

Ljudi iza Philip Morris nauke

Intervju sa Catherine Goujon-Ginglinger

The People behind Philip Morris Science

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Procena potencijala smanjenja rizika bezdimnih proizvoda oslanja se na kvalitet inicijalnog dizajna proizvoda i na stroge kontrole proizvodnje, kako bi se osiguralo da isporučuje konzistentan aerosol. Philip Morris-ovi nesagorevajući duvanski proizvodi, dizajnirani su sa ciljem da eliminišu ili smanje nivoe štetnih i potencijalno štetnih sastojaka koji se nalaze u njihovom aerosolu, u poređenju sa onima koji se nalaze u dimu cigareta. U intervjuu sa Catherine Goujon-Ginglinger, naučnicom i šefom odeljenja za istraživanja iz oblasti hemije u Philip Morris-ovom naučno-istraživačkom centru „Cube” biće predstavljena hemijska ispitivanja aerosola bezdimnih alternativa, kao i njen lični razvojni karijerni put.

1. Šta Vas je inspirisalo da postanete naučnik i šta vas je navelo da odaberete ovu naučnu disciplinu?

Kada sam bila tinejdžer, bavila sam se muzikom, bila strastveni čitalac, volela istoriju, i želela sam da mi te aktivnosti ostanu hobiji. Nisam bila ljubitelj učenja stranih jezika, pa sam odlučila da studiram biologiju i hemiju. Tokom srednje škole, imala sam fantastičnog nastavnika hemije koji je svake subote ujutru organizovao praktične eksperimente kako bi podelio sa nama svoju strast prema hemiji. Mislim da

Assessing the risk reduction potential of a smoke-free product relies on the quality of the initial product design and on strict manufacturing controls to ensure it delivers a consistent aerosol. Philip Morris's heated tobacco products (HTPs), for example, are designed with the aim of eliminating or reducing the levels of Harmful and Potentially Harmful Constituents (HPHCs) found in their aerosol, compared to those found in cigarette smoke. In an interview with Catherine Goujon-Ginglinger, a scientist at Philip Morris International and Head of Chemistry Research at the PMI's research and development center "Cube", will be presented the chemical testing of aerosols of smoke-free alternatives, as well as her personal development career path.

1. What inspired you to become a scientist and what made you choose this scientific discipline?

When I was teenager, I played music, was an avid reader, loved history, but I wanted to keep these as hobbies. I was not a fan of learning foreign languages, so I decided to study biology and chemistry. During high school, I had a fantastic chemistry teacher who was organizing practical experiments every Saturday morning just to share his passion. I think this was a catalyst for choosing my university studies. Then, year

je ovo bio katalizator za odabir mojih univerzitetskih studija. Onda, godinu za godinom, shvatila sam da mi je primenjena nauka veoma privlačna, i dalje sam uverena da sam napravila pravi izbor.

2. Zalažete se za budućnost bez duvanskog dima. Koliko je ta budućnost daleko?

Ostvarujemo ogroman napredak ka budućnosti bez duvanskog dima. Naša ambicija je da bezdimni proizvodi čine više od 50 procenata ukupnih neto prihoda Philip Morris International-a (PMI-a) do 2025. godine. I verujemo da uz prave regulatorne okvire, dijalog i podršku civilnog društva, prodaja cigareta može da se okonča u roku od 10 do 15 godina u mnogim zemljama.

Procenjeno je da je 31. decembra 2021. godine bilo 21,2 miliona korisnika PMI-ovog bezdimnog uređaja, od kojih je 72% ili 15,3 miliona u potpunosti prešlo na ovaj uređaj i prestalo da puši, a ostatak je u različitim fazama konverzije. Ovo je mnogo veća stopa konverzije od one koja je primećena kod drugih bezdimnih proizvoda širom sveta.

3. Mnogi ljudi ne prave razliku između dima cigarete i aerosola nesagorevajućih duvanskih proizvoda. Možete li objasniti sličnosti i razlike između ova dva?

Dim cigarete sadrži čvrste čestice i hiljade materija koje se stvaraju na visokim temperaturama kada materijal sagoreva. Od ovih materija, 100 ili više od strane zdravstvenih vlasti je klasifikovano kao štetne i potencijalno štetne. S druge strane, aerosol koji se formira na nižim temperaturama od isparavanja/kondenzacije je manje složenog sastava od dima cigarete i ne sadrži čvrste čestice. Zbog toga je veoma važno da je u bezdimnim proizvodima eliminisano sagorevanje, jer sagorevanje stvara dim.

4. Koje testove i eksperimente najčešće izvodite i kakvu opremu imate u laboratoriji?

Moje polje aktivnosti i dalje je povezano sa hemijom: razvoj naprednih analitičkih mogućnosti za poboljšanje performansi proizvoda, karakterizacija aerosola oslobođenih iz proizvoda razvijenim u našem R&D postrojenju u Švajcarskoj, i razvoj nauke u oblasti hemije koja podržava tvrdnje o proizvodima. Da bismo ispunili ove izazove, sprovodimo analize na najsavremenijoj opremi kao što je gasna ili tečna hromatografija u kombinaciji sa masenom spektrometrijom visoke rezolucije. Jednako važno, angažujemo naučnike sa dugogodišnjim iskustvom i izuzetnom stručnošću u tumačenju podataka. Među testovima koje sprovodimo je, na primer, brza skrining analiza da bi se pratilo nekoliko hemijskih sastojaka u kontekstu razvoja i poboljšanja proizvoda. S druge strane, napredna hemijska karakterizacija može zahtevati mnogo truda u zavisnosti od složenosti analiziranog uzorka. Merenje zagađujućih materija u vazduhu je jedna od naših naprednih mogućnosti i takva procena traje nekoliko nedelja.

after year, I realized that applied science was very appealing to me, and I'm still convinced I made the right choice.

2. You stand for a future without tobacco smoke. How far is that future from now?

We are making a tremendous progress toward a smoke-free future. Our ambition is for smoke-free products to account for more than 50 percent of PMI's total net revenues by 2025. And we believe that with the right regulatory frameworks, dialogue and support from civil society, cigarette sales can end within 10 to 15 years in many countries.

As of December 31, 2021, we estimate there were 21.2 million total PMI's heated tobacco product users, 72% of whom—or 15.3 million—have switched to heated tobacco products and stopped smoking, with the balance in various stages of conversion. This is a much higher conversion rate than has been observed for other smoke-free products around the world.

3. Many people do not make a difference between cigarette smoke and heated tobacco product (HTP) aerosol. Can you explain similarities and differences between these two?

Cigarette smoke contains solid particles and thousands of chemicals that are generated at high temperatures when a material combusts. Out of these chemicals, 100 or so are recognized by health authorities to be harmful and potentially harmful. On the other hand, an aerosol that is formed at lower temperatures from vaporization/condensation is much less complex than cigarette smoke and no solid particles are generated. This is why it's so important for smoke-free products to avoid combustion, as it's combustion that generates smoke.

4. What tests and experiments do you usually perform and what equipment do you have in the laboratory?

My field of activities remain associated to chemistry: building advanced analytical capabilities to accelerate the product performance, characterizing the aerosol generated from products developed in our R&D facility in Switzerland, and developing the science in the field of chemistry that support product claims. To fulfil these challenges, we conduct analyses on state-of-the-art equipment such as gas or liquid chromatography coupled with high resolution mass-spectrometry. Equally important, we hire scientists with years of experience and deep expertise in data interpretation. Among the tests we conduct is, for example, fast screening analysis to follow a few chemical constituents in a context of product development and improvement. On the other side, advanced chemical characterization can require much effort depending on the complexity of the sample analyzed. Measurement of the pollutants in the air is one of our advanced capabilities and such assessment takes several weeks.

5. Možete li nam reći nešto o PMI-imstudijama o kvalitetu vazduha u zatvorenom prostoru koje prate međunarodne smernice za kvalitet vazduha u zatvorenom prostoru? Koje supstance su merene tokom ispitivanja?

Cilj našeg istraživanja kvaliteta vazduha u zatvorenom prostoru¹ je kvantifikacija razlike, ne samo u nivou zagađujućih materija koje se pripisuju upotrebi bezdimnih proizvoda, već i određivanje sastava nastalog aerosola u životnoj sredini. Stečeno znanje pomaže potrošačima da razumeju razlike između upotrebe cigareta i bezdimnih proizvoda u zatvorenom prostoru.

Merenje jednog zagađivača nije dovoljno za procenu kvaliteta vazduha u zatvorenom prostoru. Zbog toga je važno imati reprezentativan skup zagađivača koji se mere, kao što su markeri sagorevanja, karbonili ili isparljiva organska jedinjenja, koja su poznata kao glavni zagađivači u vazduhu. To radimo tako što pod istim uslovima vršimo procenu kvaliteta vazduha u prisustvu sveća koje gore, tamjana i cigareta. Pri tome smo uspeli da identifikujemo markere sagorevanja, ali i većinu poznatih zagađivača koji nastaju prilikom upotrebe tamjana i cigareta.

S druge strane, kada pogledamo rezultate za dva-naest patronasagorevajućeg duvana koji se koriste u prostoriji, dobijamo sasvim drugačiju sliku. U stvari, potvrđeno je odsustvo duvanskog dima u životnoj sredini, poznatog kao važno zagađenje. Štaviše, iz kompleksnih studija sprovedenih u stvarnom okruženju, pokazali smo da upotreba PMI-ovog nesagorevajućeg duvanskog proizvoda, kao bezdimnog duvanskog proizvoda, nema negativan uticaj na kvalitet vazduha i izloženost posmatrača s obzirom na granične vrednosti postavljene prema postojećim smernicama za kvalitet vazduha i kada se koristi u okruženju gde se poštuju regulatorne norme adekvatne ventilacije.

6. Ako biste morali da izaberete nešto zanimljivo iz svoje naučne karijere u PMI-u, šta bi to bilo?

Teško je odgovoriti: svaki dan je zanimljiv! Ipak, imala sam priliku da započnem svoju karijeru direktno u oblasti bezdimnih proizvoda. Naše odeljenje, tada malo, bilo je organizovano kao start-up; veoma dinamično, veoma otvoreni za nove ideje, imali smo mnogo interakcija i zajedničku motivaciju da stvorimo nešto novo. S obzirom na uspeh naših bezdimnih proizvoda, osećam se privilegovano zato što sam uključenu u ovo putovanje od samog početka.

¹Mitova MI, Cluse C, Correia D, Goujon-Ginglinger CG, Kleinhans S, Poget L, Sendyk SS. Comprehensive Air Quality Assessment of the Tobacco Heating System 2.2 under Simulated Indoor Environments. *Atmosphere* 2021;12:989. <https://doi.org/10.3390/atmos12080989>

5. Can you tell us something about PMI indoor air quality and human signature studies which followed the indoor air quality exposure limits for pollutants under international guidelines? What substances were measured during the trial?

The aim of our research in indoor air quality¹ is to quantify the differences, not only on the level of pollutants attributed to the use of the smoke-free product, but also to determine the composition of the resulting environmental aerosol. The knowledge generated helps consumers understand the differences between using cigarettes and smoke-free products indoors.

Measuring one pollutant is not enough to get a good idea of indoor air quality. That's why it's important to have a representative set of pollutants to measure such as markers of combustion, carbonyls, or volatile organic compounds, which are known as major pollutants in air. We do this by conducting an assessment under the same conditions on tea lights, incense, or cigarettes. In doing so, we were able to detect markers of combustion, but also most of the known pollutants when incense or cigarettes were used.

On the other hand, when we look at the results for twelve sticks of a heated tobacco product used in the room, we see a very different picture. In fact, absence of Environmental Tobacco Smoke, known as important pollution, was confirmed. Moreover, from compilation of studies conducting in real-life environment, we demonstrated that PMI's smoke-free product use, as Heated tobacco product, has no adverse effect on air quality and bystanders' exposure considering threshold limits set by existing air quality guidelines and when used in a setting where regulatory norms of adequate ventilation are respected.

6. If you had to choose something interesting from your scientific career in PMI, what would that be?

Difficult to answer: every day is interesting! Nevertheless, I had the chance to start my career directly in the field of smoke-free products. Our department, small at the time, was organized like a start-up; very dynamic, very open to new ideas, we had many interactions and a common motivation to create something new. Considering the success of our smoke-free products, I feel it was a privilege to be involved in this journey from the start.