genomeweb

Amplyus Launches Kickstarter to Move MiniPCR into Full Production

October 30, 2014

Amplyus Launches Kickstarter to Move MiniPCR into Full Production

By Madeleine Johnson

NEW YORK (GenomeWeb) — Cambridge, Mass.-based Amplyus has launched a Kickstarter funding campaign intended to bring its miniPCR platform into full production and "open the world of DNA science to everyone, everywhere."

The device is essentially a miniaturized, computer- or smart phone app-controlled thermocycler. The one-pound machine runs eight samples at a time using standard tubes, and is about the size of a two-inch thick, four-by-five-inch note card. It has a clear case, and the app allows users to visualize the PCR cycles as they run.

Currently, Amplyus is marketing miniPCR as an educational and research tool. For this purpose, the company has created kits for family tree inquiry, pathogen detection, and forensic DNA sleuthing. The Kickstarter will also fund development of a food testing lab exercise to learn about genetically modified organisms.

In addition to educational use, however, the platform is being adopted in research labs and is being evaluated for possible use in the Space program.

In an interview this week, Amplyus co-founders Zeke Alvarez Saavedra and Sebastian Kraves, estimated the Kickstarter funding will lower the cost of the platform from its current $799 list price to $399 for early users, with an additional $49 for reagent kits and $100 for consumables.

"Our goal is to really send a message that DNA technology is accessible and ready to use, and everybody can use it," Kraves said.

In addition, miniPCR could also be a tool that "increases efficiency in every lab [and] becomes part of the personal toolkit of every molecular biologist," he said.

While most benchtop PCR machines use thermoelectric heating, Saavedra and Kraves were able to miniaturize the technology by using thin-film heating, also known as Kapton heating,

and convection cooling.

"Our premise was really to keep the same format; you can use tubes interchangeably, reagents interchangeably, this is just like your regular PCR machine, just much smaller and more efficient," Saavedra said.

Kraves added that, in his experience in the lab, it could be frustrating when "someone would tie up the entire PCR machine to run two samples, or to run a restriction digest overnight ... we thought there was a place for a small unit, that you could have right on your bench."

There are a few small-footprint PCR machines on the market. By comparison, the Piko thermocycler from Thermo Fisher comes in a 24-well size, but requires special consumables and has a list price of around $5,000. The Freedom4 platform from start-up Ubiquitome might be the most similar, but is for real-time PCR and may be more for field applications. That device has an early access price of $10,000.

There is also a do-it-yourself PCR platform on the market from OpenPCR, a company that began shipping devices in 2011. That company also had a crowd-funded development campaign, but as part of the DIY element, end users assembled the PCR machines themselves from over 400 parts and the device costs around $600. OpenPCR notified *PCR Insider* in an email this week that it is now working on its own Kickstarter campaign to help commercialize a real-time PCR machine that costs $1,500 and comes fully assembled.

Kraves noted in a follow-up email that Amplyus' instrument "is fully assembled, calibrated, and ready to use out of the box. It is fully supported and has a warranty ... Our focus is enabling biology without the hassle of building tools."

Mark Emerson, a researcher at City University of New York studying the neurobiology of the retina, was an early adopter of miniPCR for the lab. In his case, being a beta tester of miniPCR was a huge boon when the lab's expensive bench-top machine suddenly stopped working.

"As a startup lab, we had purchased only one expensive name-brand PCR machine, but as the lab grew, we needed to run reactions in parallel to increase our productivity," Emerson told *PCR Insider* in an email.

"The miniPCR offered a solution that was economically feasible compared with buying another name-brand unit. We have found it to be very reliable and when our name-brand machine broke within six months of buying it, we used the miniPCR unit for all of our reactions with great success."

In comparison to a standard PCR machine, Emerson said one benefit of miniPCR is that lab members can set up and manage their programs on their own computers, without having "to search through reams of saved programs left by past or current lab members."

Kraves said Amplyus hopes to grow its academic customer segment, as well as add to the few global users and enable PCR in low-resource locales.

Boeing is also an early user, with researchers there assessing whether miniPCR might be suitable for molecular testing aboard the International Space Station, according to Scott Copeland, manager of research, systems, and specialty engineering at that company. Currently, there are no PCR capabilities on ISS, so samples must be returned to ground for

analysis. Researchers are particularly interested in monitoring pathogens and biological mutations caused by microgravity.

“Hardware size, mass, power, and thermal resources are important factors when evaluating items for usage in a space environment like that found on ISS," Copeland explained in an email.

"Boeing is investigating multiple commercial off-the-shelf items that could be utilized to conduct research on the ISS. The small size and cost [makes] mini-PCR ... an attractive candidate for research use as well as ISS STEM education activities.”

The importance of hands-on biotech

Saavedra and Kraves believe passionately in the importance of biotech education. They asserted that many biotech and biopharma companies are familiar with this as well, and have outreach arms, community labs, and foundations to promote science education, "not only because it is a good thing to do but also because it feeds into their junior ranks and talent pipeline," Kraves said.

"We need an economy that produces DNA-literate kids, and so a lot of the big players are already investing in that, and a lot of them are already using mini-PCR in their science education and outreach labs," he added.

Michelle Mischke, director of biotechnology education programs at the Massachusetts Biotechnology Education Foundation, agrees.

MassBioEd works to take hands-on, inquiry-based lab activities into public high schools. Its mission is "to inspire students to follow STEM fields with the idea that they would be part of the career pipeline for the growing ecosystem of biotech here in Massachusetts," Mischke said in an interview with *PCR Insider*.

"A lot of schools are ready to do some biotechnology, but many of them don't have some of the fundamentals for doing gel electrophoresis, [or] PCR, things that would be classic first-step techniques for anyone doing biotechnology," Mischke said.

While the particular platform is not the emphasis of the hands-on biotech curriculum — any thermocycler would do — Mischke said MassBioEd uses miniPCR platforms because they're small, portable, and inexpensive.

"The interface that they use, which you can see on your computer or your smartphone, is really informative to the teachers and the students because it's a visualization of what's happening during the PCR process that you can follow in real time," she said. This makes it a particularly good teaching tool.

"There's no doubt that there's going to be huge job growth development in the biotech industry, and in the life sciences in general," Mischke said. "With respect to biotechnology and education, [miniPCR] allows students to do activities, based on technology, that reinforce core biological principles."

Kraves reinforced this message of education. "We started with a mission to increase access. We think that it is ridiculous that we're in 2014 and it is hard to teach PCR and DNA science in schools, so we decided to change that," he said.

"We're still very much focused on education, classrooms, and homes, but we're also thinking about where we are going to go next," he added.

The miniPCR Kickstarter will be running until December 12. It went live earlier today, and has already achieved nearly half of the $20,000 goal. So far, four backers have pledged $399 for the reward of the miniPCR machine itself, while four others have pledged to get one and also donate one to a school.

Related Stories

- New Zealand Startup Ubiquitome Launches Handheld qPCR Device, Claims True Field Operability
  September 4, 2014 / PCR Insider
- Product Watch: OpenPCR; Fluorogenics Taqtonix; Techne PrimePCR
  July 18, 2013 / PCR Insider
- IP Watch: Thermo Fisher, Abbott, Biological Dynamics, Others Win US Patents
  October 28, 2014 / PCR Insider
- IP Watch: Cascade Biosystems, Thermo Fisher, Siemens, Others Win US Patents
  October 22, 2014 / PCR Insider
- Northwestern Researchers Develop RT-qPCR Assay for Depression Biomarkers, Seek Industry Partners
  September 18, 2014 / PCR Insider