

## INTERVIEW

# Professor Jiří Dědina kindly gave an interview to BrJAC



After obtaining his PhD in Physical Organic Chemistry in 1975, Prof. Jiří Dědina's research has focused on trace element analysis. His current research interests include: (a) Generation, collection, and atomization of volatile compounds for trace and ultratrace element analysis and for speciation by atomic absorption and atomic fluorescence spectrometry; (b) Mechanism of hydride atomization in flames and quartz tube atomizers. He is the author of a monograph on hydride generation, several book chapters in the field, and over 100 papers in impacted journals, most of them involving atomic spectrometry. He has presented over 30 invited lectures at prestigious international conferences.

Prof. Dědina has received recognition for his work, including the Ioannes Marcus Marci Medal from the Spectroscopic Society of Ioannes Marcus Marci, Prague, and the Nicolaus Konkoly – Thege Medal from the Slovak Spectroscopic Society. He also received a tribute from the 20<sup>th</sup> ENQA in 2022 and was honored by the 16<sup>th</sup> RSAS and the Federal University of Santa Maria, RS, Brazil in 2023.

He is a full professor of analytical chemistry at Charles University in Prague, Faculty of Science. Until his partial retirement in 2020, he was the Head of the Department of Trace Element Analysis at the Institute of Analytical Chemistry of the Czech Academy of Sciences. He was also a member of the Council of Sciences of the Czech Academy of Sciences and chairman of the Commission for the Defense of the Research Professor Degree in the Field of Analytical Chemistry, Czech Academy of Sciences. Presently, Prof. Dědina continues his activities as a researcher.

**BrJAC:** How was your childhood?

**Prof. Dědina:** I was born into a teacher's family. My mother was a primary school teacher, and my father was a professor at a gymnasium and later at the Faculty of Education at Charles University in Prague. Both my parents were humanistic oriented. I have a brother, who is five years younger, who is a commercial engineer.

**BrJAC:** What early influences encouraged you to study chemistry? Did you have any influencers, such as a teacher?

**Prof. Dědina:** Actually, my interest in chemistry started at a very early age - around 10 years old. The person to be "blamed" for that was my uncle, who worked in a chemical laboratory.

**BrJAC:** How was the beginning of your career in chemistry?

**Prof. Dědina:** Because of my above-mentioned interest in chemistry, I attended the Secondary Technical School of Chemistry in Prague after finishing primary school. Studying at this prestigious school gave me firm grounds in chemistry and, even more importantly, deepened my interest in the field. This led me to decide to continue my education at the university. I specialized in physical chemistry at the Faculty of Science, Charles University in Prague.

**BrJAC:** What has changed in your profile, ambitions, and performance since the time you started your career?

**Prof. Dědina:** After graduating from the university, I started as a doctoral student at the Institute of Chemical Process Fundamentals, Czechoslovak Academy of Sciences Prague in 1970. I worked in the field of physical organic chemistry, developing applications of  $^1\text{H}$  nuclear magnetic resonance for structural studies of small organic molecules. In 1975, I defended my thesis and received the scientific degree *Candidatus scientiarum* (CSc.), equivalent to a PhD at that time, I saw my future in the continuation of my research in nuclear magnetic resonance. However, for political reasons, I was not allowed to pursue this path. Fortunately, one of my colleagues recommended me to leader of a research group at the Institute of Physiology, Czechoslovak Academy of Sciences (CSAV) in Prague. The research of the group was focused on the metabolism and toxicity of trace elements, particularly selenium. My role was to develop methods for the determination of trace concentrations of selenium in biological materials, based on atomic absorption spectrometry. This was a completely new area for me and it might sound like an anecdote, but it was the first time I had even heard of this technique. After conducting literature research, I decided to rely on the generation of selenium hydride and its atomization in a quartz tube atomizer. This initial impulse led me to investigate the principles of the generation of volatile species and their atomization, and to develop applications of volatile species generation/atomization coupled with analytical atomic spectrometry for (ultra) trace elemental and speciation analysis. I pursued this research direction at institutes of CSAV, and finally, at the Institute of Analytical Chemistry of the Czech Academy of Sciences (Czech Acad Sci, Inst Anal Chem). In the early years, I worked alone, but over time, students and young researchers joined me. In 2003, we established a detached workplace, the Department of Trace Element Analysis, at the Czech Acad Sci, Inst Anal Chem.

**BrJAC:** Could you comment briefly on the recent evolution of analytical chemistry, considering your contributions?

**Prof. Dědina:** I am astonished by the recent progress in speciation analysis. In our group, we are developing speciation analysis based on the generation of substituted hydrides. This approach makes it possible to perform speciation analysis of ionic alkyl substituted compounds of several hydride-forming elements in laboratories possessing only simple equipment and for a low price. Additionally, it can handle sample matrices that cannot be separated on LC columns.

**BrJAC:** What are your lines of research? You have published many scientific papers. Would you highlight any?

**Prof. Dědina:** The most favored line of my research is the mechanism of the atomization of hydrides and other volatile species in flames and quartz tubes. Based on the knowledge gained through this research, we formulated principal rules for the optimization of hydride atomizers and we were also able to develop new atomizers for atomic absorption and atomic fluorescence detectors.

Here is a list of several papers I am highlighting:

- The first paper explaining hydride atomization by an interaction with hydrogen radicals (Radical Theory of Hydride Atomization).<sup>1</sup>
- Development of a new flame hydride atomizer – flame-in-gas shield.<sup>2</sup>
- Development of a new quartz tube atomizer – the multiatomizer.<sup>3</sup>
- The first direct observation and quantification of hydrogen radicals in the quartz tube atomizer – corroboration of the Radical Theory of Hydride Atomization.<sup>4</sup>
- Detailed insight into hydrogen radical-forming reactions between oxygen and hydrogen.<sup>5</sup>

**BrJAC:** There are, in Brazil and in the world, several conferences on chemistry. To you, how important are these meetings to the chemistry scientific community?

**Prof. Dědina:** I believe that scientific conferences are extremely useful for the community. It is the best way to get in touch with the current trends in the research. Even more important is to meet colleagues working in the same or similar field.

**BrJAC:** What is the importance of awards for the development of science and new technologies?

**Prof. Dědina:** High. It is encouraging to learn that one's achievements have an impact on a broader community.

**BrJAC:** What advice would you give to a young scientist who wants to pursue a career in chemistry?

**Prof. Dědina:** Work hard, listen to your supervisors, but rely upon your own judgment. Do not forget to stretch yourself out from time to time.

**BrJAC:** For what would you like to be remembered?

**Prof. Dědina:** As somebody who is always willing to listen, learn, discuss, and explain.

## REFERENCES

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Double Portrait: The Mountain and I.