Boffin Access
FOSTERING KNOWLEDGE

Open Access Journal | Volume: 1.1

Pollution Prevention and Control

Combating Plastic Pollution Plastic to Fuel and Textiles or Incineration?

Shimon Shatzmiller[1*]
Rami Krieger[1]
Ludmila Buzhansky[1]
Galina Zats-Mor[1]
Inbal Lapidot[1]

[1]Department of Biological Chemistry, Ariel University of Samaria, Ariel, Israel

Foreword

Many scientists in various places on Earth have for many years been alerted to the ecological holocaust that is approaching us with gigantic strides. Already today there are many signs that the delicate equilibrium in which the "ball-Earth" has been, ours with the various life forms that occur in it is facing disaster. This disaster can bring about a halt or change in life processes.

Life itself is a miracle founded on a system that is a collection of a large number of biological catalytic processes (enzymatic processes many based on unique coenzymes) which the principle of metabolism governs together with the energy transitions and electron flows in the animal system. All of this works in a very narrow range of temperatures in most of the various animals and plants and microorganisms. Changing the concentrations of greenhouse gases (the water, the waiting gas and the carbon dioxide gas, which are the main components) changes the capacity of the air to thermal energy in the direction of raising the temperature of this controlling medium. A failure to do so, the balanced temperatures of the outer earth crust layers, which are in direct contact with the air, will rise. This warming already destroyed the ice envelopes (glaciers) at the poles and mountain peaks, and changing the direction of ocean currents. It also releases methane gas from the methane hydrates deposits that accumulate for eons on the ocean floor in our world. The result is a chain reaction process that results in even a very rapid rise in temperatures and may lead to the destruction of life on Earth.

The severity of the situation and the difficulties in developing adequate technological solutions is needed in these circumstances. The problem is not in the complex "startup" area and its interdisciplinary is far beyond the "exits" or the other due to the need to handle millions of megatons of materials. The chemists, botanists, and engineers, microbiologists and biologists and biochemistry! Synthetic chemistry is, in a tremendous global effort with essentially "unlimited" funding, to start a new way of addressing the problem. The "problem", as it is being addressed today, will not find its solution without complex innovative effort. World governments are required for development because their hands are slack. They are engaged in personal struggles and idle wars.

There is hope and there is a possibility. But the public must demand that its leaders succeed in suppressing global warming.

It is expected that for about 50 years, the Earth's ice envelopes will melt, sea levels rise, coastal cities will be flooded and the atmosphere will absorb more massive amounts of Pimane methane gas from the oceans. Carbon dioxide will be supplied from the transport system and from the global industry fed by the coal burning from the mines in the Earth's shell.

How Large is the Great Pacific Garbage Repair? Science *Vs.* Myth

Remains of a baby Albatross died on a beach with plastic waste. The remains of the baby Albatross are dying to reveal the far-reaching plastic contamination on the Midway Atoll, 2000 miles from the continent. Chris Jordan, from the series "Midway: Message of Gyre." Used under Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 Licenses USA.

However, while everything could be more significant in Texas, some reports about the high Pacific garbage repair [1] will lead you to believe that the marine mass of plastic is more prominent than Texas - perhaps twice as large as a single-star state, or even twice as large as that of the continental United States. For the National Oceanic and Atmospheric Administration (NOAA), a national science agency that separates science from science fiction on the Pacific waste shelf (and other trash repairs) is essential when answering

Article Information

DOI: 10.31021/ppc.20202103
Article Type: Opinion
Journal Type: Open Access
Volume: 1 **Issue:** 1
Manuscript ID: ppc-1-103
Publisher: Boffin Access Limited

Received Date: 20 December 2019
Accepted Date: 26 December 2019
Published Date: 09 January 2020

*Corresponding author:

Shimon Shatzmiller
Department of Biological Chemistry
Ariel University of Samaria
Ariel, Israel
E-mail: shimon120@gmail.com

Citation: Shatzmiller S, Krieger R, Buzhansky L, Zats-Mor G, Lapidot I. Combating Plastic Pollution Plastic to Fuel and Textiles or Incineration?. Pollut Prev Control. 2020 Jan;1(1): 103.

Copyright: © 2020 Shatzmiller S, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 international License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Figure 1: The Great Pacific Garbage Patch (GPGP)

Description: GPGP is the largest of the five offshore plastic accumulation zones in the world's oceans. It is located halfway between Hawaii and California.

questions about what it is and how we should deal with the problem. There are many conflicting estimates of the size or mass of the trash patches. The NOAA Marine Debris program brings two more myths about the rubbish patch [2] (Figure 1).

Dust patches are not a solid stain. The name shows pictures of a floating dump in the middle of the ocean, with miles of wobbly plastic bottles and roaring yogurt cups. While it is true that these areas have a higher concentration of plastic than other parts of the ocean, much of the waste found in these areas are small pieces of plastic, or microplastics, smaller than 5mm in size that is suspended throughout each water column. The ruins are more similar to the spikes of pepper floating over the bowl of soup, rather than as thin of accumulated fat or sitting on the surface. Micro plastics are almost everywhere in today's marine environment and can come from larger pieces of plastic that have been broken over time, from fleece jackets or plastic micro beads to extra facial scrubs. The effect of these micro plastics on marine life is an area of practical research.

Size Estimation

"The Great Pacific Garbage Patch" (GPGP), covers an estimated area of 1.6 million square kilometers, an area twice the size of Texas or three times the size of France.

To formulate this number, a team of scientists behind this study conducted the most elaborate and ever-harmonized sampling method. It included a fleet of 30 boats, 652 surface nets and two flights over the patch to collect aerial photographs of debris. The sampling in different locations within the same time allowed for a more accurate assessment of the size of the sticker and the plastic drifting in it.

As the crisis escalated in our natural world, we refuse to stay away from climate disaster and species extinction. The environment is a top priority. We discuss the climate, nature, and pollution of the bulge it deserves stories that are often not reported by others. At this central stage for our species and our planet, we are determined to inform readers of threats, consequences and solutions based on scientific facts, not political prejudice or business interests. More people are reading and helping journalism than investigative reports. And unlike many organizations, we chose an approach that allows us to keep as accessible to all, regardless of where they live or what they can afford. But we need your continued support to continue working as we do.

With this in mind, the cleanups of the oceanic plastic pile and applying it to something useful for people like conversion into energy and clothing, is discussed in this paper.

Today, plastics are derived almost entirely from petrochemicals produced from fossil and gas oil. Around 4 percent of annual oil production is converted directly from plastic from petrochemical raw materials. As the production of plastics also requires energy, its production is responsible for consuming an additional similar amount of fossil fuels. However, it can also be argued that the use of lightweight plastics can reduce the use of fossil fuels, for example in transport applications when plastics replace heavier conventional materials such as steel.

Cleanup and Harvesting Plastic Oceanic Depositions

A San Francisco-based waste and energy development company has announced the closing of a $260 million knancing package for the construction of what it says is the nation's krst commercial-scale plastics-to-fuel plant, which will be located in Ashley, Indiana (Figure 2).

The Dutch company Ocean Cleanup said it had successfully raised $21.7 million in donations to initiate the first large-scale trials of its Pacific cleaning technology later this year [3-5] (Figure 3).

This significant round of funding is led by San Francisco-based philanthropists Mark and Lynn Benioff and an anonymous donor. Other sponsors include the Julius Baer Foundation, DSM Royal, and Silicon Valley entrepreneur / investor Peter Thiel.

The foundation has recently conducted experiments in the North Sea to test the behavior of a newly developed boom on waves.

Lately, people deployed System 001 to the "Great Pacific" garbage bag - marking the first attempt to begin cleaning it. During the last campaign, we have confirmed many key assumptions of design, but also encountered two unplanned learning opportunities: the system did not maintain sufficient speed, allowing the plastic to exit the system, and pressure concentration caused fatigue fracture in HDPE floater.

Figure 2: Pyrolysis

Description: "Pyrolysis" is the technology used to break down plastic waste to obtain hydrocarbon-based fuel, has been known for years. But this calls for complicated and costly refining steps to make the fuel useable

Figure 3: The largest clean up in history

Description: The foundation has recently conducted experiments in the North Sea to test the behavior of a newly developed boom on waves.

With the understandings from the root cause of analysis, the engineering team started working on solutions that we can start experimenting at the Great Garbage and Repair (GPGP). The upgraded design, which we called '001 / B', will include various changes (listed below) that will be reviewed during our next campaign. By adapting the design to cope with these unknown learning opportunities, we strive to have a system that can effectively capture plastics and withstand ocean forces (Figure 4).

Plastic Waste Pyrolysis to Oil Production Line

Amazing machine transform plastic bags into fuel

Humans produce hundreds of millions of tons of plastic every year. But a very small portion of it is recycled. According to a study published in the journal Science in 2017 [6], as 12.7 million tons of plastic waste finds its way into the ocean each year (Figure 5).

The usual method for converting plastics into fuel is based on pyrolysis [7]. This involves breaking the long plastic hydrocarbon chains at higher temperatures in the absence of oxygen, followed by some refining steps. The method can be energy-intensive, expensive, and time-consuming [8].

Is the center of the American developed and applied technology? A reasonable research pair may be a solution. Sailing boat James H. Holm and polymer scientist Swaminathan Ramesh are developing a portable reactor that can turn plastic into diesel fuel. Technology can reduce plastic waste on land and sea, and create cleaner, cheaper fuel [9]. "Ridding the Oceans of Plastics by Turning the Waste into Valuable Fuel."

The reactor, which can fit in a shipping container or on a boat, can someday convert ocean plastic waste into fuel for the ship, researchers hope (Figure 6).

Figure 4: A technology to convert plastic trash into fuel [4 ,5]

The machine: He warms the plastic with electricity, and then binds the steam, and then he cools and thickens Crude Oil. Crude oil can be used to heat electricity-producing generators and some furnaces, and when refined, it can be used for gasoline. When scientists first created the process, Ito explained that by converting plastic into oil, we eliminate CO_2 pollution and raise awareness of the fuel potential of plastic. When plastic is burned– a Usually to recover potential energy sources - it produces a large amount of toxins andCO_2. While the final product is still a fuel that will be burned and let the CO_2, innovative. The recycling method can revolutionize the way certain plastics are treated. Because of the system. It is made for households; it can create energy independence among consumers.

We may assume that the oceanic plastic trash is collectable and the technology to convert it to fuel products is also available [10].

Millions of tons of the world's plastic waste could be turned into clean fuels, other products through chemical conversion. (Purdue University)

Recently, Use of Supercritical Water for the Liquefaction of Polypropylene into Oil. About five billion tons of plastic waste has already accumulated in landfills and the natural environment over the last 50 years. Polypropylene [11] waste (PP) accounts for approximately 23% of total plastic waste. The conversion of PP waste into useful products can reduce accumulated waste and the risks associated with the environment and human health. In this study, the PP model was converted to oil using supercritical water at 380-500°C and 23 MPa at a reaction time of 0.5-6 h. Up to 91% wt of the PP model was converted to oil at 425°C with a reaction time of 4 - 4 hours or at 450°C with a reaction time of 0.5-1 hours. Higher response temperatures (450°C) or greater reaction times (> 4 hours) led to additional gas products. The oil products included olefins, paraffin's, cyclic and aromatics. Approximately 80-90% wt of the oil components were in the same boiling range as nitrate (25-200°C) and heating values of 48-49 MJ / kg. The reaction paths for converting the PP model to oil under tested conditions were suggested. This conversion process is positive in net energy and may have higher energy efficiency and lower greenhouse gas emissions than fire and mechanical recycling. The PP derived oil has the potential to be used as a gasoline mixture or raw material for other chemicals.

Making Textiles and Recycled Plastic Clothing [12]

It is necessary to providing the information to change the attitude and human behavior on plastics. Efforts are also made by clothing brands, retailers and other organizations to change the situation. Referring to a much broader problem of the current criminal pollution crisis, companies are recycling plastic waste to create new clothes and increase awareness among their consumers.

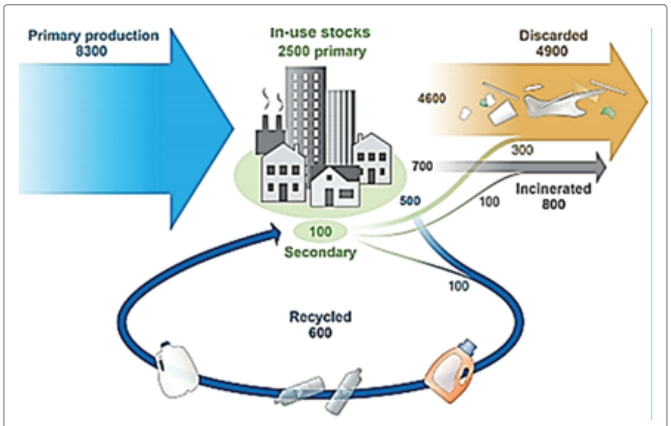

Figure 5: Global production

Description: Global production, use, and the fate of polymer resins, synthetic fibers, and additives (1950 to 2015; in a million metric tons [5]

Figure 6: Japanese researcher illustration

Description: A Japanese researcher inspiration for the method comes from the simple understanding that plastic bags are formed from oil, so they should be able to convert back to the original form

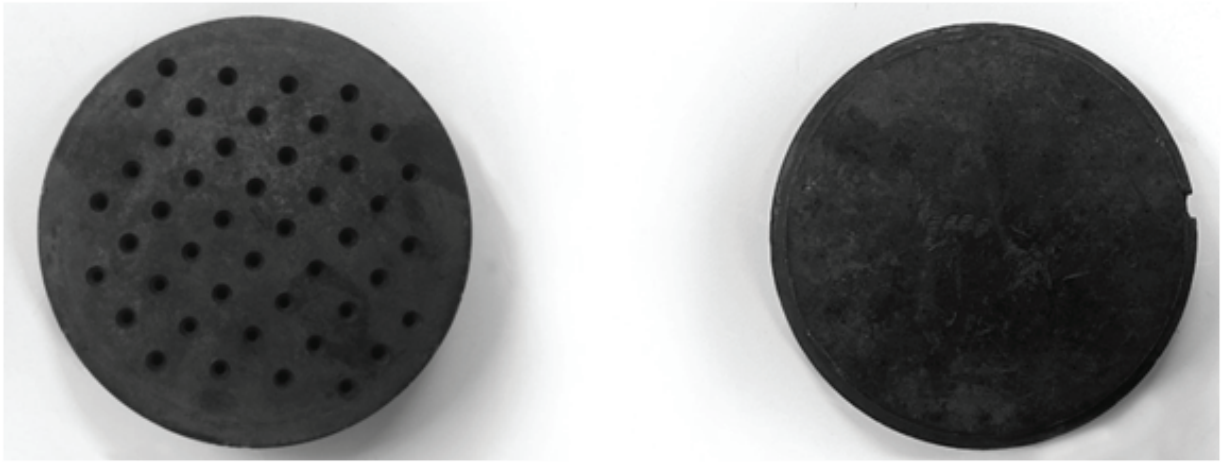

Figure 7: Top and bottom view of heated plastic disc

Description: Above left: The top of the heated plastic disc is forced through. Right: Bottom. If you look closely you can see the tiny holes where molten polyester is extruded.

Figure 8: Dyed and blended polyester

Description: Above: Dyed and blended polyester that is ready to be carded and spun into yarn. Notice how similar it looks to wool

It is obvious to rely on municipal recycling programs. After collecting the bottles, the bottles are clearly separated from the other colored bottles. Cleaning the bottles will create a white thread, and naturally colored bottles create a green thread, or whatever the color of the bottle was.

The next step is to shred the bottles into tiny pieces and separate the balls and labels from the bottle material. The soda cap or water bottle is actually a different type of plastic than the PET bottle itself. Then the grated mass is dried (Figure 7).

Now it is time for the carrots to begin their transformation into something that can be used again. This happens with a machine called extruder. The plastic is heated and forced through tiny holes that resemble something like a shower head to form fibers. Beautiful fibers, long strands. After that, they are torn into pieces into short

pieces, so the fibers are not strands. Then he is on bail and he is finally ready to make a thread. At this time the fibers very close to wool, as we shall see below (Figure 8).

Clothes are a daily necessity, and many have an essential form of expression. However, as we continue to study the degree of impact of human actions on our environment, sustainability is becoming one of the central themes of the textile and clothing industry.

According to a report by the Arkard Foundation's violent fund published in 2017, fashion production currently generates a greenhouse emission of 1.2 billion tons per year. It is estimated that more than half of the fast-paced fashion production is dead within a year, one garbage truck full of textiles is land filled or burnt Every second, combined with a meager rate of recycling, leads to constant pressure on resources. Textile production (including cotton agriculture) also uses around 93 billion cubic meters of water per year, contributing to problems in rare areas of water (Figure 9).

While turning recycled plastic into clothes provides an appealing solution to the amount of plastic waste floating in the oceans or covering the country, there are also concerns that this approach may do more damage when it comes to another form of plastic contamination - micro plastics. It is estimated that half a million tons of plastic microfibers, equivalent to more than 50 billion plastic bottles, pour during rinse ends in the ocean and eventually enters the food chain. According to Dr. Mark Brown, an ecologist and postdoctoral fellow at The National Center for Ecological Analysis and Synthesis (NCEAS) in Santa Barbara, California, USA, whenever a synthetic garment goes through a cycle and rinses with a washing machine, it pours a large number of plastic fibers, and most washing machines have no filters to unify these particles, No sewage plants.

Despite the dangers of plastic microfibers, however, recycling plastic into clothes may still be its benefits. According to Adrian Midwood, founder of Leisure Leisure Group, turning plastic bottles into new objective objects may help capture plastic waste and also create some jobs in areas where waste management or recycling programs are available, preventing large-scale pollution.

Incineration Versus Recycling: in Europe, a Debate Over Trash

For short communities on landfill area [13], "waste to energy" fire sounds like Solution bullet: Recycle whatever you can, and turn the rest to heat or electricity. This is how it is considered in much of Europe, where almost a quarter of all municipal solid waste is burned in 450 incinerators, and more and more in the United States countries, where dozens of cities and towns are considering new plants, cutting. But the leaders of the international movement zero waste, which seeks to reuse all products and send anything to landfills or crematoria, says fire falls on the energy front actually encourages waste. Many "zero wasters "- includes groups such as Zero global waste Europe United States Crematorium Alternatives, or GAIA - have become ardent opponents of technology, arguing that supporters have co-opted carefully label zero waste by offering that fire produce no energy actually wasting. In Europe, there burning capacity continues to grow even though it has already gone beyond the trash supplies in some countries; the conflict goes beyond semantics to the heart of meaning and sustainability (Figure 10).

Figure 9: Alignment of the fiber

Description: Above: a lot of metal "needles" like a hair brush to rotate on different drums to align the fiber in the same direction

Waste-To-Energy Advocates Say the Recycle Vs. Incinerate Comparison is a False Choice -that the Two Can Coexist

As it turns out, even countries with the highest rates of garbage - Denmark, Norway and Sweden, for example - all burn at least 50 percent of their waste - also tend to have a high rate of recycling and composting of organic substances and food waste. But zero wasters argue that if it were not for large-scale combustion, these environmentally conscious countries would have a higher rate of recycling. Germany, for example, burns 37% of its waste and returns 45% - a much better recycling rate than 30% plus Scandinavian countries.

In Many European Countries, Public Subsidies Support the Expansion of Incineration Capacity

The German Waste Disposal Attorney said that he saw such an impact in Bavaria. In and around the towns of Schwandorf, Coburg, and Burgkirchen, each containing a crematorium, some waste authorities openly refused to separate organic waste for compost, He said, instead of burning the material at a lower price. "For us, this refusal is a good proof that the existence of burning plants can delay recycling."

In Flanders, Belgium, the effort to keep a lid on incinerator crematoria led to close zero waste. Since the early 1990s, when recycling rates were relatively low, the local waste disposal facility in Flanders decided not to increase the fire beyond 25 percent, Simon said. As a result, combined compost recycling rates now exceed 75 percent, GAIA says. "They stabilized and even reduced the production of waste when they burned a fire."

Home Trash Disposal and Separation in Germany

Australians are good at recycling, but we're not the best in the

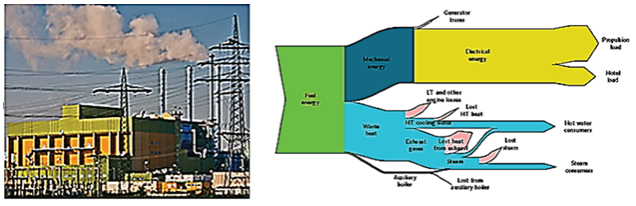

Figure 10: A waste-to-energy incinerator in Hesse, Germany. NORBERT NAGEL/WIKIMEDIA COMMONS

Figure 11: Waste, followed by papier, Kunstsoff, Restmull, Glass, Metal

world. There are some good recycling habits that we can learn from other countries. Finding which country is best in recycling is not easy because not all state recycling reports the same way (Figure 11).

References

1. Lebreton L, Slat B, Ferrari F, Sainte-Rose B, Aitken J, et al. Evidence that the Great Pacific Garbage Patch is rapidly accumulating plastic. Sci Rep. 2018 Mar; 8(1):4666.
2. How Big Is the Great Pacific Garbage Patch? Science vs. Myth.
3. The Largest Cleanup in History. Take Ocean Cleaning into your own hands.
4. Niutech has dedicated to waste polymer pyrolysis technology research and equipment manufacture for over 30 years.
5. Yangjiang Factory Sale Waste Plastics Oil Engine Oil Recycling Machine.
6. Geyer R, Jambeck JR, Lavender KL. Production, use, and fate of all plastics ever made. Sci Adv. 2017 Jul;3(7): e1700782.
7. Mochamad Syamsiro, Harwin Saptoadib, Tinton Norsujiantob, Putri Noviasri, Shuo Cheng, et al. Fuel Oil Production from Municipal Plastic Wastes in Sequentialand Catalytic Reforming Reactors. Energy Procedia. 2014; 180-188.
8. Patel P. Turning an ocean of plastic into fuel. 2017 Apr.
9. Stanchak J. Ridding the Oceans of Plastics by Turning the Waste into Valuable Fuel.
10. Ramli Thahir, Ali Altway, Sri Rachmania, Juliastuti Susianto. Production of liquid fuel from plastic waste using integrated pyrolysis method with refinery distillation bubble cap plate column. Energy Reports. 2019 Nov; 70-77.
11. Wan-Ting Chen, Kai Jin Nien-Hwa, Linda Wang. Use of Supercritical Water for the Liquefaction of Polypropylene into Oil. ACS Sustainable Chem. Eng. 2019; 74:3749-3758.
12. How a Plastic Bottle Becomes Fabric.
13. Incineration Versus Recycling: In Europe, A Debate Over Trash.
14. Looking at Australia's efforts at recycling compared to the rest of the world.