE ENTIRE AUSTRALIAN ECONOMY. ”

The Energy Burden and Environmental Impact of Health Services by Lawrence H. Brown, MPH&TM, corresponding author Petra G. Buettner, PhD, and Deon V. Canyon, PhD, DBA, MPH

SUMMARY OF

ENVIRONMENTAL CONCERNS OF ETHANOL FROM PRODUCTION TO CONSUMPTION AND BEYOND.



STEP 1 - PRODUCTION

- Deforestation
- Fertilizing and the use of pesticides
- Crop burning
- Mechanical harvesting
- Distillation



STEP 2 - TRANSPORT

- Shipping
- Manufacturing of special equipment
- Land transports
- Risk of accidents



STEP 3 - CONSUMPTION

- Manufacturing of special storage
- Additional security measures
- Replacement of materials
- Ignoring safety protocols
- Additional security measures

END RESULT

- Tons of waste
- Recycling challenges
- Dry and damaged hands
- Poor short term disinfection
- Unnecessary transports
- Lots of extra safety measures
- Fires and accidents
- Damaged material

BENEFITS OF BIOPOLYMER™ PLUS

The key to green bioscience in regards to hand sanitizing and disinfection is to use a concentrate. Something that can be mixed locally. Our ratio of active ingredient is less than 0.05%, which allows us to manufacture and ship only 1 liter of non-classified concentrate that can make up to 2,000 liters of 'ready to be used' disinfectant, with long-term protection.

<p>SUPER EFFECTIVE BIOCIDES</p> <p>Using an active ingredient that is highly effective against germs allows us to use much less. This gives us a much higher exchange rate on the concentration ratio.</p>	Need less ingredient, higher water ratio.
<p>MULTIPLE ACTIVE INGREDIENTS</p> <p>Having multiple ways to attack germs allows us to lower the overall concentration while fighting against multi resistant bacteria strains.</p>	Need even less ingredient, higher water ratio.
<p>LOCALLY SOURCED WATER</p> <p>Over 90% of our formula is distilled water. Sourcing it locally does not require transportation.</p>	No need to transport.
<p>MAIN INGREDIENT IS A BYPRODUCT</p> <p>We acquire our water from industries where distilled water is a byproduct.</p>	No extra energy required.
<p>NO CLASSIFICATION</p> <p>Biopolymer™plus is an unclassified formula with no need for special transport, storage or handling, which is much more efficient.</p>	No waste or unnecessary production.
<p>NO SOLVENTS</p> <p>Our plastic containers can be recycled as regular plastic.</p>	Easy to recycle.
<p>LONG TERM EFFECT</p> <p>Even with modest usage we can protect hands and surfaces long term and prevent staff and customers becoming sick. Sick people create waste.</p>	Improved effect, less waste.
<p>MADE IN SWEDEN</p> <p>A widespread culture of eco friendly initiatives makes Sweden a great place for environmental conscious production, according to latest research.</p>	More environmentally friendly ecosystem makes for a reduced total impact.

BIOPOLYMER™PLUS CONCENTRATE TO FINAL PRODUCT

1 : 2,000



COMPARISON OF HAND SANITISER WITH **ETHANOL VS BIOPOLYMER™ PLUS**

ETHANOL

- Tons of waste
- Recycling challenges
- Dry and damaged hands
- Poor short term disinfection
- Unnecessary transports
- Lots of extra safety measures
- Fires and accidents
- Damaged material



BIOPOLYMER™ PLUS

- Super effective biocide, leads to less waste
- Easy to recycle
- Safe for hands and the environment
- Locally sourced water
- No unnecessary transports
- No added risk for accidents or damaged materials
- No secondary production needs, like replacements or safety concerns
- Made in Sweden, an environmentally conscious ecosystem

REQUIRED TO MAKE AND DELIVER 100 LITERS OF HAND SANITISER

ETHANOL

1 ton waste + worldwide transport

BIOPOLYMER™ PLUS

0,5 deciliters of active ingredient
+ locally sourced water

OUR PART TOWARDS
REACHING THE UNITED NATIONS

SUSTAINABLE DEVELOPMENT GOALS



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The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth - all while tackling climate change and working to preserve our oceans and forests.

”

<https://sdgs.un.org/goals>



GOOD HEALTH & WELL-BEING

3.3	By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.	We at Hygiene of Sweden target to aid in the fight against epidemics with our well researched and stable BIOPOLYMER™plus formula which does not allow bacteria and viruses to become resistant.
3.4	Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol.	Hygiene of Sweden's 100% alcohol-free antibacterial liquid prevents the risk of alcohol abuse in any age-group.
3.5	By 2020, halve the number of global deaths and injuries from road traffic accidents.	Our product does not require heavy or special transportation. This means that we do not add to the risk of road traffic accidents caused by heavy duty trucks and containers.
3.6	Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.	We aim to achieve universal health with the most basic of hygiene routines - to have clean hands.
3.9	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	We aim to reduce the risk of illness by offering proper and safe hand hygiene to all.
3.9b	Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all.	The health sector benefits immensely from our product as it does not destroy the material on which it is applied. The hands of health workers, who have to constantly sanitize their hands, are protected without causing dryness and damage to their skin.
3.9c	Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.	We are now expanding our reach to developing countries across the globe.



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CLEAN WATER & SANITATION

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AN **ESTIMATED 10%** OF ALL U.S. GREENHOUSE GAS EMISSIONS COME FROM THE HEALTH CARE INDUSTRY.

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DAVID INTROCASO, WALT VERNON

6.a	By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.	Our formula is developed from waste water treatment technologies for the specific purpose of reducing growth of organic materials. We use distilled water in our production that comes from a byproduct.
6.b	Support and strengthen the participation of local communities in improving water and sanitation management.	We enlighten cleaning companies on the benefits of using our product, which is an environmentally clean and friendly solution to all their sanitization needs, so that we can work together towards achieving our sustainability goals.



INDUSTRY, INNOVATION & INFRASTRUCTURE

9.1	Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.	We have developed a quality, reliable, sustainable and resilient methodology to manufacture and produce our 100% alcohol-free product, with over 90% from locally sourced water.
9.4	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.	CO ₂ emissions are negligible in the production of our product as the whole process is done in room temperature.

Biopolymer™ Plus

consume
less
green
living
O₂
eco-friendly
Hygiene of Sweden
climate
smart



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RESPONSIBLE CONSUMPTION & PRODUCTION

12.2	By 2030, achieve the sustainable management and efficient use of natural resources.	Our formula is water based and the concentration is extremely low. This enables the production to be produced in the country where it is distributed.
12.4	By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	We have sound management of chemical waste throughout the lifecycle of our product.
12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	We use local biproducts in our manufacturing process. Everything that is considered waste, if possible, is recycled according to local guidelines.
12.6	Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.	We encourage companies to adopt sustainable practices like keeping hands and surfaces clean.

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HOSPITALS AND LABS EMIT **4.4% OF THE WORLD'S GREENHOUSE GAS** EMISSIONS AND ARE RESPONSIBLE FOR MORE THAN **5 MILLION TONS OF WASTE** EACH YEAR.

KEN BUDD, AAMCNEWS

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CLIMATE ACTION

13.1	Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.	We have very little CO ₂ emissions and therefore support the climate action sustainability goal.
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PARTNERSHIPS FOR THE GOALS

17	Strengthen the means of implementation and revitalize the global partnership for sustainable development.	We work with companies across Europe and the US and encourage the use of alcohol-free hand sanitization and work along with them to create a better world for tomorrow.
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SOURCES

** Fundamentals of Renewable Energy Processes - Aldo Vieira da Rosa, Juan Carlos Ordonez

** <http://www.eolss.net/sample-chapters/c10/e1-05a-22-00.pdf>

SOILS, PLANT GROWTH AND CROP PRODUCTION - Vol.II - Growth and Production of Sugarcane - Willy Verheye

** <https://knoema.com/atlas/topics/Agriculture/Crops-Production-Area-Harvested/Sugar-cane-area-harvested>

** <https://www.sciencedirect.com/science/article/abs/pii/S1364032115008576>

** <https://en.wikipedia.org/wiki/Sugarcane>

** <https://sdgs.un.org/goals>

** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3519304/>

** <https://www.aamc.org/news-insights/hospitals-race-save-patients-and-planet>

** <https://www.statnews.com/2021/06/29/public-reporting-health-care-greenhouse-gas-emissions/>

