

The revolutionary tampon invented by Hila Shaviv will try to change the way diseases are diagnosed

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It is a novelty with great commercial potential: a combination of tampon and menstrual cup that will also be used in the future to diagnose diseases. So why does the inventor and entrepreneur need crowd funding to move from development to production?



Hilla Shaviv's study in her home in Mevaseret Zion is a kind of extraordinary museum, closed to the public. It is adorned with models of vaginas of various sizes, rare tampons and other feminine hygiene products that are no longer on the market. If anyone is wondering how deep and far Shaviv has taken her passion for the field, here is the answer.

Shaviv is a biomedical engineer and an experienced entrepreneur. The last product she developed has been crowdfunding for the past two months, and has raised close to a million shekels (300,000 USD) as of the publishing of this article. The money is needed for moving from development to production. But Shaviv's story is also that of an entrepreneur who continues to swim forward, against the odds: she is involved in FemTech (female technology), a field that receives a fraction of the investments in medtech; it is a physical product, with all the challenges involved, like production and transportation costs; and it is intended for end consumers (B2C) – a category that is not common in Israeli high-tech, partly due to the difficulty of selling directly to the American consumer.

The product she invented was designed to combine the benefits of the tampon with those of the menstrual cup (a small reusable cup made of silicon, which collects the menstrual bleeding). It is inserted into the vaginal cavity using an applicator and then opens inside the body. It is supposed to provide complete protection without leaks for 12 hours – and is especially designed for women

with heavy flows. It is an ecological product, explains Shaviv, with an antibacterial coating, and unlike a regular tampon, it does not leave fibers in the body.



Tulipon inside the applicator and after use

This tampon, called a Tulipon, allows women to monitor their bleeding, and know if they are suffering from excessive bleeding. In the future, thanks to the way it is shaped and designed, it will help diagnose diseases through menstrual blood.

The startup, Gals Bio, has raised \$2 million so far, not including the current fundraising on the crowdfunding platform PipelBiz. The entire amount came from AH trust of British billionaire Alan Howard, which earlier this year Bloomberg named the "secret hedge fund" that Howard personally manages.

"This is not a simple Via Dolorosa," says Shaviv about the life of entrepreneurship. "But I believe I'm doing something innovative. It's no longer about money – because no amount in the world is worth the things I go through."



Hilla Shaviv. Photo: Eyal Toug

The ketchup effect

Shaviv, 50, holds a bachelor's degree in mechanical engineering from the California Institute of Technology (Caltech), after beginning her studies at the Technion. She did her master's degree in biomedical engineering at Tel Aviv University, and her research topic was blood flow. Later, when she worked at the medical device company Biometrics, she was a partner in the development of a device that pumped tissue, fluid and blood around the lungs after open heart surgery.

"I started to think that women have blood and tissue that comes out of their body every month. And there are those with very long menstruation. We know this tissue is already detached from the body, it just takes time to get it out. At one point I decided to jump into the water and explore the subject. From blood flow I switched to dealing with menstrual blood. "

Shaviv says that "in cardiology, everywhere you place your finger you encounter an existing patent. However, when I started researching menstrual blood flow, I found a vacuum: no patents, no innovation, empty space. It is also difficult to find researchers who are researching this subject – all the research done is on the cellular level. I deal with systems, mechanics, contractions, flow. Hardly anyone researches this nowadays. When I founded my first company, GalMedics, I used to say that it did not make sense that in 2007 no one could explain why half of the women had primary dysmenorrhea (menstrual cramps)."

The product developed by GalMedics, Shaviv's first startup, was designed to do two things: significantly reduce menstrual pain, and shorten bleeding time.

"According to our theory, which was also published in a scientific journal, the cause of menstrual cramps is what I call the 'ketchup effect': since menstruation contains tissue and blood clots, and all this mass has to come out through a thin and long tube called the cervix, the uterus has to squeeze for all of it to come out. We were the first to prove the connection between menstrual viscosity and menstrual pain."

Actilady, the device developed by the company, released menstruation quickly using a specific sub-sound wave frequency, which created imperceptible vibrations. It was inserted into the vagina during menstruation, and also served as a tampon. The company existed for about nine years, until it closed, even before the product hit the shelves. "We raised a total of five million dollars, and we showed in the clinical trials conclusive evidence that the product relieves menstrual pain. But we were unable to raise any more money, and the company was closed" says Shaviv.

If you already have a product that has proven to be effective, why have you not been able to raise more money?

"I see this in the current startup as well: we have a product that works, a team, research. And yet – we deal with FemTech, and we have a product that is B2C (marketed directly to the consumer), so it's harder to bring it to market. These things have a crucial impact on our ability to raise money. A Swiss company, which developed a more or less similar technology at the same time, actually managed to reach the market, but eventually closed down as well", she says.

Five years ago, you re-established a company with a product that is a unique tampon. Why again? What has changed?

"I gained a lot of experience in the first company, and I also came across the menstrual cups for the first time. I thought it's a great invention, and I wondered why it was not more popular, because in fact it has been on the market for almost 100 years, like tampons. Each menstrual cup lasts 5-7 years so the assumption was that there was no interest in marketing this kind of product, moreover, since menstrual cups are reusable I assumed women do not want to mess with their menses."

"The first product, Actilady, was a complex project with a lot of engineering, and included a battery. The new idea was purely mechanical so I thought 'how complicated can this be?' Besides, I'm an entrepreneur, that's my character. I'm not going to work on someone else's ideas."

Gals Bio Ltd has eight employees, and they are involved in engineering, marketing, regulation and more. The most well-known among them is the gynecologist Dr Amos Ber, who wrote the book "The Israeli Guide to Pregnancy and Childbirth" and holds the position of Chief Medical Officer in the company.

"Israel is a tampon empire"

In 2020, the FemTech sector raised only 3% of the total money invested in companies engaged in health technology (MedTech), according to Pitchbook. By last October, only \$14 billion in total had been invested in it. But the future looks bright: according to research firm Global Market Insights, published by The Economist, the FemTech market is expected to grow from \$22.5 billion today to more than \$65 billion by 2027.

"Israel is a powerhouse of tampon production," says Shaviv, referring to Albaad Fem plant in Caesarea's industrial area. According to Deloitte's May 2020 report, tampon market revenue in the United States is about \$1 billion a year. According to Deloitte, many women prefer to purchase private label tampons, mainly for economic reasons, but also because of product quality, innovation and customer service. At the end of 2025, the global tampon market is expected to reach \$6.34 billion, compared to \$3 billion today.

What does innovation in the market look like? Some tampons are made from organic cotton; others control the pH level; and there are even tampons with the addition of CBD. However, the basic model has not changed for decades, and real innovation has hardly reached the shelves. For example, the flagship product of the British company Callaly – a tampon to which a small pad is attached – was crowned one of the 100 best inventions published by Time magazine in 2020.

Shaviv's Tulipon is not like the tampons on the market today. It is designed to solve the problem of dealing with the menstrual cup – the insertion, removal, cleaning and disinfection, and at the same time the problem of tampon leakage. "There is a lot of engineering here," says Shaviv. "Tulipon is made of biodegradable polymers, and when you insert it into the body it opens like a cup. When a woman wants to take it out, she pulls on the string, a fluid locking mechanism is activated, and Tulipon's structure collapses to facilitate its removal from the vagina". Thus, when it is out, the blood actually remains well preserved inside the tampon, which is shaped like a small container.

This tampon cannot be thrown in the toilet. Of course, you can throw it in the trash, but if you want the plastic to decompose, you have to throw it in the compost. According to Shaviv, there are currently developments that allow plastic to degrade in the toilet using dedicated bacteria, and in the future, this may be more common.

Using a small meter on the tampon, and later with the help of an app, the user can, as mentioned, monitor the amount of blood she has lost. "I give lectures, so I find that women do not know basic things like how much we bleed each month; on average 40 ml, around the amount of a shot of alcohol. But if a woman bleeds more than 80 ml, it may be an indication of a problem – such as fibroids, polycystic ovaries, iron deficiency and more. We are not aware of this, and doctors currently have no tool to check it," according to Shaviv. "This

is the first biomarker we can measure that does not exist in any other product" (a biomarker is a biological marker, an indicator of the presence of a disease).

Today, Gals Bio's tampons are manufactured in a 3D printer, and then cleaned and assembled in a clean room located in Haifa. Printing is also the reason for the high cost of production today – reaching \$40 for a single tampon. The crowdfunding is supposed to provide the money to complete the development and move to production by injection instead of printing, which will lower the cost of the Tulipon to the price of a regular tampon made of organic cotton.

At Gals Bio they decided not to try to become a well-known brand in their own right, but to instead connect with private brands of feminine hygiene products that allow customers to subscribe and create a monthly package for themselves from the site's variety of products, which they receive regularly. Sites like Veeda, Moxie or Tomco usually offer higher quality types of pads and tampons.

"The goal is to come under an existing brand, to demonstrate marketing feasibility and not just functionality, to show that there are returning customers, and on the basis of these sales to turn to one of the big tampon manufacturers," says Shaviv. "The company does not intend to enter into the logistics of setting up a tampon factory, but to continue in the field of disease diagnosis."

Will Shaviv's vision reach the shelves this time? It seems that despite the anguish she is talking about, which characterizes the lives of quite a few entrepreneurs – especially in a difficult field like FemTech – Shaviv does not intend to give up. "It's my life's mission" she says. "I want to leave my mark, that's what gives me the drive."

One in ten women

Hilla Shaviv's vision for the coming years is to allow women to monitor their health status through menstrual blood, and to do so by sending it to a dedicated lab, or by doing at-home tests, depending on the tests needed.

Today, says Shaviv, there are already several biomarkers that have been proven to correlate menstrual blood with venous blood, such as cholesterol and A1C (average blood sugar level). However, there is still no economic reason to do such tests using menstrual blood.

On the other hand, there are studies that deal with biomarkers that can be found in menstruation, and can be of great value. Gals Bio is in contact with a group of American researchers who have been able to identify endometriosis (a chronic and inflammatory gynecological disease that can cause excruciating pain and severe damage to women) in the menstrual blood.

According to studies, one in ten women has endometriosis, and the true rate may be higher because it is a very difficult disease to diagnose: on average, patients need seven years to get the correct diagnosis. The advantage of

Tulipon is that it hermetically retains a considerable amount of menstrual blood, and can be used as a collection device.

Another company in the field is the Israeli company Gina Life, which was founded in 2015 and is developing a smart pad, which should be an off-the-shelf product as early as 2025, and can help in early diagnosis of medical conditions and diseases such as endometriosis and ovarian cancer.

According to Gals Bio's vision, the "Tulipon-Pro" could serve as a home lab (using the collected menses and home tests combined with a designated app) through which women could monitor iron, B12, magnesium, folic acid and more. It will also be possible to send the product in for more complex laboratory tests.