

## Dr Prabodh Satyal's interview

Hello Prabodh,

Thank you for agreeing to this interview. You are the Chief Scientific Officer and owner of the Aromatic Plant Research Center. You are the author of the article Adulteration and its Consequences, which was of great interest to readers of [aromaresources.com](http://aromaresources.com)

But before talking about your activities at the center, could you tell us a little about your career path.

### - What studies have you followed?

Regarding formal studies, I have gone through BSc Chemistry, MSc Organic Chemistry from Tribhuvan University, MS (research: Himalayan essential oil), Ph.D. (research: adulteration, the discovery of new compounds in essential oils), post-doctoral (essential oils and their biological activities) at the University of Alabama Huntsville.

### - What led you to become interested in essential oils?

Since my high school days, I was highly interested with organic chemistry reactions and mechanism, when I was upgrading my studies and my master's degree specialization was on natural product chemistry and highly impressed with the biochemical reactions carried on plants especially volatile compound's biosynthesis. When I was Chemistry Lecturer, I thought I have to pursue my Ph.D. degree/research in essential oil chemistry. I looked various the university's at that time and I found the most prolific and the best professor Dr. William N. Setzer at the University of Alabama in Huntsville to fulfill my dream.

### - Why are you particularly interested in adulteration?

Approximately ten years ago, I started working on commercial essential oils; I realized the large volume of essential oils had been sold in the market was forged oil. None of the established labs were able to detect sophisticated types of adulteration. My training was in organic synthesis and biosynthesis, so by combining both approaches, I was able to solve complex adulteration problems. Adulteration detection is not only a true lab work; it is an FBI type of investigation. Sometimes to resolve one issue, it takes me weeks.

### About APRC.

APRC is an Aromatic Plant Research Center. Our CEO Aaron Sorensen and me founded it. The founding groundwork was begun in 2016 when Aaron and I realized, most of the labs really could not detect sophisticated adulteration. We thought we can provide this gap by creating APRC.

### - What are the activities of APRC?

APRC is majorly focused on aromatic plants, essential oils, and their extracts. However, we work on testing (adulteration focused), research, education, and sustainability studies on aromatic plants.

### - Who uses your services?

We have varieties of clients range, small farmers to the largest retailers. We have around 300 recurring clients. Specifically, on our cannabis side, we are growing exponentially.

### - Do you conduct other research at the Centre? And what research do you conduct?

We are regularly publishing two to three peer-reviewed articles every month. We conduct biological and chemical properties of explored and unexplored essential oils from all over the world besides sustainability research. Quality control research is another part of the study we are focused on.

### - What practical applications can they lead to?

## Dr Prabodh Satyal's interview

Regarding practical applications, we were able to discover or commercialize essential oils from various parts of the world. Besides that, APRC effort has also helped in conserving some endangered species. Another focus is bringing awareness (education); that's why we keep running educational programs online and offline regularly.

### **- Do you conduct your own projects in parallel with other teams?**

Yes, we are doing so many collaborations from farmers, distillers, scientists, to university professors. I have been all the time supporters of teamwork. We have collaboration with international, national universities. Around 265 producers are our collaborators on farm level research. That's one of the reasons we publish a lot. We also have a strong collaboration with instrument producing company Shimadzu.

### **- You are a board member of at least two specialized journals, American Journal of and IJPHA, and you publish. Not all scientific directors publish in specialized journals. What does it mean for you to conduct EO research and publish?**

I have been regularly reviewing several journals besides publishing. Publications are the only way to communicate in the scientific community. Every day or maybe every week being a chief scientific officer, we discover some sort of useful information. Sharing knowledge is like doubling knowledge, so it works.

### **- The American Journal of Essential Oils and Natural Products of which Mr Setzer is Director and of which you are an editorial member is ranked by "stop predatory journals" (<https://predatoryjournals.com/journals/>). Did you know that and what do you think about it?**

Predatory journals are supposed to ask for money for the publications, so far I know AJEONP do not ask for any publications charge. It has strong publications ethics with several peer reviewers. I don't see any reason to say AJEONP as a predatory journal. It must be their mistake.

### **- How do you think scientific research on essential oils is doing today?**

Usually, all researches are carried out to solve the problems in the related field. Specifically in essential oil research I see a big gap between academic and industrial research. I believe research paper or thesis or dissertation work carried out by researchers should address a solution for the essential oil industry. The industry is also keeping their research confidential. Being a lack of resources, several peers reviewed journals have misleading information.

### **- Generally speaking, do you think the studies are of good quality?**

The most positive part of EO research is it's been carried out all over the world. The quality of research depends upon the quality of the researcher too. Some are fantastic publications; some are satisfactory publications.

### **- I written a blog article about a study that made me think of an advertising flyer. Is my vision wrong? Does this happen often?**

It depends upon your working mechanism.

#### **What do you mean ?**

Sorry for the confusing answer, putting flyer is all the time good. I was meant to say everybody has their own working structure or pattern. I was just saying follow your heart.

### **- What are EO research issues, prospects, and challenges?**

## Dr Prabodh Satyal's interview

Lack of funding and resources are all the time issues for any researcher, which is the same here in the EO field. The major challenge is not having consistent distillation practices all over the world. Also, there are several unexplored aromatic plants which have to be furthermore investigated. There are still several sesquiterpenes, or a new molecule has to be identified. Toxicology research has also been done in tiny bit quantities. Even from the taxonomical perspective, there is a lot of controversy in essential oil plants, which makes me sometimes frustrated.

Clinical studies are also done in a handful quantities, since being used in aromatherapy I love to see more animal model or ethnopharmacological based approach.

Being said so, lots of work has also been done in academic types of research. Long story short, EO research is a universe, only some cities of one planet have been explored to a certain extent.

**- What do you say to people who would be surprised to find out that doTERRA is funding the APRC (see Biological Activities and Safety of Citrus spp. Essential Oils article)?**

doTERRA is definitely one of our major clients. In some research projects like every other research institution do, we write a research proposal and we receive the grant, it could be doTerra, NIH, NSF, FDA, or University or State, USDA. We do grant proposals to all other funding bodies from time to time. The citrus project is a similar one. So I don't see any reason to be surprised. APRC is a completely independent research institution.

**- There have been many claims about the properties of essential oils? What do you think about these claims?**

Without clinical studies, some claims have been made, which is absolutely wrong. Improper or unsafe use of EO may also bring lots of causalities in the future. I hope aromatherapy communities have been raising awareness to people to some limited extent for safe use. It should come as a single voice of all essential oil users, and I expect people are getting there sooner.

**- Do you feel that your job limits you to a single (molecular) approach to essential oils?**

Not all essential oil molecules are equally important in providing therapeutic benefits. Especially EO molecule works in the synergistic mechanism, that's why EOs are powerful natural products.

**- What are you currently working on?**

Several projects, specifically, I am now working on farmers' level chemistry research. What are the factors that can impact on final chemistry of essential oils? We are also making auto adulteration detection software; we already collected 40,000 essential profiles of more than 450 commercial essential oils. Software is almost 60% completed. Once the software becomes commercial, most of the adulteration analysis becomes easier.

**- Last question Prabodh, what do you feel passionate about in your job?**

I like problems or challenges which come every day in my work in different ways. I believe all the problems born with solutions and love to solve the problems.

Thank you very much Prabodh