SOUTHERN JOURNAL OF SCIENCES
ESTABLISHED IN 1993
Interview

SUSTAINABILITY, INNOVATION, AND INTEGRATION: PROFESSOR RIBAMAR'S VISION FOR BRAZIL'S CHEMISTRY PROFESSION

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Received 23 May 2024 – Version 1.0 of the translation was completed in June 2024.

SCAN ME

NOTE: Version of the translation transcription. 1.0.

Dear friends, the interview transcription was done by machine and later reviewed. We are aware that it is imperfect. If you wish to collaborate with improvements, you are welcome to contact us at southbchem@gmail.com

ABSTRACT

Background: The interview with Professor José de Ribamar, conducted by Luís de Boni, addresses various aspects of his career and contributions to chemistry in Brazil. The conversation includes his experiences in teaching, research, and university administration, as well as his role as President of the Federal Council of Chemistry (CFQ). **Aims**: The primary aim of the interview is to highlight Professor Ribamar's achievements and challenges throughout his career, and to explore his views on chemistry and its impact on scientific and educational development in Brazil. **Methods:** The interview was conducted in a question-and-answer format, allowing Professor Ribamar to share his experiences and insights in a detailed and personal manner. The interview was recorded, transcribed, and is available in both text and video formats. **Results**: Professor Ribamar detailed his academic and professional journey, including his undergraduate and graduate studies in chemistry, his contributions as a professor at the Federal University of Maranhão (UFMA), and his initiatives as a course coordinator and department head. He also discussed the impact of his research and his vision for the future of chemistry, emphasizing the importance of artificial intelligence and algorithms in predicting chemical models. **Discussion**: The interview provided a comprehensive overview of Professor Ribamar's contributions to chemistry in Brazil. He emphasized the importance of education and ongoing research for scientific advancement, as well as the need to adapt to new technologies. The discussion also addressed the challenges the scientific community faces and the importance of interdisciplinary collaboration. **Conclusion**: Professor José Ribamar has significantly promoted and developed chemistry in Brazil in academia and public administration. His career illustrates the importance of dedication to education and research, and his reflections offer valuable lessons for future generations of scientists and educators. The interview serves as a testament to his lasting impact on the scientific community.

Keywords: *José de Ribamar Oliveira Filho, Chemistry Education, Federal Chemistry Council (CFQ), Interdisciplinary Collaboration, Sustainability*.

Luis: Good afternoon, Professor Ribamar. How are you?

Dr. Ribamar: Very good, even more so now, in your presence, sharing with you all the best. Before starting, I want to show my solidarity with the gaucho brothers and that the system, CFQ, CRQ, we have capillarity in the 27 units of the Brazilian federation. We are represented by 21 Regional Councils that are located in each state, covering all our federation units. There is a council, for example, that represents four states, as is the case of Amazonas. So, we have representation in all Brazilian federation units, reiterating.

Photo: Dr. José de Ribamar Oliveira Filho. 2024.

Luis: I appreciate it, and, as a gaucho, I am grateful for all the support we are receiving from our brothers. From our perspective, as we live in the extreme South, we call them brothers from the North, but for us it is North from Santa Catarina onwards. And all help is very welcome. Our state was hit hard. But let's go back...

Dr. Ribamar: Luiz, I just want to complement you, if you don't mind.

Luis: Of course, please.

Dr. Ribamar: Regarding our concern, we are mobilized. The 21 councils representing the 27 units of our federation are together, emanating in everything. We are all mobilized to do as much as possible for our brothers and sisters, and we have already started donating, doing everything within our reach.

In a few days, we will have our plenary meeting, and they will bring news from each of their states. There are 22 advisors who will bring news and provide some new ideas so that we can be more effective in providing this assistance and move on to more practical, visible things.

This is what I want to clarify to our brothers there in Rio Grande do Sul. I was there recently inaugurating the headquarters of the fifth region, the headquarters of the Regional Chemistry Council, through Dr. Fallavena (Paulo Roberto Bello Fallavena).

And we, through this Council and through the banks, will provide maximum solidarity to you. That's what I say from the heart.

Luis: Thank you very much, professor. I hope our brothers in Porto Alegre are well. Porto Alegre is a huge city affected by rain and floods. The city I am in, thank God, was minimally affected, but others went the other way.

And if you allow me...

Shall we go back to our interview?

Dr. Ribamar: Let's go.

Luis: Because I'm not able to talk much about it. At least not now. In a year or two...

Dr. Ribamar: Porto Alegre will be Porto Alegre again and much happier than before.

Luis: Definitely. It will be a better city after this. It was already a very good city.

Today we have the excellent opportunity to interview Professor José Ribamar. Thank you very much for having us.

On this special date and...

Let me concentrate here. I told you I'm not a reporter, man, but let's do our best. Initially, I'm just going to read a statement regarding our interview.

Our interview will be published in Portuguese by Periódico Tchê Química and in English by Southern Journal of Sciences. We will share the interview with a local television, Conecta Mais TV. Our interview content is distributed under a Creative Commons license. So, it is public.

Today, we have the pleasure of interviewing Professor Ribamar, who is president of the Federal Chemistry Council. And if you allow

me, I'll start by asking questions.

Dr. Ribamar: Okay.

Luis: Professor, you have a degree from UFPA. Degree in Chemistry. Full Degree in Chemistry from UFMA. Specialization in Chemistry from UPE. Master's degree in Analytical Chemistry from UFMA and PhD in Analytical Chemistry from USP. How did this diversity of training influence your career?

Dr. Ribamar: Look... chemistry was a wonderful breakthrough in my life because until then, I didn't really like studying, but my mother, thank God, with that very strong pulse, mother of 8 children, 6 boys... I studied to pass the year because I was afraid of her. After all, she hit those who didn't study very hard (laughs). It was at 6 am that things started. And I studied to pass the grade because of her since it was a horror not to pass the grade with my mother.

Thank God I have never failed in anything in my life. I mean 'nothing' concerning studies in the area of chemistry. Then, I got into chemistry, which was an interesting thing. In the past, it was first grade, second grade, junior high, and scientific.

When I went on to my first scientific year, I learned chemistry through the teacher, and I will never forget this teacher, Reis from Maranhão. He was my chemistry teacher in the first scientific year, and we were making our debut. Those young people and I arrived at the first class drunk (laughter).

We drank a few shots of cachaça — I'm saying this with open heart —, a shot of cachaça (laughs), and we got there, in class, full of cachaça. Then Mr. José R. arrived and noticed that we were drunk; he was a chemistry teacher — a pharmacist, and a chemistry teacher. Then he arrived and said... he looked at our class, looked at our faces, and put the formula C2H5OH. I said, "What the hell is this?" He put structure in place and said, "Do you know what this is?"

Then, people looked at each other, and no one responded. The teacher said: "I'm asking precisely the group that is at the back." We were at the back. "Do you know what this is?"

"No," everyone said. He said: "This is the chemical formula of alcohol, of ethyl alcohol. You are all ethylized" (laughs). He said this word, 'ethylized.' Whether the word is right or wrong, ethyl alcohol... "You are full of ethyl alcohol, and you don't even know it does a lot of harm. It does a lot of harm. I'm your chemistry teacher." In our first class, this was the question he asked. "Don't do that in my class anymore. I'm Mr. José Reis; from now on, I'm your chemistry teacher."

After that first class, I arrived home, and for the first time, I said to my mother, "Mom, Dona Carmem"... "Mom," I say, "look... I discovered something interesting today called chemistry. And I liked that." She was excited, but at the same time, she said, "My God!" "What is it, mom?" "You take after your grandfather. He was a chemistry technician." He came from another place... He did so many experiments on the farm, bottles would explode... "My son, I was terrified of that. And you are just taking after him... but it was okay." That was in the morning.

When she arrived late in the afternoon, she had bought a chemistry book collection, Victor A. Nehmi — General Chemistry, which I never forgot. From then on, I began to study chemistry on my own, and, evidently, I became the best student in the chemistry class.

And I was already earning money, teaching privately, private chemistry classes. Those who paid me were the wealthier, middle class, or a little below. Then, I started making money with chemistry in the first year of my studies, and then I turned to chemistry and I got to the entrance exam. That whole thing. I passed the first time right away, and...

There was only chemistry in Belém do Pará. In Maranhão, there wasn't any. I traveled to Belém do Pará, and took chemistry, thank God... I passed, and made this... this career, thank God, without any failings in my life, in the academic part.

Luis: Allow me to ask a question. I was looking at your CV, and I think you just answered. What led you to graduate from two different universities, the industrial training at one and the graduation at another? Weren't there both courses at the same?

Dr. Ribamar: Exactly. There was no chemistry at the Federal University of Maranhão. The closest one was in Belém do Pará, which is about 40, more or less 45 minutes away by plane.

Luis: Oh, by plane!

Dr. Ribamar: And I went there by bus. I went by bus to do chemistry. Then, the failure rate was so high that there were two entrance exams. I passed the first exam straight away. In the second, it was even more crowded because everyone who didn't pass in other areas wanted to take chemistry, but it didn't work out well because of the remaining vacancies. But that was it.

I lived in a republic for four years. I lived in Belém do Pará, in a republic, with 16 colleagues who were taking various courses.

Most of the ex-Maranhão students took chemistry and agronomy, since there was neither of them there (in Maranhão). Some studied chemistry and agronomy, and others studied medicine.

Mr. Zé Reis was the one who clarified my ideas and made me love chemistry. When his son went there to study medicine, Reis asked me to help him with chemistry.

My first job was precisely at São Luís School, where he was a teacher. Recommended by whom? By Mr. José Reis. He nominated me. It was my first job, in April 1974, at São Luís School. I graduated in 1974, but my graduation was completed at the end of 1973. It was made official in 1974. In April 1974, I was already a chemistry teacher at São Luís School.

And a detail: I am the only stuttering teacher I have ever met in my life. In chemistry, was only me. I was very stuttering.

And I went to teach a special class, which didn't have a high school education. They had the scientific, and only people of mature age, and some even more... less young. Just to avoid calling them old, we call them less young. And they helped me a lot when I had difficulties. And there was a radio host, Herbert Fontinelli, and the students said, "Teacher, if you speak slower, you can do it." And I was 'unstucking,' as they say in the countryside, I never had treatment for stuttering. It was a shock treatment (laughs). Because I needed to earn something, and my first job was as a teacher. I liked being a teacher... because I was prepared to be an industrial chemist and work in a closed factory, I thought I was very shy — I still am, very shy — and with that, I had to find a solution. Everything I was afraid of in my life, I was compelled to do. That's that.

Luis: It's a really cool path.

Dr. Ribamar: I'm almost cured of my stutter.

Luis: Professor, my next question. Since 1977, you have been an assistant professor at UFMA, correct?

Dr. Ribamar: I'm already a member. I already jumped a grade.

Luis: Exactly.

Dr. Ribamar: But I'm an associate. Associate is a higher degree.

Luis: Yes.

Dr. Ribamar: Maybe you want to do something else because otherwise, I'll go ahead and talk and tell some huge stories (laughs)...

Luis: But stay, that's great, that's great because it's good to be able to talk.

Dr. Ribamar: I feel comfortable with you. You are a good journalist. I love communication. Thanks to communication, we ascend to a higher level, and we will talk more about it later.

Luis: Yes, thank you, professor.

Returning to the previous question. Since 1977, you have been an associate professor at UFMA. What are the main contributions that you believe you have made to chemistry teaching over these decades, which has already been a long time?

Dr. Ribamar: Very much.

I was the course coordinator for the undergraduate chemistry course. I'm an industrial chemist, and I graduated with a degree in chemistry, too.

And at the request of the students, I was a teacher... and I like being a teacher. I adore. I love chemistry. Just mention chemistry, and I spend the whole day on it. I love it, and I love chemistry.

But okay. As a legacy, I left mainly... When I was an undergraduate chemistry teacher coordinator, I was already a general chemistry teacher, and I taught almost all the basic chemistry in the department. I also replaced several colleagues who were going to complete their

master's degree and doctorate at the time. I wasn't interested in any of that. Master's, doctorate... I wanted to teach. Do you understand? Which I liked.

I started in second grade. São Luís School, then Liceu Maranhense and then university. The Liceu Maranhense was a reference.

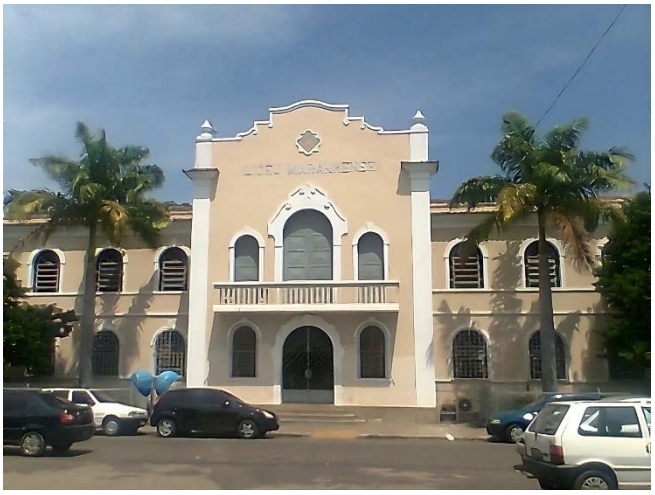

Image: Liceu Maranhense.

Source:https://pt.wikipedia.org/wiki/Liceu_Maranhense#/media/Ficheiro:Liceu_Maranhense.jpg

Some old ones — making a digression to inform you —, today politicians, and even state governors, were high school students. They really lay it on thick about having studied in public school. Just one detail. The public school, at the time the Liceu, was the best state school, it was the best school that existed in Maranhão. It was called Liceu Maranhence.

Only those who had an IQ were accepted. But not an intelligence IQ, the IQ of "who indicates" (pun in Portuguese). That's how it worked, do you understand? I do this to correct things because, "oh, because today, private schools"... In the past, private schools were much inferior to the Liceu. And I studied at a private school, which was São Luís. Much inferior to the Liceu. "But why didn't you go to the Liceu?" Because I knew you had to be the son of a senator or a politician to climb the ladder. Only a few people got in there, and there wasn't even a selection. Now, for the teacher, there was.

And thank God, I never went through the window anywhere. I entered through competition, and I've been doing exams since I was a kid. I did exams with the sectional so my mother wouldn't pay for São Luís High School. I've been doing exams since I was a kid. I took my first public exam when I was still a boy. And it was always through public competitions that I achieved everything. At the Liceu, for teachers... The governor at the time was Victorino Freire. He stipulated a selection to be a teacher at the Liceu, and I passed the selection, thank God. I liked Liceu so much that I refused when I was invited to UEMA, the State University of Maranhão. I preferred to stay at the Liceu. High school. Why? Because there were all the conditions. It had chemistry laboratories. I was one of the heads of these laboratories. I loved teaching at the high school, and I only left the Liceu because I took the federal exam and went to the federal level in Maranhão. Not to the state level, to the federal level. Then I left because I spent too much time teaching. I taught in the morning, in the afternoon, at UFMA, and at night at the Liceu. Then I couldn't handle it. Even though I was young and had a lot of resistance, I couldn't handle teaching like that. Then, I asked for exclusive dedication at UFMA and left high school. You know, the state spent two years... I resigned, and the state took two years to fire me.

I have always tried to raise my children like this with ethics and respect. Found is not stolen? I don't accept this, and the find has an owner. Look for the owner. That's how my mother raised us. If you don't find the owner, put it in its place and let someone else take it. That's how I taught my children.

Luis: Professor, moving on to the next question.

In addition to teaching, you also served in several administrative positions at UFMA, as course coordinator, head of the department, and member of the Center Council. How did this experience in university management contributed to your preparation to assume the presidency of CFQ?

Dr. Ribamar: So, there was one activity missing. I was the director of the Extension Department.

And I loved it. Look, I loved working in the extension. Because extension is knowledge taken to populations.

In the interior of Maranhão, there was a very high level of infant mortality. Why? Because of the water. All because of the contaminated water that people drank. And I went to give the

extension course and left them doing it... Doing it. I hate it when things remain just in theory. And I did it there, and it worked. Simple things: you can treat water and do the test, you can see the treatment level in small tests, as, for example, free residual chlorine. But if we go there, we will never end. Please repeat your question.

Luis: Of course, Professor. How did this management experience contributed to preparing you for the presidency of CFQ?

Dr. Ribamar: First, when I was coordinator of the chemistry course, there was a student, a chemistry technician, who took the entrance exam for chemistry to graduate so he could increase his responsibilities at a higher level. He did it because the assignments in the secondary course were limited by law.

In other words, a chemistry technician may even be technically responsible for a factory. However, it must be of small size. For medium-sized and large factories, he must have a higher education degree. He came in to increase his professional responsibilities, to increase his professional scope through higher education, and be technically responsible for medium-sized and large factories. Then I heard his story. Until then, I was registered with the Council of Pará because we were a delegacy, the state of Maranhão was a delegacy. I was registered with the Council of the sixth region, which is Pará, because I graduated from the federal university of Pará.

Then I went to find out about it. I discovered that a chemistry graduate could not practice the chemical profession. He was limited to high school education at most. He couldn't be a practitioner. I found this incongruous. Why? How can a chemistry technician practice as a chemist and a graduate with a higher education degree cannot? He could only teach. Look, guys, those who teach chemistry know chemistry. So, why were chemistry teachers underestimated at the high school level? The thing was so serious that, in those days, the private schools — that are the best today — preferred medical or pharmacy students to teach chemistry rather than a person with a degree in chemistry.

So I say, "Guys, why is this?"

This woke me up, and I sent, at the time, a letter to the president of the Federal Council, who, at the time, was Dr. Hebe Martelli, asking why the graduates were prohibited from practicing the profession of chemist by the Federal Chemistry Council itself. We establish the standards, establish these parameters, and examine the curriculum.

Then she responded, by letter, that chemistry graduates did not meet the minimum required by the Federal Chemistry Council to be a chemist. She sent me this extraordinary resolution, 1,511, which is still in force today. And I discovered that our chemistry curriculum was very weak. We taught three chemistry classes halfway, and the rest were just subjects in the pedagogical area. Then I say, "My God, oh no!" It was then that I communicated with the president. It was no longer Hebe Martelli. It was Professor Adade, Jesus Adade.

I also communicated with him by letter, and he replied what I had to do. I say, "Professor, why can't a licensed chemist in Brazil work as a chemist?"

He replied, "Because the curriculum is very weak." "And what can we do to climb the ladder and claim that a chemistry graduate is also a chemistry professional?" He replied, "You have to reform the curriculum and establish the minimum contained in resolution 1,511."

Then he sent the resolution to me, and I started the fight. After two years — because people in the education area already had another interest, which was is very well known —, I started to reduce the workload on pedagogy and even eliminate subjects from the pedagogical area to introduce chemistry. Then there was a series of debates, people in the education area would say, "It's difficult. Oh, you're changing the professional profile," among other things. I would come and say what my understanding was at the time.

I say, "Look, pay attention, those in the field of education." They were using those difficult terms. "I confess that I didn't understand 50% of what you said." I said that right away. "I am ignorant of your terminology, but I tell you, education teachers. No matter how many public speaking courses one takes, no one in the world gives a speech without knowing the content. What will the chemistry graduate teach? He'll teach chemistry! How am I going to teach chemistry without knowing the subject?"

Therefore, the market is full of pharmacy and medical professionals and students. I became a teacher at São Luís School only with training as

an industrial chemist. I passed the high school selection, just with this training. And if I passed the selection, it's because I showed that I have knowledge of teaching.

I taught a pre-university exam course in the 24th Hunter Battalion in the army here for people to take an officer course. People liked it, and I didn't have any discipline in their area.

Thenn I'm going to take a look at my curriculum to see if it has inorganic chemistry — 60 hours —, it doesn't have experimental chemistry... Physical chemistry 1, and organic. What the hell is that?

Guys, this can't happen!

Oh boy... The coordinator of the chemistry course in the experimental practical part was a math teacher. For the love of God, right?

Then I say, "Look, professor, I'm going to replace you because I'm going to hire someone from the area." He replied, "No, I'm a doctor..." I argued: "Listen, you don't know chemistry in depth. You know some basics, you know nomenclature, that decorative thing... You have to study reaction mechanisms and more advanced organic chemical reaction mechanisms."

"The properties... You don't even know how to prepare a solution, professor. Imagine standardizing a chemical solution... You don't know! You have no basis in chemistry at all." It is difficult. He started fighting, and I replaced him. Man, it was a struggle.

Then, I managed to approve the curriculum. So I told the new dean: "I have a problem with the area of education. I can't approve of this curriculum or this reform because they don't want it. It's a market issue. They will lose their jobs, I don't know what's going on." Then the professor, who joined us during the rector's time, arrived and said, "He who knows the plus knows the minus. I agree with you."

That's it. Then it went to the Council. At the time, the curriculum reform had to go through the Department, the Center Council, and the State Council.

It passed all three, I approved it, and that was the first Council to approve this in Brazil.

I arrived and sent it to Professor Adade. I was invited, for the first time, to step into the Federal Council, which was there in Rio de Janeiro. I was invited because he set up a committee to approve this course, and wanted me to be present. They paid for everything, so I went.

Then, I met Professor Jesus Adade, and I saw this system thing and I got excited.

It was approved. I came carrying the approval, arrived and broke the news to the students, and to that student. "Now, yes, a chemistry graduate is a chemistry professional!"

"The new resolution is here: it changes the one that has the prohibition, and more, it can even increase your competencies through the additional curriculum."

"If you want to have assignments of 1 out of 12, which is industrial chemistry, you only take the technological subjects. If you want to have the competencies of a chemical engineer, just do the part relevant to the area of chemical engineering. Your title will remain the same, with a degree in chemistry, but with competencies from 1 to 16."

I achieved all of this, and the rest of Brazil copied me. It copied Maranhão, but about it they said nothing.

Luis: Allow me to add something, Professor. I reaped the fruits of your work. I already graduated with this concept. I did PUCRS.

Dr. Ribamar: That's great, boy.

Luis: Thank you very much.

You know, we hear about it... The Council did it... But you know, I never imagined I would talk to the person who did this. Thank you very much, Professor.

Dr. Ribamar: Don't mention it, I did what was my obligation.

From then on, I got carried away with the Council and started a fight with Pará because we were a delegacy, and I created the Maranhão Chemistry Council. "I'm going to create the Council because I don't agree with the state of Maranhão being a delegacy of Pará."

I graduated there, right? I love Pará. The state of Pará was my second home, in my youth. I spent four years there. Four years in the republic

there. And many friendships. I love the Federal of Pará. My teachers and my colleagues. Thank God that is over, and today we are a very big brotherhood. We are very united. I love the Federal University of Pará because it is my story, the most brilliant page of my life was written at the Federal University of Pará and in the republic there in Belém do Pará. And we will be there, God willing, in this new meeting, which will be about the environment. It will be global, and we will be there because we have practically been invited by the staff, by the entities that are in charge there, to participate in this meeting in Belém do Pará, which will be COP number 30.

The 29th will be in Azerbaijan, right?

The 30th will be in Pará, when the whole world will see the state of Pará and know about it. They will meet indigenous people, who they no longer know. They will see forests, on site, and they destroyed theirs. And they will also see the importance of Amazon for the environment and the sustainability of the planet.

Luis: Thank you, Professor.

Taking advantage of your suggestion about COP 30, we are organizing a small conference in November. I know you have a busy schedule... Anyway, I'll invite you, if you're available. It's virtual and in person, so you can give us a little talk. Keep the invitation in your heart.

Image: Logo of the SSCON 2024.

Dr. Ribamar: Okay, I could never reject it, especially coming from you. You're the second journalist I like. The first is here.

Luis: Thank you, thank you.

Dr. Ribamar: Look, guys, I love you. Without you, this divulgation does not exist. Chacrinha already said that those who don't communicate get into trouble, and that's true (laughs).

There's no point in doing something without communicating what you're doing. Being ostracized, what is that? You have to show up, and people have to show their faces. And you have to get along well with the press. The press is a great thing because it publicizes things for us. Without the press, you know nothing.

Luis: It's true.

Dr. Ribamar: The press is essential.

Luis: It's true. I'm going to send an invitation letter to Jordana later to make the invitation official.

Moving on to our next one. Now it's a group of questions about the role of the chemist in society. How important is the chemistry professional for Brazil's scientific, technological, and economic development?

Dr. Ribamar: It's so important, but so important... We have a series of fantastic things that chemistry can — chemistry wants, can, and will accomplish.

Because God, the great architect of the universe, created chemistry. Without chemistry, we wouldn't be alive because chemistry preceded biology.

So much so that the concept of life that is the most accepted worldwide, from NASA, defined it as a highly sustained chemical system capable of undergoing Darwinian evolution.

So, if chemistry didn't exist, life wouldn't exist. Because chemistry preceded life. God created us to be able to create life.

Life, even scientifically, as I said, underwent an evolution because, in the explosion (Big Bang), the elements were formed, they came together to form organic compounds, and they came together to form DNA and RNA.

And then life pulsed through chemical evolution. So, biology is living chemistry. Living chemistry is biology, and we are a perfect chemical system. Any gesture you make triggers hundreds of reactions in you.

So, you see, the importance of the chemical is essential, on a global level, at the level of national sovereignty of any country. Because without chemistry, there is nothing. Everything you are using right now has chemicals in it. You use chemicals in your mouth, and your body produces chemicals. What makes bones and teeth? What are teeth? It's hydroxyapatite.

The teeth formula is calcium dihydroxyexaphosphate Ca10(PO4)6(OH)2. This is the teeth formula. Cavities are a chemical reaction.

Why is fluoride used in toothpaste? Fluoride replaces the hydroxide in the tooth, forming a film that is more resistant to cavities, which is nothing more than acidity caused by the lactic acid that we are using in the body. All that is needed is a pH acidity below 5.5, which favors the attack on teeth.

Image: Representation of the fluoride used in toothpaste.
Image Source: Generated by IA · May 2024. Ideoagram.

So, see, chemistry is in everything. It is present in everything; we live it right now when we breathe O2. And water. When we breathe, we only think about oxygen, but no. There has to be water. In space, there has to be water, and if there wasn't water, you would dry out. You would implode.

If the water, if the relative humidity of the air was zero, you would implode. The lung deflates, and you would implode.

Water is a divine thing, but it has side effects. You have proof of this, which is drowning and excess. Everything that is excess is surplus. And Paracelsus already said, I don't know how many years ago, that "what kills is not the poison, it's the dosage, it's the concentration." We have more than 50% of the chemical elements in the body. You have radium, you have a radioactive element inside your body. Mercury. Just look at the water we drink, the amount of things there are. The mineral water. So, we're also going to have more information to say that, below certain limits, nothing is toxic. What is toxic is something outside the limits, as we have more than 50 chemical elements and products. We have organogenic elements: oxygen, carbon, nitrogen, and hydrogen. The most present elements in all life, in all life there are these elements.

Image: The representation of chemical elements is being studied.
Image Source: Generated by IA · May 2024. Ideoagram.

So, it's a lack of information. We have to demystify chemistry, and we will achieve it.

Well, what does the chemist do? The chemical is important in industrial development. We have the least polluting chemical industry in the world. Brazil is at the forefront in this area. We are at the forefront of sustainability.

We have the least polluting chemical industry in the world. We have everything it takes to be at the forefront of global sustainability. We have to teach and not be subject to unfounded criticism, especially from more developed countries.

I think there could even be a tax on pollution. Some politicians have even suggested this.

Or invest more in countries that produce cleaner. Why don't they invest in the Amazon? The Amazon is responsible for water, including the fight against pollution. It absorbs excesses. Whoever destroys the Amazon destroys Planet Earth. People still haven't gotten it into their heads that we live in the same house. The evil that is done here has repercussions there and vice versa. And theirs are having more impact here. Oh, sometimes it's local. Yes, but look at the warning

from Rio Grande do Sul. It's there. This tragedy that is happening. This is a climate response. It's a response to climate change. In the face of excessive human pollution, we are the most polluting agents. It's us. We pollute the air. We pollute in liquids, in waste, all these things. We are the most polluting. If you calculate the number of things we produce, then you'll see. Damn! No one has yet realized that what we produce when we breathe is carbon dioxide. We contribute to the greenhouse effect. What the world population breathes?

So, the chemical is in everything. The important thing is to transform CO2 — in addition to reducing... We have a solution for everything. For everything. Here comes artificial intelligence. Today, we have algorithms. I'm not going to talk about it because it's an extremely complex topic.

Image: Representation of AI being used in chemistry.

Image Source: Generated by IA · May 2024. Ideoagram.

Luis: Comprehensive.

Dr. Ribamar: There are several things. But we have algorithms today that predict. Through the study of the physical, biological and chemical footprints of chemicals, products can be synthesized, before laboratory experiments, through artificial intelligence and algorithms applied to artificial intelligence. This model prediction, without carrying out laboratory tests, is fantastic. I will say more, the future language of chemistry is artificial intelligence. It is already being greatly successful. And for us, it is essential.

Of course, we'll study the side effects on the companies, regarding the statutes. But we have to prepare ourselves, including curricular changes. That's why I intend to hold a meeting as soon as I have more information.

We have high-level scientists in chemistry who are not appearing. I'm going to create a Bank of Notables here to help people who are studying this area and are already doing things in this area. Let's understand all the good things that chemistry does. This will demystify chemistry. Through this, the teaching of chemistry will change at the cellphone level. The person on the cellphone will be able to predict things that would otherwise cost a lot of money on rehearsals, which will cut the path to many achievements. Fantastic. The potential is a tremendous, unimaginable thing. We are just at the beginning.

Luis: True.

Professor, I know I have to ask the questions. I apologize profusely.

Dr. Ribamar: That's why I tell you.

Luis: It's great. I want to make the most of our first meeting. And that many others appear along the way.

So, Professor, allow me to move on to the next block of questions about CFQ's activities.

What are the main actions and projects that CFQ has implemented to enforce the legislation regulating Brazil's chemical profession?

Dr. Ribamar: We have done a lot. Really a lot. But the main point, the most important for what is happening, and so that it can happen even more — and that I want more, I worry a lot —, is that tomorrow is a lesson for today, and for the future.

So, I wanted to implement the digital process for the entire system, back in 2018.

I'm anxious. You must have noticed. I'm anxious indeed. I say this in public, there's no problem at all.

I haven't managed it yet, but we are developing a lot of things in this sector. Did you mention standardization?

Luis: Yes. Actions to enforce legislation that regulates the profession.

Dr. Ribamar: The first keyword is integration. When I took over in 2018, the first thing I did... And for the first time in my life, I did it — our law is the Law No. 2,800, of 1956. The first time I

heard about it was now in 2018. You'll even think it's funny. For the first time in the system's history, I managed to bring together all the regional presidents.

Luis: May it be the first time of many.

Dr. Ribamar: Yes. I managed to get them together and create a plan, a 10-year strategic plan, with all the presidents and advisors. We spent a week together, focusing solely on this, and a 10-year plan came out, so I did a multi-year plan.

What a clear shot that was. Can you believe no one knew each other? Neither do the regional presidents. One of the presidents had never stepped foot on the Regional Chemistry Council. Then, they started to trust. The proposals came from them. COPRESI (College of Presidents, Ordinance No. 168 of September 13, 2022) is an example. We strengthened it, strengthened the base. They gained confidence in the system. Today, things are different, and we have monthly meetings. We are integrated.

I speak in a chemical language — we fight for the concentration of convergences and the dilution of divergences.

Luis: Perfect language.

Dr. Ribamar: So that's it.

We are creating standards, and the staff is complying, but these standards are made with broad base consultation. Some colleagues see it as a defect that I am excessively democratic. My answer is, "I would rather sin by excess than by lack."

Well then.

And this democracy, and this dilution of powers, which used to rest entirely with the president — I created 12, 6 commissions, and 6 committees. I created the ombudsman's office, which didn't exist; I created internal and external controllership, which didn't exist; a chief of staff, which we didn't have; and a job and salary plan, which didn't exist. I created everything. All of it. I do not have a single labor action against the Federal Chemistry Council. Thank God, thank God we made it.

I never say "I." I say "we." I always speak in the plural. We managed to be united and integrated and have the trust of all employees. Everyone has their rights guaranteed here. Good salaries. This is what we do, and everyone has motivation. There is no point in wanting to do something if your base and those under your command are not satisfied. I never took a course in anything. The only thing I've studied in life that I like is chemistry.

I'm talking in terms of — I didn't take an MBA course, anything like that. I just do what I think. Fortunately, it's working. I am in my third term. And look, having the vote of Brazil's 22 delegates, unanimously, in the third term...

Because they feel represented and they feel that this administration is ours, it is diluted with them. They are part of this administration. So, when criticism comes, I take that criticism on board. But they know it's for them, too.

We have everything here today, everything in terms of infrastructure. And the infrastructure is improving. And I want to improve more and more. In this sense, the staff complies with the legislation. We are enlisting the support of chemistry associations such as ABQ, SBQ, and ABQUIM, the Brazilian Chemical Industry Association. Here, people were at odds with ABQUIM. They saw us as an enemy. "They are inspectors." No, we are not inspectors. We want to work together. I fight for the development of the chemical industry because it is our job market. Today, we work together. Do you understand?

Luis: Yes.

Dr. Ribamar: One supports the other, and the converse is true. We have a parliamentary front in defense of chemistry. There in the National Congress. Chemist's Day will be celebrated in the Chamber. Look, there is a committee called CRIG (Institutional Relations Committee). I created. As I created COPRESI (College of Presidents). We have this interconnection with all of them, everything we do is open. You enter the transparency portal, everything is clear. Even my income tax is done here at CFQ by the auditor. He is an employee here. He always was, and he always prepared my income tax declaration. When I became president, I asked, "Is it legal?" I consulted legal counsel. They said, "It is, and it's even better because your income statement is open here."

Anything I do wrong, I want to be punished for this. People who make mistakes, intentionally or even innocently, must be punished.

That's why I have too many auditors, internal and external. If anything goes wrong here, it goes through all sectors. I'm the last one to see the document. Other sectors have already approved it. I have a legal sector, with six or seven lawyers.

Because there is a lot of demand here, and we provide assistance to the regional authorities — who previously did nothing —, with everything they want. We assist them.

Partisan politics is prohibited here. I know that people have their preferences, but for God's sake, partisan politics has no place even in my house. So please, let's not mix things up. Our party is the party of the CFQ, CRQ system. It's converging more and more. With a single objective, which is the growth of chemistry in Brazil, with visibility in Brazil and abroad. I don't just think at the local level. I think at the exterior level, and we are achieving that. Of course, I am nonconformist. I criticize everything. "This whole thing is slow!" But public matters, man — we have to follow the rules and the laws. So, we do and try to do everything that is legal. Within legality. Obeying the rules. The current rules. The laws and regulations that are in force in our country.

Luis: Perfect.

Dr. Ribamar: I respect and love this country.

Luis: Allow me to move on to the next question. In drugstores — which is another branch, another activity —, having a pharmacist while the store is operating is necessary.

It is not a single pharmacist serving a drugstore chain. Each store has its own pharmacist. If it is open 24 hours, there are three pharmacists. In a similar way, based on Decree No. 85,877 of 1981 — the second article describes the activities that are exclusive to chemists. What would a company be like, hypothetically speaking, if it operates in 300 municipalities? Can it have just one chemist or half a dozen chemists to serve the 300? Or should it have at least one professional per place of work?

This is the first part of the question. What would it be? One is enough for everything, or is it required at least one professional per place of work?

Dr. Ribamar: This is regularized by our resolutions that establish that the technical responsibility is a function of time, it's a function of distance. For example, if you are the president of a board that has three small stores — not a big company, right —, and the chemist can prove that there is time compatibility, and that the distance is feasible — i.e., it's a small distance — to have the responsibility over those three, it is the responsibility of the regional president. Each case is different. In this case, it is impossible. How come? There you are even taking... This is not ethical.

Technical responsibility considers time, distance, and, especially, the ethical aspect. This is not ethical because you are harming professionals, do you understand?

So, this has to be... Now, this is done individually by the presidents of Regional Councils. If you know of any case, please report it to the ombudsman.

Look, not you (Luis), but any chemist who is listening to me. If you know of cases of this nature, inform the ombudsman of the Federal Chemistry Council, and we will take action.

Luis: Continuing with the same question. This concerns our chemical training, technical training, our fellow engineers, any professionals in the field of chemistry. The legislation speaks of physical-chemical tests and dosage of chemical products. That is, these are the responsibilities of the chemistry professional.

Dr. Ribamar: That's right.

Luis: In a factory — it could be anyone —, could the analytical part be delegated to anyone else without the necessary training, or does the chemist have to be there to do it?

Dr. Ribamar: It could even be under the supervision of a mid-level or higher-level chemist or technician, depending on the factory's complexity level. If it is small, it can be supervised by a technician. A technician can be the responsible chemist.

Luis: Yes.

Dr. Ribamar: So, he can say, "It's under my supervision." Now there are types of things that are really complex. This depends on the degree of complexity and on each Council. They have the

independence for that. For more complex things.

For example, making buffer solution. It's not a simple thing, especially when it has ionic strength. When it is tabulated, in Tokio Morita, that manual book for preparing reagents and solutions... everything is fine. And when it's not there? I did my doctorate, and there were people there, doing their doctorates, and anything beyond Tokio Morita they didn't know how to do. And I had to teach. But everyone needs everyone. Knowledge is complementary. I'm learning from my neighbors, you can learn from anyone, and then you say, "Man, I never thought about that." No one can do more than anyone else. Knowing is complementary. Everyone can help each other. Talking and learning from each other.

When I went there, I didn't know how to use Orange, that mathematical program. Then, damn, I had to learn. But... I spent almost a day learning. But... I spent almost a day learning, slow as hell. And there was a boy there who was a like a snake (very agile in using Orange). It was this boy who helped me, he was already doing his doctorate. He passed the Petrobras competition, he was the only one who passed there, of those who participated.

I told him I wanted to learn. Soon, I became so good that I started teaching those who arrived to use Orange. I made graphs and such, interpolations, put graphs one on top of the other and so on. You could even do it with a program there to see the spectrum part, right? I did everything there to find out if there was only one specie or two, through this program. So, it was a fantastic thing.

That was it. I didn't take anything else after my doctorate (laughs). The Council didn't let me do anything else.

And so, I was promoted here to be first secretary, and my advisor knew. I said, "Okay, I'll do a doctorate as long as you accept that I won't leave the federal university." In fact, I missed a chance to do a postdoc because of the Federal Chemistry Department.

Then I said, "I won't go." I preferred the federal position because I was already very committed. I wanted the Council of Maranhão. Same president. Then, I came here as a substitute. I spent a lot of time as a substitute.

It took me a long time to become a permanent staff member, and it was a struggle. Winning in the boardroom. I worked my way up — substitute, permanent secretary, second secretary, first secretary. Then, due to illness, I became second vice. And so I went.

Luis: Very cool.

Professor, due to time, I will ask one or two more questions.

Dr. Ribamar: I will be more objective (laughter).

Luis: No, not at all.

It's great talking to you, sir. It's great to talk to people who talk. A difficult interview is when you ask a question, and the person answers "yes" or "no." So, it's great.

Professor, about the future of the chemical industry in Brazil, what trends and opportunities do you see for the development of the Brazilian chemical industry in the coming decades?

Dr. Ribamar: Wow, it's fantastic. Because we are already a reference, we are already a vanguard. We are the sixth-largest chemical industry in the world. Who do we lose to?

China, the United States, Germany, Japan, and South Korea.

I said this to a colleague from another area, right? And he said, "Wow, so you're complaining with a full stomach." I said, "No, we're not."

He said, "What is this phenomenon where you are sixth but keep crying and such?"

And we will improve because now the king has returned, not as we wanted, but he has returned with the support of the vice-president, Dr. Alckmin.

I'm going to expose a secret. Professor Alckmin, the vice-president of the Republic, Professor Dr. Alckmin, he said he was a professor of organic chemistry.

I went to ask him because he was a doctor, but at the time, as I told you, they preferred that the professor of these courses be a medicine or pharmacy graduate because the chemistry graduate had nothing in chemistry.

He said this, and he remembers that things

like C1, C2, until C4 are gases. And from then on... (laughs). I thought that was cool about our vice president.

Luis: Yes, what do you see in the future? Which areas will be a priority?

Dr. Ribamar: Brazil as the world's powerhouse in the chemical industry. We are the least polluting industries; we are already at the forefront of this, and we will grow with the rehabilitation of the king. We will grow and gain more space. And we can, and we have the potential for this.

When I told this story and my colleague criticized it, I said, "Our big problem is that we import more than 40% of raw materials." Why?

Because some countries, mainly... I won't name them because...

Luis: That's beside the point.

Dr. Ribamar: That's beside the point.

They practice the following, they sell raw materials cheaper than they have there.

Luis: Dumping!

Dr. Ribamar: Yes! It's so cheap that they sell it below the asking price there.

Luis: To kill our industry?

Dr. Ribamar: Exactly.

So that we don't...

For example, we have enormous potential in these raw materials, but investing in it is so expensive that we prefer to import it, which is much cheaper. And they practice that there. High subsidies. It's something highly harmful to our development.

So much so that we import 40-45% of raw materials, both in the chemical and pharmaceutical chemistry areas. Why?

We have all this here, and we have plenty, but we don't want to invest and produce. That's bad in the future. We could greatly reduce the price of these products. We are unable to invest here, which would create more jobs. We have an import deficit of almost 35 billion dollars. If we invested this money here, we would create more jobs for our chemists, you know? And we would stop being dependent. This affects our sovereignty because if a country suddenly cuts the supply, what will we do? Are we going to extract this from the ground right away? No! It's all there. I think this should be seen, and it is being seen...

Luis: Priority, with attention.

Dr. Ribamar: This protection is a priority because it really is very harmful. Now we have enormous potential. We are already sixth, the one that pollutes the least, and in the future we will be among the very first. Reaching third place and much more. We have the potential to be even the first. Now, I think that this political vision has been well regarded by the government. This vision is that there has to be some solution so that we can explore our riches.

Luis: I agree, perfect.

Professor, there were several questions. I will choose the last one, but it will not be our last interview, God willing (laughter).

Dr. Ribamar: I think I didn't let you speak because I talk too much.

Luis: But I don't need to talk (laughs).

Professor, what are the main environmental and sustainability challenges the chemical industry must face, and how can CFQ contribute to this agenda?

Do we have a guide? Let's go that way, do it this way, do it differently. How can we integrate?

Dr. Ribamar: Look, we are going to integrate a lot with green chemistry. We are integrated with green chemistry. The energy solution, for example, the energy transition, is nothing more than sustainable hydrogen, which comes from a clean source. Then hydrogen is there, and we have all this potential. And we can get ahead in this too. But the Amazon and, for example, green chemistry, the artificial intelligence in green chemistry, what does this contribute to? Some countries are already using chemical catalysts, and they are transforming CO2 into methane, a raw material that goes into almost everything. And we sell methane. Our methane is five times more expensive when sold than imported methane. And we have a lot of methane. Now, they are already producing it through

chemical catalysts, where artificial intelligence comes into play. So there's something fantastic there. Excessive CO_2 causes the greenhouse effect, and sometimes people criminalize it. For God's sake, the greenhouse has to be there, it cannot be exacerbated as it is. Because if there is no greenhouse effect, there is no temperature regulation. However, CO_2 can be extremely reduced through these catalysts, and we have to be concerned about that too. Sometimes, people think about energy transition as if it were a magic trick, but it's not like that. We have wealth, and oil has petrochemicals.

Luis: Exactly.

Dr. Ribamar: This transition has to be slow and enter in a way that does not harm the exploitation of our riches. In other words, we have been trying to find more efficient ways of capturing CO2 and transforming it into useful things, such as CO2 transformed into methane.

Because it is a very expensive raw material to exploit concerning imports, which come with a price six times lower, a price outside the price charged here in Brazil. So this is not magic. CH4 is highly strategic for the chemical industry. What's more, considering a way to capture more CO2. So that we can make it compatible with the extraction of our wealth. Because you see that the countries that do this the most, they have already explored almost everything, and we cannot leave this wealth buried. Those colleagues who are more exacerbated, "You have to do it soon" — that's not magic. This has to be an energy transition. Okay, great. Because otherwise, the planet dies. But we can reconcile. It's possible. And even replace it completely in the future. But it's not magic. This has to be done gradually and slowly.

I'm showing my personal vision. Not all counselors think like this.

Luis: No, not at all.

Dr. Ribamar: I have this view. We're going to have a great show at COP 30. I saw comments from colleagues here saying "Because man, we won't have the structure we had in Dubai..." I say, "Man, better than this? They've never seen it in their lives." They will meet the Indians, and they will miss their Indians. They will see forest, excess forest, and will see it on site. There will be ships, according to what I heard from the city minister himself, there will be ships docked there for people to arrive and return to give guarantees. To give more guarantees to these people from abroad who will arrive. They will be amazed, they will come and say, "My God." They will have an awareness that perhaps they never had. The eyes of the world will be here. And we will do very well, God willing. This is what I say to colleagues who criticize that we have no structure. Better structure than on-site? And know that this exists? So that's a fantastic thing. And, God willing, I will be there.

Luis: I hope so and that we are well represented there. Thank you very much.

Dr. Ribamar: I will do my best. This position is a position of honor, of great honor for me. Look, for the third time, I have the honor of presiding over the Federal Council. It's a fantastic thing. Because it's not the Federal Council, it's the system — Federal Council, Regional Councils. It is the chemists who support us and who are increasingly supporting us. In the past, we had a lot of regrets about what happened, which was an isolated thing. The diagnosis that I had at the beginning was a very bad thing. I made a diagnosis in 2018, and I was like: "My God, where are our investments?" Zero. "Where's the communication?" It wasn't even there. How come? So that's what I did. I hope I got more right than wrong. Thank God. And this demonstrates the support I have from COPRESI, the presidents, our directors, our effective advisors, and our substitute advisors. These are people of the highest levels here. So look, we have everything and a whole bunch of scientists who are hidden, but I'm going to bring them and show them, because they are fantastic. I saw an interview with a professor at Unicamp in the field of artificial intelligence, and I was impressed. He is already doing this at Unicamp. I forgot his name. I didn't record his name. But I was amazed to see that he is already working on it and understands so much of it. He gave an interview to CFQ about artificial intelligence in chemistry.

Luis: Professor, on behalf of the newspapers that I represent today, Periódico Tchê Química, Southern Journal of Sciences, I would like to thank you for your willingness to welcome us. Thank you for the opportunity to talk to you, to present the Chemistry Council a little more to other colleagues, and to say that it was a pleasure to talk to you. I hope you can welcome us again.

Thank you very much.

Dr. Ribamar: I guarantee that I am really happy to meet you and have this opportunity to

show a little of the Federal Chemistry Council system and the Regional Chemistry Councils.

I am proud and honored to represent them.

Luis: Thank you very much, Professor. Have a good week, and I see you next time.

Dr. Ribamar: All the best.

DECLARATIONS

1. Limitations: The interview is limited to its content.

2. Funding source: The host funded this interview.

3. Competing Interests: The host has worked for the journal for many years, and this may have influenced the interview.

To know more:

- CFQ. https://cfq.org.br/
- Por aclamação, conselheiros escolhem José de Ribamar Oliveira Filho para comandar CFQ no triênio 2024/2027. https://cfq.org.br/noticia/por-aclamacao-conselheiros-escolhem-jose-de-ribamar-oliveira-filho-para-comandar-cfq-no-trienio-2024-2027/

Conference invitation. (now related to the interview)

Visite o site da *Second Southern Science Conference* que será realizada nas belas cidades de Mendoza, na Argentina, e Vassouras no Brasil, de **7 a 9 de novembro de 2024**. https://www.sscon.org/