

EUROPEAN **CHITIN** SOCIETY

# NEWSLETTER

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## EDITORIAL

By now many members of the Society will have all their arrangements made for their attendance at this year's premier event in the world of chitin and chitosan: the combined 10<sup>th</sup> International Conference on Chitin & Chitosan /7<sup>th</sup> International Conference of the European Chitin Society [EUCHIS '06]. It promises to be an excellent conference and will give delegates the chance to both renew old contacts and make new ones from around the world – and possibly even buy a conference T-shirt. So I would encourage any members who have not yet planned to attend the Montpellier conference to do so immediately. Further information on the Plenary and Keynote lectures is to be found elsewhere in the Newsletter.

While on the subject of conferences remember that after this year the Society will be reverting to holding them on the odd years; this means that we will avoid clashes with the Asia-Pacific and Latin-American chitin conferences. This means that the 8<sup>th</sup> International Conference of the European Chitin Society will be next year and not in 2008. Considerable thanks are due to the Turkish organising committee who were awarded it for 2008 but agreed to hold it a year earlier. One outcome of this change is that we will be due to hold a conference in 2011, which is the bicentenary of the discovery of chitin by Braconnot. Since neither the ICCC, the Asia-Pacific group or the Latin-American group are currently scheduled to hold a conference that year, EUCHIS '11 should be a major attraction for chitin scientists world-wide. The question is, where should the Society hold it? The obvious answer is Nancy in France, where Braconnot was at the time of his paper, and for many years afterwards, the Director of the Botanical Gardens. France hosted the 1<sup>st</sup> and 2<sup>nd</sup> EUCHIS conferences in 1995 and 1997, the latter was combined with the 7<sup>th</sup> ICCC, and of course is hosting the combined conferences this year. Despite this, I would suggest that the historic significance of the year 2011 would be best recognised by holding the conference in Nancy, provided that there is a group willing yet again to carry out all the work involved in running a conference.

Readers will no doubt have noticed that this issue is a rather slim one. Basically we can only publish what we have, and if that is very little then the issue is a very slim one. One possible approach would be to produce the *Newsletter* only as and when there was enough material for say 15-20 pages, but the current policy is to try to publish it at regular(ish) intervals. So once again I would like to encourage members of the Society to contribute to the *Newsletter*. Contributions could take the form of an article on a topic that falls within the remit of the Society, suggestions on directions that the Society should take, reports on conferences already held and advance notices on forthcoming conferences that might be of interest to members, or anything at all to do with chitin and chitosan.

George Roberts  
Honorary Secretary

**The 7<sup>th</sup> Asia-Pacific Chitin and Chitosan Symposium**  
**April 23. to 26., 2006, Bexco, Busan, Korea**

The activity in relation to research, production and applications related to chitin and chitosan is very high in Asia, and the recently arranged Asia-Pacific Chitin and Chitosan Symposium (APCCS) in Korea attracted more than 200 participants, mostly from Asia. It is therefore good reasons for bringing together (mostly) Asian scientists working on chitin and chitosan to exchange their latest scientific results. The 7<sup>th</sup> APCCS symposium was recently arranged in Busan, Korea, the nations second largest city and largest port with about four million inhabitants. Busan is situated in the south-eastern part of Korea with easy and convenient access to Japan.

The first lecture of the symposium was a plenary lecture given by professor Jin Won Cho (Korea) entitled 'Functional roles of dynamic O-GlcNAc modification on nucleoplasmic proteins', who presented their latest results on stability, nuclear localization and cellular location of specific proteins in cells. Two other plenary lectures were given by professors Ravi Kumar (India): 'Chitosan, a potential excipient for nanoparticles intended for mucosal delivery of drugs and genes' and Seichi Tokura (Japan): 'Acceleration of reactivity of chitin by solvation on the chemical modification'.



As many as thirteen invited speakers were allowed 30 minutes to present their recent results in parallel technical sessions. The technical sessions were divided as follows:

- Resources and Production of Chitin and Chitosan
- Physical and Chemical Aspects of Chitin and Chitosan
- Chemical Modifications of Chitin and Chitosan
- Chitin and Chitosan Related Enzymes and their Applications
- Applications of Chitin and Chitosan
- Chitin/Chitosan Oligomers and N-acetyl-D-Glucosamine/Glucosamine

In relation to pharmaceutical applications of chitosan as a nonviral vector in gene delivery, professor Song Su Cho from Korea presented their latest results in this field. This is an active and promising research field where different scientists from Korea are very active. The greatest challenge with non-viral delivery vehicles (such as chitosan) is their relatively low efficiency as compared viral vectors, and much more efficient non-viral vectors need to be developed before they can be applied in human gene therapy.

The social program consisted of a boat tour in Busan and a 'Korean night'. The last event was, at least to me, an unforgettable event with excellent entertainment in a very friendly atmosphere!

The collected papers were already published at the start of the symposium as 'Advances in Chitin Science and Technology (Volume VII)'. Although it is convenient to receive the written summary of the presentations at the start of the symposium, this benefit must be considered in relation to the fact that this means that the written summary is concluded 2-3 months before the start of the symposium and will therefore not necessarily be updated in relation to the most recent findings.

The total impression of the arrangement is very positive, and the Korean Society for Chitin and Chitosan should receive well-deserved congratulations for the symposium.

Kjell M. Vårum

## TRUTH OR MYTH?

There are a number of statements made so frequently about chitin and chitosan that they are accepted as facts without normally being questioned. Although some of these statements are at best debateable and at worst may be incorrect, they continue to be repeated in books, papers and articles dealing with chitin and chitosan. I would like to highlight three such statements for members to consider.

### 1. Chitin was first isolated by Braconnot.

It is normally accepted as a fact that chitin was first isolated from mushrooms by the French chemist Henri Braconnot in 1811. Indeed the Society's Student Prize is called the Braconnot Prize in honour of him. However our former Honorary President, the late Professor Charles Jeuniaux, suggested in a paper presented at the 1<sup>st</sup> International Conference of the European Chitin Society held in Brest in 1995 that chitin had previously been isolated from arthropod cuticle by an English scientist A Hachett in 1795. However, as pointed out by Professor Jeuniaux, Hachett only reported the presence in the cuticle of an organic material particularly resistant to the usual chemical reagents but did not investigate it further. Braconnot on the other hand carried out chemical analysis on his isolate, reported the formation of acetic acid from it on treatment with hot acid, and concluded it was a new material.

Without wishing to enter the realm of philosophy, it becomes a matter of what is meant by "discovery". Hachett certainly isolated chitin but there is no indication that he was aware of what he had done. In that respect he is in the same position as that attributed to Christopher Columbus by some historians – he didn't know where he was going, he didn't know where he was when he got there, and when he got back didn't know where he had been! It is Amerigo Vespucci, who reached South America several years after Columbus and who realised that it was indeed a 'New World' and not part of Asia, who gave his name to the American continents. So Braconnot may rightly be considered the discoverer of chitin even though his name for the new material, 'fungine', was soon replaced by its current name which was first proposed by Odier.

### 2. Chitin is the second most abundant material produced annually by biosynthesis.

Chitin is certainly a very abundant material even if much of it is not readily accessible for industrial use. But is it in fact second to cellulose in terms of the amount synthesised each year? Professor M Peter has challenged that assumption suggesting that hemicelluloses, which occur in conjunction with cellulose in trees and other plants, are actually more abundant than chitin. The hemicellulose component averages about half that of the cellulose component, whereas the normal estimate of chitin production is that it is one whole order of magnitude less than that of cellulose. Another possible contender is lignin, which again occurs in conjunction with cellulose in most plants and, like hemicelluloses, averages about half that of the cellulose component. A fourth possible contender is starch which like cellulose it is a major component of vegetable matter where it acts as a reserve material rather than a structural component. There are some estimates for

the annual production of starch in the literature but any that I have found seem to be very low, for example a figure of  $4 \times 10^7$  metric tonnes is typical. The world population in the year 2000 was slightly in excess of 6 billion and a daily intake of 100 g of starch would give an annual total of  $2.2 \times 10^8$  metric tonnes. Much of that starch will be in the form of rice and the production of corn adds another  $5 \times 10^8$  metric tonnes to the total. These figures represent just a proportion of the starch produced “on demand” and the quantity Nature produces unasked for must be considerably in excess of this amount.

Although many of the figures given for the amounts of specific organic materials produced by biosynthesis are “best guesses” the claim for chitin to be the second most abundant material after cellulose appears to be less than totally convincing. Perhaps it would be better to say that “chitin is one of the most abundant after cellulose”. After all, it is so interesting a material it does not need any false claims made about it.

### 3. Chitin is an environmentally friendly polymer.

This is another claim frequently made about chitin, but is it necessarily true? Currently most commercial production of chitin is based on extracting it from the exoskeleton of shrimp, prawn, crab and other crustaceans. This source contains a high percentage of inorganic material, primarily  $\text{CaCO}_3$  and a rough calculation indicates that for every tonne of chitin produced, 0.8 tonne of  $\text{CO}_2$  is released into the environment. In view of current concerns about global warming this cannot be considered to be a truly environmentally friendly process.

Another source of chitin that is more environmentally friendly, although much more limited in volume, is squid pen. This waste contains very little in the way of inorganic material and very little, if any  $\text{CO}_2$  would be released in the extraction and purification process. Another and perhaps more sustainable source in the long run is vegetable chitin from fungal sources such as waste mycelia. The production of vegetable chitin and chitosan has been studied for many years and there is an extensive literature on the topic, but it is only recently that it has become commercially available. There are two points of particular interest to members of the European Chitin Society. The first is that the company producing vegetable chitin and chitosan, KitoZyme SA, is a European company based in Belgium. The second is that it obtains the chitin by extraction from mushrooms. This brings us back to Henri Braconnot and closes the circle very neatly.

George Roberts

**Recent news: 10<sup>th</sup> International Conference on Chitin and Chitosan  
&  
7<sup>th</sup> International Conference of the European Chitin Society  
(Montpellier, France September 6-9, 2006)**

**1. Plenary lecturers / plenary lectures:**

Dr. Marie Thérèse Corvol is Directeur de Recherches at the INSERM (Institut National de la Santé et de la Recherche Medicale). Dr. Corvol is a renowned specialist of cell biology and is considered as one of the most important specialists of chondrocytes, in relation with cartilage and invertebrate disks repair.

Title of the presentation: "Tissue engineering and cartilage repair: Limits and perspectives"

Dr. Olav Smidsrød is the former Director of the Norwegian Biopolymer Laboratory in Trondheim, Norway. He is a renowned international expert of structure/function relationships of alginates and chitosans, and was very recently awarded the prestigious "Food Hydrocolloids Trust Medal".

Title of presentation: "Highlights from 30years of pure and applied research on chitosans"

**2. Keynote lectures:**

The following (selected) keynote lectures will be presented:

Martin G. Peter: **Protein-Ligand Interactions of Chitoooligosaccharides**

Seiichi Tokura: **Molecular Aspects of Hydrated Chitin**

Keisuke Kurita: **Linear Polysaccharides as Precursors for Glucan-Chitin Materials**

Willem F. Stevens: **Chitin and chitosan product modification control**

Sabina P. Strand: **Chitosans as Gene Delivery Vehicles**

Shiro Kobayashi: **In Vitro Synthesis of Chitin via Enzymatic Polymerization**

Laurent David: **The concept of Chemical and Physical Decoy of Biological Media**

Isao Nagaoka: **Anti-inflammatory and Anti-platelet actions of Glucosamine**

Reza Ghodssi: **Chitosan: an Interface between Biology and Microsystems**

Hsing-Wen Sung: **Nanoparticles with Chitosan for Oral Delivery of Protein Drugs**

Saburo Minami: **Biomedical effects of chitin and its derivatives**

**3. Poster Prizes:**

The European Chitin Society (EUCHIS) has decided to award three poster prizes at the Montpellier meeting:

First price: **Euro 500**

Second price: **Euro 300**

Third price: **Euro 200**

The awards will be decided by an award committee. Further details

regarding the prizes will be given at the EUCHIS web-site (<http://www.euchis.org/>)

Kjell M. Vårum

**EUCHIS Financial Report 2004**  
(per December 31, 2004) Account at Deutsche Bank, Bonn

<b>POSITIVA</b>			
<b>Balance per 31.12.2003</b>	<b>EUR</b>		
	<b>10.031,99</b>		
<b>members fees</b>			
- collective members		<b>EUR 540,00</b>	
- active members		<b>EUR 2.039,50</b>	
- associate members		<b>EUR 220,00</b>	
- student members		<b>EUR 176,00</b>	
	<b>EUR</b>	<b>EUR 2.975,50</b>	
	<b>10.031,99</b>		
<b>total</b>			<b>EUR 13.007,49</b>
<b>NEGATIVA</b>			
<b>Bank charges</b>		<b>EUR -151,54</b>	
<b>EUCHIS 06 money advance</b>		<b>EUR -4.500,00</b>	
		<b>EUR</b>	
<b>Office expenses</b>		<b>EUR -260,00</b>	
<b>Internet charges</b>		<b>EUR -85,10</b>	
<b>total</b>		<b>EUR -4.996,64</b>	<b>EUR -4.996,64</b>
<b>Balance per December 31 2004</b>			<b>EUR 8.010,85</b>

Dr. Martin Graeve

**EUCHIS Financial Report 2005**  
(per December 31, 2005) Account at Deutsche Bank, Bonn

<b>POSITIVA</b>			
<b>Balance per 31.12.2004</b>	<b>EUR</b>		
	<b>8.010,85</b>		
<b>members fees</b>			
- collective members		<b>EUR 900,00</b>	
- active members		<b>EUR 1.721,00</b>	
- associate members		<b>EUR 120,00</b>	
- student members		<b>EUR 192,00</b>	
	<b>EUR</b>	<b>EUR 2.933,00</b>	
	<b>8.010,85</b>		
<b>total</b>			<b>EUR 10.943,85</b>
<b>NEGATIVA</b>			
<b>Bank charges</b>		<b>EUR -247,91</b>	
<b>Web page production</b>		<b>EUR -500,00</b>	
<b>Office expenses</b>		<b>EUR -260,00</b>	
<b>Internet charges</b>		<b>EUR -215,76</b>	
<b>total</b>		<b>EUR -1.223,67</b>	<b>EUR -1.223,67</b>
<b>Balance per December 31 2005</b>			<b>EUR 9.720,18</b>

Dr. Martin Graeve