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TerraFemme: A Social Entrepreneurship Investigation into Composting Menstrual Waste

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Abstract

This paper discusses the problems of landfilling menstrual waste and explores composting as a viable alternative. Menstrual products are often made from synthetic materials that do not biodegrade well in landfill conditions. Biodegradable plant-based menstrual products exist but are thrown into the trash because there is no other disposal option available. By comparing the disposal methods of regulated waste, biohazards, and compostable materials, this research illustrates the potential dangers of and lack of concern regarding menstrual fluid and its disposal. Industrial composting facilities can destroy plant, animal, and human pathogens found in typical yard waste and kitchen scraps, as well as those found in animal rendering and baby diaper waste. Pathogens that may be found in menstrual fluid would be killed in the composting process while also rerouting the menstrual waste stream from landfills.

Keywords: Menstrual Waste, Social Entrepreneurship, Composting,

1. Introduction

Social entrepreneurship combines the creativity and drive of a sustainable business venture with a social cause that benefits our lives socially, economically, and environmentally. The concept for TerraFemme came from a social entrepreneurship course called "Ideas to Action," in which student teams developed their ideas for social good into written business plans and pitches. TerraFemme is a service which collects and composts non-synthetic, organic cotton menstrual products to "recycle the menstrual cycle." This business would divert the 17 billion tampons and pads that are landfilled each year in the U.S. and return the natural organic cotton fibers and menstrual fluid back into the earth. After winning the 2016 Social Entrepreneurship Competition, the TerraFemme team knew that their business plan was sound, but wanted to investigate the regulatory obstacles in place that may prevent the composting of menstrual waste. This paper will question many aspects of the legal, medical, and social entities that seldom discuss menstrual waste as an environmental or health issue. The lack of discussion illustrates the current societal stigma of menstruation. Towards these ends, the following research question guides this paper: What are the problems with our current methods of disposing menstrual products and is composting a viable alternative?

2. What is Menstrual Fluid?

Menstruation is the monthly termination of the endometrial lining after the female body prepares to implant an embryo for pregnancy.[7] It is a critical cycle of female fertility that has been regularly tabooed as "dirty" for much of recent human history. This historic taboo has created societal misconceptions surrounding menstrual fluid.

Commonly known as "menstrual blood," only half of what is expelled during a menstrual period is truly blood. In addition to blood, the fluid contains: vaginal secretions, which are composed of water, electrolytes, and proteins; cervical mucus; and endometrial tissue.[25] Of the 1061 proteins found in menstrual fluid, 385 are unique to the blood contents of menstrual fluid and are not identified in venous blood nor vaginal fluid.[17] Because of the different proteome of menstrual blood, the forensic and medical professions commonly distinguish it from venous blood. Forensic analysts frequently test for endometrial proteins to identify the blood of a rape case as either from menstrual fluid or trauma.[25] The difference in proteome of menstrual fluid from venous blood is essential for forensic examination, but uncommonly differentiated from venous blood in social contexts.

The medical community does not currently classify menstrual fluid as a regulated biohazard like its venous blood counterpart. The blood that is expelled through menstruation is similar to venous blood, but because of the other fluids, proteins, and endometrial tissues, its makeup cannot be treated equally. Only one study would suggest that bloodborne pathogens could be spread through contact with menstrual fluid.[19] The concern is not if menstrual fluid may contain the same hazards as venous blood, but that the medical community does not conduct enough research on menstrual fluid or menstruation in general. Medical professionals still argue why humans menstruate in the first place,[26] and have historically blamed menstruation as a cause for mental illness and disease.[12] In this present day, menstruation should not only be examined to capture its function and biological properties, but also respected as perhaps the most important biological cycle of human existence.

3. Issues with Current Disposal of Menstrual Products

The societal norm of hiding menstruation has contributed to unspoken social, health, and environmental problems of modern menstrual products. The "discreteness" of menstruation has created a market for small, extra-absorbent, disposable products that target women's insecurity of an important biological phenomenon. This market based on secrecy has created a market of users who do not know the contents of their menstrual products nor think about the possible health and environmental consequences associated with them. Most of the single use menstrual products are made from a mix of cotton, rayon, and foam materials that are often bleached, fragranced, and contain pesticides.[13] This money-making design causes both environmental and health issues associated with a normal cycle of female body.

3.1 Environmental Problems

The average woman has at least 400 periods between the ages of 12 and 50. Over her lifetime, each North American woman will use over 11,000 disposable tampons and pads,[13] each contributing to decades of trash in landfills. Modern tampons are comprised of 90% cellulose absorbent material, such as rayon, cotton, or a mixture of the two. These tampons are wrapped with a paper or polymeric ("crinkle free") material then packaged into cartons. Most tampons are each contained in a cardboard or plastic applicator for "ease of insertion."[11] Disposable sanitary pads, although more popular globally, have greater environmental concerns. In addition to the cellulose fibers, there are many synthetic glues, plastics, and foams that are used to "wick moisture" and absorb more menstrual fluid. The combination of these materials in menstrual pads may take over 400 years to break down in natural open-air conditions.[1]

The Royal Institute of Technology Stockholm conducted a "Comparative Life Cycle Assessment of Sanitary Pads and Tampons" which provided data on the production of one brand of tampon and one brand of sanitary pads on human health, ecosystem quality, and natural resources. One functional unit of pads created 23.6% of its weight in waste just in production. The same brand used 166% of its weight in raw material consumption.[14] The data on resource waste from menstrual products does not include that an overwhelming majority of these are later disposed into landfills to further their contribution to each unit's weight in waste. Essentially, the production of pads and tampons requires the creation of waste. The products themselves quickly serve their use and are trashed. The low-density polyethylene plastic (which is not recyclable) made for the plastic applicators for tampons and the adhesive strip of sanitary pads creates 5.3 kg of carbon dioxide each year per menstruating person.[8] This accumulates to over 250 million kg of carbon dioxide created by women in the US between the ages of 18 and 45 using disposable menstrual products,[14] equal to the carbon dioxide emissions of 49,020 cars on the road for a year.[10]

The foams and plastics of many menstrual products do not easily break down and biodegrade. The estimated decomposition time of a foam pad is over 400 years if they are placed in organic conditions, not inside a plastic trash bag starved of oxygen and moisture.[6] Every piece of plastic ever made still exists in some form, such as microplastics, which are small enough to penetrate through wastewater treatment facilities and build up in our bodies without

detection.[22] Menstrual products and their wrappings are used for 6 hours and last hundreds of years after the original consumer has perished. There are reusable, sustainable, 100% organic cotton, plastic and foam free options currently on the market, but no widespread push from large corporations to produce and market these products to improve the environment.

3.2 The Question of Pathogens

Over the course of this research, medical policy makers, Obstetrician-Gynaecologists, and biohazardous waste professionals did not know if menstrual waste contained blood-borne pathogens. It was assumed that if venous blood contained pathogens, then menstrual fluid would as well.

There have been many studies on the bioavailability and transmission of bloodborne pathogens like HIV, Hepatitis C virus (HCV), and Hepatitis B virus (HBV) from venous blood, but few studies have investigated the pathogenic content of menstrual fluid, one for HCV and the other for HBV.[2] Hepatitis C is a liver disease caused by HCV that chronically infect 71 million people globally, with 1.75 million new cases each year.[8] Because it is a blood-borne virus, HCV can be transmitted by sharing needles, reusing inadequately sterilized medical equipment, the transfusion of unscreened blood and blood products, sexual contact, and can be passed down from a mother to baby.[23] The virus can survive on surfaces outside the body at room temperature for up to 3 weeks,[7] making it imperative to safely dispose of any product in contact with infected blood. According to the Center for Disease Control and Prevention, the transmission of HCV via sexual contact is "believed to be low" with no sources referenced. They state that more research is needed to better understand the sexual transmission of HCV.[21] A study from Wayne State University of Medicine analyzed the menstrual blood of 10 premenopausal women who were chronically infected with HCV. The results concluded that all 10 women also contained HCV RNA in their menstrual fluid.[18] The presence of HCV in menstrual fluid may seem intuitive due to half its contents containing blood, however, "health care providers rarely advise patients of the potential sexual or intrafamilial infectivity of this bodily fluid."[18] This study was published in 1994, but no other current studies could be located on this subject. This calls into question the sexual guidelines for those with HCV and how infected patients should dispose of their menstrual waste; however, neither have been discussed in the literature. The current method of disposing menstrual waste and related products in landfills does not address possible pathogenic concerns, raising the question why the medical community and regulatory groups have not discussed this issue.

To conclude the possible concern of bloodborne pathogens in menstrual fluid, further studies must be conducted. Other studies may also consider examining the partners of those with bloodborne pathogens who have contact with menstrual fluid during sexual activity. Many medical websites state that HCV may be contracted via sexual activity but there is no recommendation for women with HCV to abstain from sex while menstruating. There exists no recomendation for women with HCV to dispose of their used feminine napkins differently to avoid contact with the pathogen to waste-workers.[24,21,7] If there are pathogenic concerns in menstrual blood, the medical field and the public does not know about or have considered how to dispose of this possibly harmful waste.

4. Disposal Comparison of Biohazards

Medical and biohazardous waste have very clear methodologies of disposal. "Biohazardous waste may be contaminated by blood, body fluids or other potentially infectious materials."[3] Biohazardous waste includes: sharps like needles, blades and slides; dry biohazardous waste such as paper towels, bandages, and culture flasks; liquid biohazardous waste (blood and blood elements); and human or animal anatomical specimens. All waste considered biohazardous must be collected by a licensed biohazardous waste hauler to either be steam sterilized or incinerated.[3]

Medical equipment has a distinct lifecycle from creation to disposal due to stringent laws to protect medical staff, waste professionals, and the public. In North Carolina, when blood-soaked bandages and needles are of concern in any workplace, there exists a set of guidelines enacted by the Occupational Safety and Health Administration (OSHA) and the North Carolina Department of Environmental Quality (NCDEQ). However, there are many inconsistencies between agencies as to how different regulated waste must be treated. OSHA considers blood soaked bandages, dressings, tubing, gowns, and "other such items" to be regulated medical waste.[16] This citation of regulated medical waste only discusses "certain features of the regulated waste containers, including appropriate tagging" but the ultimate disposal method for medical waste falls under state and local regulations. NCDEQ states that their medical waste rules are meant to apply to medical facilities such as hospitals, care-facilities, doctor's offices, etc., and medical waste that would require treatment would have to contain over 20 milliliters of " human tissues, organs and body parts,

the carcasses of infected animals and cultures and stocks of infectious organisms."[13] Blood soaked bandages and menstrual products do not fall under the NCDEQ's category of regulated waste The discrepancy between these government bodies allows for much waste to be left un-regulated. When embalming bodies, funeral homes have much regulated waste in the form of venous blood and body fluids. Since most funeral homes are connected to a sanitary sewer, human waste fluids can be appropriately disposed of through sanitary water ways. [15] Trauma scene clean up businesses are exempt from regulated waste because medical waste is defined as "waste generated from the diagnosis, treatment, or immunization of humans or animals." [15] Since trauma waste does not fit under the definition of medical waste, the blood and human tissue found in trauma scenes are not disposed with the same level of caution. Instead, trauma waste may be treated under "Universal Protections" through OSHA, which recommends the use of gloves, masks, and gowns during clean up and disposal.

OSHA does not consider menstrual napkins to be regulated medical waste or necessarily a biohazard.

> "A37. OSHA does not generally consider discarded feminine hygiene products, used to absorb menstrual flow, to fall within the definition of regulated waste. The intended function of products such as sanitary napkins is to absorb and contain blood. The absorbent material of which they are composed would, under most circumstances, prevent the release of liquid or semi-liquid blood or the flaking off of dried blood." [16]

The average blood loss during a menstrual cycle is about 35 milliliters, just under the equivalent to a shot of vodka. Many women who suffer from a heavy menstrual flow may expel 60 to 80 milliliters of blood. [6] In terms of NCDEQ, a household or workplace sanitary bin will hold more than double what is considered in to be regulated medical waste (over 20 milliliters).[15] OSHA states that they expect menstrual napkins to be discarded into "waste containers which are properly lined with plastic or wax paper bags. Such bags should protect the employees from physical contact with [the bin's] contents." [16] Although a single feminine napkin will absorb at most 10 milliliters of menstrual fluid, the concentration of bodily fluids inside of a single waste will most likely be more than the 20 milliliter threshold for regulated waste. It seems that regulatory agencies are not concerned with feminine menstrual waste or the possible pathogen hazards that may be a danger in menstrual fluid.

4.1 Menstrual fluid disposal in numbers

Current methods of disposing menstrual waste are also a concern. A typical women's restroom has a feminine sanitary bin attached to the wall of the bathroom stall or sitting on the floor. These bins are generally cleaned out daily and their contents may be negligible at a small populated facility, however, many women have experienced dealing with an overflowing sanitary bin. Imagine an analysis of a large convention center where 100 women use the facility restroom in a single day. The average menstrual period lasts about 5 days on a 28-day cycle,[27] or one sixth of the month is spent menstruating. We can assume that 16.7% of the women using the bathroom facility are menstruating, or about 16.7 women of the 100. If 2 of the days of a woman's menstrual cycle are considered to be "heavy," and expelling the most menstrual fluid, 6.7 women are using their menstrual napkins at full capacity. The average tampon holds 5 milliliters of fluid, which is about the amount a woman would expel during their heavy days of flow. If 6.7 women each throw away one tampon holding 5 milliliters of blood into a single sanitary bin, that's 33.5 milliliters of blood, exceeding the 20 milliliters of waste NCDEQ suggests to be regulated. For the sake of conservancy, if 16.7 menstruating women dispose of a feminine napkin holding just 3 milliliters of menstrual fluid, that equals 50.1 milliliters of blood disposed. Each gallon-sized bin has the capacity of holding 511 tampons the size of 7.35 cubic centimeters. If 511 tampons were disposed with only 1 milliliter of menstrual fluid, that bin would contain over 500 milliliters of unregulated human bodily fluids that may contain bloodborne pathogens.

This short exercise demonstrates the lack of clarity in the legal regulation of blood. It is unclear if NCDEQ considers 20 milliliters of fluid to be contained in a single napkin or in total contents of a waste container. Bodily fluids can accumulate easily without being controlled with the same precautions as medical waste. If menstrual fluid is not considered medical waste and does not contain pathogens, then there can be another solution for disposal.

5. Composting

Composting is the process of recycling organic material into a rich soil amendment, which diverts waste from landfills and reduces the buildup of methane, a greenhouse gas, into the atmosphere.[21] Common compost typically involves a

backyard pile or tumbler full of kitchen scraps and yard waste that eventually decomposes into a fertile humus, or topsoil. More municipalities are installing commercial composting systems which take compostable materials of an entire community. When dealing with large volumes of plant-based decomposable waste, large scale composting systems are used to handle the waste that would alternatively be left in a landfill to contribute to the build up of methane. The finished compost is often used for public green scaping or sold to farmers and individuals to enrich the soil. [21]

5.1 How does Composting work?

Aerated static pile (ASP) and aerated turned pile (ATP) systems are a common industrial method of composting that are constructed of long aerated windrows or piles that allow proper air flow, water distribution, and optimal degradation. Both the ASP and ATP systems are driven by the production of heat by thermophilic microbes inside the compost windrows. The air density inside the pile decreases and allows for the warm air to rise, creating an inflow of air near the bottom of the pile that flows out from the top. As the pile temperature increases, so does the temperature of the pile's water content. [4] The water evaporates and further decreases the air density from inside the compost pile. Air must be able to permeate from the pile to allow proper distribution of air pressure which controls the air flow inside as well as to control the temperature fluctuation of the compost.[21] The piles are covered with loosely piled bulking agents such as wood chips and newspaper to create a permeable skin. Some ASP systems are placed over a network of pipes that help deliver air into or from the pile, whereas all ATP systems are turned over regular time intervals to ensure proper air flow and water distribution.

At the chemical level, composting must maintain a proper ratio of carbon and nitrogen, which are the basic components of all organic matter. The carbon nitrogen ratio (C:N ratio) is the best indicator of the quality and performance of a compost pile. To efficiently produce the most fertile topsoil, it is recommended to keep the C:N ratio to about 25-30 parts carbon to one part nitrogen.[5] If the carbon content is too high, then the rate of decomposition slows, whereas, if the nitrogen content is high, then the compost pile is at risk for killing the essential microbes.[5]

While maintaining a proper C:N ratio and allowing adequate moisture and gas flow, the thermophilic microbes can successfully degrade the waste, at the same time achieving high temperatures to kill pathogens.[20] Organisms that cause disease in humans and animals such as E. coli, salmonella, and many molds are adapted to live at human body temperature. Bacteria make up 80 to 90% of the billions of microorganisms found in a single gram of compost and can withstand temperatures over 150°F. [20] Aerated piles typically reach temperatures of at least 46°C (115°F), which will kill pathogens within a week of constant exposure. Piles that reach temperatures of 62°C (143.6°F) will kill pathogenic content in about an hour. After many days of hot temperatures, proper ventilation, and moisture distribution, a simple lab test will determine if the compost is pathogen free and ready for consumer use.[20]

5.2 Unconventional Compostables: Animal carcasses and baby diapers

In addition to kitchen scraps, paper, and yard waste, there are other "unconventional" waste material that are commonly managed through industrial composting methods.

Mortality composting deals with animal flesh, blood, organs, feathers, and other raw animal materials commonly from farms and butchers. Due to the high cost of incinerating dead livestock, aerated composting has become a popular method for the waste disposal of animal waste on large farms.[4] Animals are often composted on site separated from crops, wild animals, and living livestock. This isolation allows the advantage of biosecurity, which refers to the introduction of potentially infectious organisms and pathogens from outside sources. Animals that have perished can be immediately separated and incorporated into a composting pile instead of waiting to be taken to an incineration facility. Eventually the finished compost can be used on crops for non-public goods or as a bulking agent to further the compost pile. When carcasses are initially placed into an aerated compost pile, the animal has a low C:N ratio (high nitrogen content), while the surrounding amendments have a high C:N ratio (high carbon content).[4] Aerobic and anaerobic processes allow for liquids and gases from the animal to distribute throughout the pile for the duration of decomposition, mixing the high nitrogen content of the animal back into the surrounding carbon-rich bulky amendment. The US Environmental Protection Agency requires that compost piles for animal rendering must reach temperatures between 131°F and 170°F for a minimum of 3 days to minimize pathogenic concern, however, to completely decompose large carcasses of cattle for instance, it would require 9-12 months of decomposition followed by another 2-4 months of pathogen reduction.[4]

The business of composting baby diapers has been a growing trend across the United States. A typical child in the US will use between 2,500 and 3,000 diapers within their first year of life.[20] Similar to feminine napkins, most name-

brand single-use diapers are made with synthetic foams and fibers that do not decompose in landfills. To combat this issue, many parents are opting from synthetic diapers to reusable cotton diapers or single-use compostable diapers. Companies like EarthBaby and Tiny Tots have turned to using ASP and ATP composting methods to quickly degrade the plant fibers of their compostable diapers as well as to ensure that the pathogenic content of human waste is safely killed at temperatures over 131°F. The finished compost from baby diapers is used for landscaping, sod growing, and roadside plantation projects instead of consumptive or agricultural goods.[9]

Composting has been a growing green business venture as society attempts to limit and redirect waste going into landfills. As traditional composting has been in the backyards of earth-conscious individuals and farmers, society has slowly expanded the compost stream to handle the loads of larger communities and municipalities. As we continue to compost kitchen scraps, paper goods, dairy, meat, animals, and baby diapers, we can consider menstrual napkins as a new compostable good.

5.3 Composting Menstrual Waste

It can be argued that the current methods of menstrual waste disposal is unsustainable for the health of the planet. Due to the lack of research on the potential health and pathogenic concerns of menstrual waste to the public and janitorial staff, there must be another way to safely dispose of feminine napkins in an environmentally sustainable way. Composting may be the answer.

Numerous brands recognize that synthetic plastics, foams, and chemicals in menstrual napkins are detrimental to the environment and to human health. In addition to the growing trend of reusable menstrual cups and pads, there are also more organic cotton, plastic-free, chemical free disposable options on the market which attempt to make menstruation "greener." Even though organic feminine napkins are more environmentally sustainable than their synthetic counterparts, these products continue to be thrown into the garbage to biodegrade inside plastic trash bags. If 100% plant-based menstrual products were added to an aerated compost pile, they would naturally biodegrade in a matter of weeks. The nitrogen content naturally found in menstrual fluid would allow for proper C:N ratios within the compost pile, just as the blood content of animal carcasses or the fecal matter in baby diapers does. Collecting feminine waste by a composting professional would limit the dangers of pathogen spread to the public. Just as sharps, needles, and other regulated medical wastes are collected by a licensed professional to be incinerated, compostable menstrual products would be contained, collected and composted by a waste professional aware of the hazards. If there are pathogens in menstrual fluid, the thermophilic bacteria would heat the compost pile to high enough temperatures to make the finished compost of menstrual waste pathogen-free. Just as conventional compost, baby diapers, and animal carcasses can be composted with known pathogens, human pathogens that may be found in menstrual products would be destroyed once the pile reaches evenly distributed high temperatures for a tested timeframe after the original napkin has broken down.

If the idea of using human menstrual fluid in compost for green scaping, public lands, and non-consumptive agriculture seems gross, one can compare this to blood meal. Blood meal is a dry nitrogen-rich powder made from the blood of pigs and cattle. Because it has the highest nitrogen content of non-synthetic nitrogen fertilizers, blood meal is commonly mixed into fertilizers for agricultural crops and plants. To limit pathogens, blood meal is steamed or boiled before being turned into a powder. Nitrogen is the nutrient that is most responsible for vegetative growth of a plant, thus the nitrogen content of menstrual fluid should only enhance the growth of vegetation if compost is properly applied.

Composting menstrual waste would decrease the use of petroleum in the creation of sanitary napkins, allow for a safer alternative to traditional landfill disposal, and create a regenerative system that would recycle the menstrual cycle.

6. Conclusions

The goal of this research was to expose the issues surrounding our current methods of menstrual waste disposal and explore whether composting is a viable alternative. Menstrual fluid, although different from venous blood, may share similar pathogenic concerns. Having an association with blood, pain, and uncleanliness, the lack of research on the function and disease spread of menstruation seems negligent. There are only two studies on the existence of pathogens in menstrual fluid, both of which suggest that there is a possibility of pathogen spread. There was no follow up research on larger populations, different pathogens, or updated studies that would state that landfill disposal of menstrual fluid is safe. Medical waste and other biohazardous wastes must endure strict regulations for waste disposal due to numerous

studies on disease spread via instruments in contact with human fluids. Why is menstrual fluid not examined as closely as other bodily fluids? The first result in a Google search on "pathogens in semen" was a study from 2007 on 241 infertile males with 6 different pathogenic diseases including HIV, HCV, and HBV. This search followed a lengthy list of studies and reports that mentioned the top Google result. More research is necessary to determine if menstrual waste contains pathogens, but it seems evident that there is more interest in the transmittance of bloodborne pathogens from semen than in from menstrual fluid.

Lack of interest in the pathogenic concern of menstrual fluid leads to a unknown issue on the long-term landfill disposal of menstrual waste. Since these materials are coated in bodily fluid and tissues without incineration, bacteria may fester inside these products while the product itself decomposes at slow rates. This is not only a concern for the environment, but also to sanitation workers who may be subject to exposure of these fluid-filled materials.

Even with the lack of research on pathogens contained in menstrual fluid, composting should be a viable solution to the issue of trash from menstrual waste. Because menstrual waste is not regulated, there is no governing body that enforces menstrual products to be disposed of in a specific way.

The disposal of menstrual waste lies on the marketing of the product. Many tampon brands used to be commonly advertised as "flushable," although plumbers and wastewater treatment facilities would state otherwise. Tampons and baby wipes often clog wastewater treatment plants. If a brand of tampons or pads were advertised as compostable, women may be more likely to compost their feminine napkins.

Composting closed the loop of waste disposal. Plant based products grow, are manufactured, used, and disposed of to eventually be apart of the soil once again. If composted in an aerated facility, these products would be heated to high enough temperatures to allow for proper C:N ratio for a healthy topsoil, as well as limit pathogenic content in the finished product.

Women may not cease to use single-use feminine hygiene, however, we can stop irresponsible and wasteful disposal in landfills. When society has the technological means to create sustainable products and the economy to create efficient waste management infrastructure, there should be lasting change in the way we deal with the products of our everyday lives. Change will happen either when the public is more comfortable discussing the waste problem surrounding menstruation, or when entrepreneurship influences and regulation enforces the issue. It is no longer an issue *if* it is possible to compost menstrual waste, but *what* is stopping this venture from realization.

Menstruation has been a historically taboo topic, and its stigma needs to be revolutionized and respected as a critical cycle of human existence. There must be more research on the pathogen spread through menstruation to ensure that more citizens are aware and safe from preventable disease. When the medical community realizes the need for research on menstrual fluid, this may result in reform from government agencies to create regulations on a forgotten and large waste stream. If menstrual waste were not stigmatized, composting tampons and sanitary pads could already be a part of the compost stream along with kitchen scraps, animal carcasses, and baby diapers. One day, society will realize the benefits of giving Mother Nature's monthly gift back to Mother Nature.

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