



NEWSLETTER

Editor: Martin G. Peter, University of **Potsdam**, Germany

E-mail Martin.Peter@uni-potsdam.de

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Special Issue

in Memory of

Kjell Morten Vårum



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Obituary - Kjell Morten Vårum

Our friend and colleague, Professor Kjell M. Vårum, was reported missing by his family since Thursday, 27th October, 2016. There have been wide searches, but only on June 1, 2017, during the 12th EUCHIS conference in Seville, Spain, we received the sad and shocking news that he was found deceased, in a forest not far from his home.

Kjell was born in 1953. He obtained the MSc in 1981, and the PhD in 1991 at the University of Trondheim (NTU). He was Research Scientist/Senior Research Scientist at the Univ. of Trondheim and NOBIPOL (1981-2004) and Professor of Marine Biochemistry, Department of Biotechnology, Norwegian University of Science and Technology (NTNU), since January 2002, and Vice Head of the Department of Biotechnology since 2009. He was a Member of the Scientific Core Group of the Marine Strategic Area at NTNU 2009-2013. In January 2015 he was Elected Member of the Academy of the Royal Norwegian Society of Sciences and Letters.

Kjell was an eminent scientist with outstanding seminal contributions in the field of marine polysaccharides, in particular chitin and chitosan, as well as alginates and β -glucans. He co-authored more than 140 publications, covering virtually all fields of "chitinology", from enzymology to gene delivery, from physicochemical properties to chemical derivatization and synthesis. His NMR investigations on degradation kinetics and structure-function properties are widely recognized and fundamental for the characterization of chitosan and oligosaccharides as well as chitinolytic enzymes.

Kjell was internationally highly recognized. He was visiting Professor with Prof. David A. Brant, Univ. of California, Irvine, USA (1987/1988); at Kinki University, Japan, with Prof. T. Fukamizo (2011); at University of Trieste, Italy, with Prof. S. Paoletti (2012), and Guest Professor at Wuhan University, China (2005-2008).

Kjell was a member of the founding assembly of the European Chitin Society (1992), member of the Board of EUCHIS (1993 – 1997; 2001 – 2004, and 2009 - 2011), Vice-President (1997 – 1999), and President (2004 – 2009). He was Chairman of the 5th EUCHIS Conference, Trondheim, 2002 (including this unforgettable boat excursion to Munkholmen, with *Pandalus* and beer unlimited – à discrétion !); Co-Editor of five Volumes of *Advances in Chitin Science*, and Special Issue Editor of 'Chitin and Chitosans' of "Polymers", 2015.

The participants of EUCHIS 2017, with honour and mourning, held a minute's silence. Kjell left his wife and two children, our thoughts are with them. We all remember Kjell as a great scientist, a dedicated colleague, and a friend with a fine personality and a splendid sense of humor. We miss him.

Bruno M. Moerschbacher
President, EUCHIS
Muenster, Germany

Alain Domard
Paris, France

Hiroshi Tamura
President, Japanese Society for Chitin and
Chitosan, Osaka, Japan

Tamo Fukamizo
Suranaree University of Technology
Nakhon Ratchasima, Thailand

Mats Andersson
Flexichem AB, Uttran, Sweden

Martin G. Peter,
Bonn, Germany

Bjørn E. Christensen
NTNU, Trondheim, Norway

Vincent G. H. Eijsink
NMBU, Ås, Norway



Brest, 1995 (with Hirano)



Trondheim, 2003



Montpellier, 2006



Natal, 2007



Taipeih, 2009 (with Roberts and Domard)



Münster, 2015 (with Heras, Senel, Peter)

Master of the Chitosans

It was in 1993 at the first Chitin Enzymology Meeting in Senigallia, Italy, that I first met with Kjell Vårum. I was a little no-one standing in front of my poster on which I described my first fledgling experiments with chitosan, and the famous Prof. Vårum stopped and discussed with me! Little did I know of chitosans and how to handle them, but Kjell offered to provide me with precious samples, two series of chitosans with different degrees of acetylation ranging from 0 to 70 (!) % done by homogeneous de-*N*-acetylation, one of high and one of low molecular weight. These were precious indeed, and we still keep small small amounts of them for reference purposes! Prof. Alain Domard, then president of EUCHIS, also donated well characterised chitosan samples prepared by homogeneous re-*N*-acetylation, and we started analysing their bioactivities towards microbes and plants, to begin understanding structure-function relationships. Thanks to the support and advice of Kjell and Alain, we quickly obtained promising results, and Kjell invited me to become co-PI on a Norwegian research grant proposal he successfully submitted. This came at a time when I was relocating to my first (and current) permanent position at the University of Münster where I was stuck in an old building with no access to laboratory facilities for several years and, thus, no option to successfully compete for research money. It was Kjell's grant that sustained me in this difficult and crucial time of my career. A huge thank you, Kjell!

He also pushed hard for us to publish our joint results, and even went as far as threatening me not to release the last instalment of the budget should we fail to do so. I had my hands and mind full of trying to get my labs renovated and if it wouldn't have been for Kjell's insistence (for which he later even apologised! - Kjell, I told you then and I am telling you now: instead of you apologising, it is up to me to thanking you!), if it wouldn't have been for Kjell's insistence, this paper - describing the first systematic study of the influence of the degrees of polymerisation and acetylation on the resistance eliciting activities of chitosans in plants - would probably never have appeared. Today, I think we can proudly say that it is a landmark paper for the elucidation of structure-function relationships of chitosans concerning their biological activities, and it is by far my most cited paper (of course, it ranges 7th only on Kjell's list!). In fact, we have a second set of data obtained even then with the same chitosans describing the influence of DP and DA on their antifungal and antibacterial activities which we have not published to this date, though I believe they are still more consistent and more comprehensive than anything published on the subject since. I do feel that we will publish them now, with you, Kjell, of course, as a co-author.

This joint work then became the basis for my first European research project - CARAPAX - in which Kjell was a key partner. I am still surprised that he agreed to support this proposal, three times as it was, because it failed twice before being successful. And I have ever since sustained my growing research group through European research projects. Again, I owe you, Kjell. I remember only too well the CARAPAX kick-off meeting in Bonn. The evening of the first day, we stood on the shores of the river Rhine admiring a really dark black cloud - and before we realised, it was upon us. The most torrential thunderstorm broke loose and all but inundated us, and the almost continuous lightning threatened to annihilate the whole CARAPAX team summarily while taking shelter under a tree. The plan called for a guided city tour next, but when Kjell realised that we were German enough to carry this through in spite of everything, he took the initiative and suggested to immediately proceed to the next item on the agenda which was "Rheinische Kneipe". We split up, the dull and dumb ones joining the poor city guide to the Beethoven house, the smart and honest ones joining Kjell for the bar. When we joined them there (not much) later, the first beers had already been spilled, the fun was in full swing, and to this day, I wonder how the Norwegians ended up being more

sociable than the Rheinlanders. I discovered another side of Kjell, and I liked it. He had a sort of humour that could be almost harsh - but it never hurt, never.

In 2002, Kjell hosted the EUCHIS conference in Trondheim where he organized a session on “Industrial Applications of Chitosan”, for which he asked a few people to express their opinions as to what was required to make chitosan successful in different market areas. He asked me to give my opinion on what was required to make chitosan successful in the agricultural market. This invitation has deeply influenced my career. Not only was this an excellent opportunity for me to become more visible on an international level. During preparation of my talk, I also became thoroughly aware of the necessity to investigate structure-function relationships of chitosans (and, thus, to speak of chitosans, plural, rather than chitosan, singular) on the molecular level if we wanted chitosan-based products to be reliable. To illustrate my point, I drew a sketch of possible influence factors such as purity, solution properties, degrees of polymerization and acetylation, molecular weight polydispersity and patterns of acetylation, on the physico-chemical properties and, thus, on the biological activities of chitosans. I keep using that sketch to this day when-ever and where-ever I give a talk. So one more good reason for me to thank you, Kjell! But the whole chitin/chitosan community, both from Academia and from Industry, has to thank you for it, too, because this session became the forerunner of the successful “Future of Chitosans” session we organized during the EUCHIS meeting in Münster in 2015, and for the “Chitosan Industry Meeting” in Madrid preceding the recent EUCHIS conference in Sevilla. We hope and trust this series will continue and will ease the way of chitosans into the markets.



I am tempted to keep telling stories about Kjell - about the CARAPAX consortium meeting he organised on a Hurtigruten ship going from Trondheim to Bergen where he was the only one not ending up green-faced because of the heavy seas; about the hilarious EUCHIS gala dinner in Trondheim where he had managed to win sponsors to serve free wine, in Norway!, a treat that made him almost as proud as he visibly was to being accompanied by his beautiful wife; etc. But I will not do this, I will rather end on a recent event at which Kjell was not present in person, yet he was still present more than anyone else in the auditorium. At the last EUCHIS conference in Sevilla, Mats Andersson explained how all chitosans available on the markets today have non-random patterns of acetylation - except for the ones he produces; and only hours later, during my talk, I explained how all chitosans available on the markets today have random patterns of acetylation - except for the ones we produce. Of course, a heated debate

evolved between us after my talk. The funny and revealing thing, though, was that both Mats and I cited Kjell as THE authority backing our view. How better to prove who is Master of the Chitosans? Kjell - we all owe you. And we miss you already. But as you see - you are still here with us, guiding the way.

PS: And if you want to learn how Mats and I resolved our dispute, you will be able read it soon in a joint paper we intend to publish in your honour, Kjell...

Bruno M. Moerschbacher

To become the friend of Kjell was not so easy. I had the chance to be one of his scientific friends for more than 20 years. His friendship was frank, reliable, and faithful. We did a lot of things together: papers, books, organization and chairing of meetings, participation in European research contracts. He even accepted to be a member of the jury of the defense of a thesis written in French (a hard job for him).

I remind a very good dinner in the beautiful house overhanging the Fjord of Trondheim where he was living with his family. I also remind he liked to walk in the surrounding of his house!

As already said he was a very good scientist by his work, he achieved with great skill and rigor. During the moments of distraction, he had much humor and was not the last to laugh when we were drinking a good beer in between friends.

I finally remind that every year, by the end of winter, I had a call from Kjell telling me: «that's it Alain, the first leaves appear on trees». This was a very important event of his life.

Kjell you left too early, I will miss you.

I feel very sad and express my heartfelt condolences to his wife and his sons.

Alain Domard

A memorial writing for Prof. Kjell Morten Vårum,

I'm so sorry to hear about Prof. Kjell Morten Vårum's passing away. In the end of August, 2011, I invited him to 25th Chitin/Chitosan Symposium in Japan, held at Nara, as an invited speaker. He presented excellent works on the mode of action of chitinases/chitosanases



toward partially-*N*-acetylated chitosans. His idea that product distribution from the chitosans provides information on the



processivity of the enzymes had a great influence on the researchers working on chitin/chitosan-related enzymes. These works

have been published in Proc. Natl. Acad. Sci. USA, J. Biol. Chem., Biochemistry, and the others. After this conference, he was staying in our laboratory of Department of Advanced Bioscience, Kindai University, as a visiting professor for 3 months, and gave a special lecture on “Carbohydrate Chemistry” to the graduate students in our department. His careful and gracious lecture enhanced the motivation of graduate students and strengthened their enthusiasm for academism. My current research works largely depends on him, and his stay in Japan has had a big impact on me. I really appreciate.

I would like to send my condolences on the loss of Prof. Kjell Morten Vårum. May his soul rest in peace.

Sincerely,

Tamo Fukamizo, Ph.D.
Visiting Professor of Biochemistry
Suranaree University of Technology
Nakhon Ratchasim, Thailand.
June, 27, 2017

Kjell Morten – a friend and appreciated colleague

A genuine interest for science first brought Kjell and me together. Our common interests in the outdoors, food, wine, curiosity and willingness to share and discuss brought us closer and over time we developed a deep friendship. I remember and appreciate our many scientific discussions, sometimes when attending conferences in exotic places and many times accompanied by a beer or two. We had a lot of fun!

Not only was Kjell Morten a great scientist, always keeping the scientific standards at highest level, he was also a great chef, knowledgeable in food and wine and it was a true pleasure being a guest at his table. Our excursions to Folldal, Hitra, Rakvåg and Fårö, all places for outdoor activities and good dinners, will all be stored as highlights in my memory. Most of all I will remember Kjell Morten for his sense of humor, our many good laughs and for being a truly warm hearted friend and colleague. He made a strong footprint in my life and I will always remember him.

Mats Andersson



In connection to the Chitosan Conference in Fortaleza we took a day for driving buggies on the beach



Going fishing outside Hitra, a big island in the inlet to the Trondheim fjord



Before going fishing at Hitra, together with his friend Prof Kurt.I. Draget (NTNU)



Kjell Morten fishing in the area of Rakvåg were he had one of his two summer houses (close to Trondheim)

Kjell M. Vårum

Publications

Web of Science, evaluation of 105 publications (June 27, 2017): H-Factor: 47; citations: 7123; without self-citations: 6570

Research Gate, evaluation of 111 research items (June 27, 2017): Index 39.24, 4774 reads, 7655 citations.

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