

The Life Changing ‘Pullei’

Ishani Chakrabarty*

Indian Institute of Technology, Guwahati

Email: ishani.kaushik@gmail.com

Khapla was a 23-year-old man residing in a small village of Manipur, India. Born in a poor family, Khapla’s parents could not afford to send him to college for his graduation, though he had secured good grades in his 12th standard in the Science stream. Despite lacking higher education, there was no end to his inquisitiveness and thirst for gaining knowledge. He loved his hometown, folk culture and ethnicity. He was proud of the fact that he was born in the northeast (NE) of India, which was abundant in natural wealth and he spent his free time observing and studying the plants in the forests. He did a number of odd jobs during the day for his family’s sustenance because his father’s meagre wage (worked as a mason) was not sufficient.

One day while going for work, he decided to take a detour through the forest and enjoy nature for a while. There, Khapla saw a man, dressed in a suit (which immediately indicated that he was an outsider), carefully examining a plant which they used for cooking a delicacy called “eromba”. Because of his curiosity, Khapla went up to the man to enquire what he was doing. After some initial communication hitches (due to a language barrier), Khapla was able to communicate with him in his broken Hindi. The man, though initially hesitant, introduced himself as Dr. Ranganathan, a scientist working on the medicinal properties of the local plants of NE India. He told Khapla that this particular plant was called *Alpinianigra* and it comes under the “ginger” family. Not much work had been done on this plant, so he wished to work on it, particularly on its anti-microbial potential. Hearing this, Khapla became very excited and he told Dr. Ranganathan

* Ms. Ishani Chakrabarty, Ph.D. Scholar from Applied Biodiversity Lab, Indian Institute of Technology, Guwahati, is pursuing her research on “Physicochemical and Pharmacological Study of LabdaneDiterpene from the Seeds of *AlpiniaNigra*.” Her popular science story entitled “The Life-Changing ‘Pullei’” has been selected for AWSAR Award.

that the people in his village consume the juice or concoction from the shoot of this plant when they suspect they have “worm” in the stomach and they call it ‘pullei’. Dr. Ranganathan, after finding out about his education, was overjoyed and offered Khapla to work in his lab in Guwahati, as a staff. He said, in addition to getting a good salary in the lab, Khapla would be able to see and learn many new things, thus, fulfilling this thirst for knowledge.

In Dr. Ranganathan’s lab, Khapla met another boy, Sranto, also from Manipur, who was going to work on this “magic” plant brought from his village and all his inhibitions were gone. He observed in wonder, how Sranto toiled night and day with the different parts of this plant – its flowers, leaves, seeds, fruit ‘covers’, stems, even the underground part (which Sranto called “rhizomes”) – drying them, cooking them in different liquids, and then getting some sticky, aromatic, black colored oily and gummy substances. Sranto told Khapla that these were called “extracts” and they need to be studied to know whether they were heat stable, were they able to dissolve in water and if they formed “crystals” like sugar. These studies, Sranto told, were important for the industrial application of these extracts.

One morning (after around one and half years) in Dr. Ranganathan’s lab, Khapla found Sranto jumping with joy. Seeing Khapla, he hugged him and exclaimed that he had isolated and identified a compound from the seeds of *A. nigra*. “It is a diterpene, I have solved its structure; see this” Sranto exclaimed in joy, and he drew a complex chemical structure with 2 6-carbon rings – something Khapla recalled to have studied in organic chemistry in school! “Now I will proceed with antimicrobial studies and you will have to help me with it,” said Sranto. Khapla was thrilled because he always wanted to learn how these lab people worked with bacteria and fungus, something that can’t even be seen with the naked eye!! Thus, Khapla learnt to prepare different growth media for bacteria and fungus, to grow the micro-organisms and to subculture them, helping Sranto in his antimicrobial studies. Three years passed quickly as Khapla learnt about Gram positive and Gram negative bacteria, about *Candida albicans* – the organism that was responsible for the skin infection his mother had some years back - and many other things. Had he known then, Khapla would have rubbed some ‘pullei’ on his mother’s wounds instead of making ‘eromba’ with it!!

One morning (after a series of overnight experiments with Sranto), Khapla found his friend, sitting with his laptop, teary faced. “What happened, *maroop* (friend in Manipuri)?” he asked. “I lost *maroop*. This diterpene is not killing this notorious *Candida*; it is only stopping its growth for some time. Even though it is highly antibacterial, the compound is not candidicidal. What am I supposed to do...time is running out,” replied Sranto. Having faced much worse in life, Khapla calmly replied, “So what? Didn’t Sir (Dr. Ranganathan) say negative results can also be presented? And it is not like you don’t have any results. And if it is stopping the growth for some time, there also must be some reason. Didn’t you say it doesn’t dissolve in water? Maybe it is doing something on the ‘skin’ of *Candida*; the skin is also ‘water fearing’ (meaning hydrophobic) like your compound, isn’t it? You had told me that earlier. In my school, our chemistry teacher always said “like dissolves/mixes with like.” Come on, let’s find it out!” Sranto looked up at Khapla in astonishment. How could someone like Khapla give him research ideas!! He hugged his friend, wiped his tears and both began work in earnest. Together, they found that the compound was temporarily binding

on the fungus surface, due to which the fungus was not able to take up its “food” or scientifically called substrate, and thus, could not grow. Khapla was even more thrilled when his boss told him he would give Khapla’s name in acknowledgement of the publication of this work; for a small village boy like him this was equal to winning a Nobel Prize!

“Why don’t you do those industrial studies with this compound too? I am sure the ‘medicine’ industries would love to see these,” Khapla asked Sranto one day during dinner. They were in very high spirits because they had just got the news that Sranto’s work on the compound structure was going to be published and they were celebrating it with ‘pulleieromba.’ The same thoughts were also going through Sranto’s mind and with Dr. Ranganathan’s approval, Khapla was allowed to accompany to the Centre where these studies were carried out and even work with them!

One day Khapla met Piyush, another boy from a different lab, who had come to help Sranto in his work. He came to know that since the compound did not dissolve in water, it cannot be used in large amounts to kill the microorganisms. So Piyush would give them some water soluble substances, which he called ‘nanoparticles.’ The mechanism of this work was a little mind-boggling for Khapla so Sranto tried to explain it with the help of an incident from Khapla’s life: “When Khapla was suffering from chickenpox, his mother used to forcibly feed him large amounts of ‘sebot’ or snake gourd, known for their anti-pox properties (which he detested) and he would end up vomiting. So what if his mother fed him a mixture of a small amount of drumsticks (which he loved) with a very small amount of ‘sebot? He wouldn’t end up vomiting and his body would also get the benefits of this anti-pox vegetable!” Khapla pondered over this parable all night to interpret and correlate it with Sranto’s work and “*Nandakorewa!*” These particles would help to take Sranto’s compound in very small amounts into the bacteria (which alone were not killing the bacteria) and thus, would help in killing the microbes more efficiently!! This was indeed MAGICAL!

Working and learning with Sranto, Khapla did not realize that he was about to complete 5 years in Dr. Ranganathan’s lab. His beloved *maroop*’s tenure in the lab was about to end; Sranto was now more engrossed in writing and reading.

Khapla had the experience to his lifetime in this lab. Looking back, Khapla realized that it was the master plan of THE ALMIGHTY that he met Dr. Ranganathan on one of his daily forest trips and got a chance to realize his unfulfilled dream of gaining knowledge. He is still working in Dr. Ranganathan’s lab and looks forward to more learning and lab research work!!!