What is the connection between the Halogens and salami?

It sounds like the sort of question that Stephen Fry would ask on an episode of QI but would you or your students know the answer? Or more importantly do they know *how to* work out the answer? That is to say, you may know the answer to this because you have seen it before or you may be able to answer it because you are equipped with the linguistic skills to be able to decipher the meaning of these words and thereby determine the connection between them.

My students have remarked to me in the past that "*it's like you are talking a different language*" as I introduce them to a plethora of words unique to chemistry. These include specialist terms such as stoichiometry or everyday words that are used in a specific chemistry context *e.g.* reduction. As a result, the language of chemistry can be a significant barrier to student understanding and it is important to equip students with the skills to tackle this challenge. Pyburn *et. al.* (2013), for example, state that;

"*efforts to prepare students for success in general chemistry should include both content and the development of language comprehension skill*".

To this end, a research project is underway at Durham University (The FOCUS project) to develop teaching strategies to improve student understanding of the language of chemistry. In particular, the project has been applying the principles of corpus linguistics to explore the connections between different words in chemistry (see Rees *et. al.* 2014) so that students can develop strategies to interpret new and unfamiliar vocabulary in a chemistry context. The project has developed a collection of Durham student writing from foundation to postgraduate level that can then be searched for a specific term in a similar way to a web search engine (See www.community.dur.ac.uk/foundation.focus). This resource may be used with students in a number of ways such as; to improve understanding of scientific affixes, explore common collocations, expand scientific vocabulary and improve academic writing. A search for the prefix "hydro", for example, will reveal all words within the corpus containing this prefix (an example result is shown in fig. 1.).

Before		After
l are polar molecules. The slightly positive	(hydrogen)	and negative parts (Oxygen) of the water mol
on or fluorocarbon chain, and the lyophilic	(hydrophilic)	group would be ionic or highly polar. Surfa
arbon has a high surface activity. Bonds with	hydrogen,	hydroxyl and carboxyl groups can be formed a
ch is only observable after a long period of	hydrolysis.	If the iodine crystals and water had been le
range 5.4-9.8 and different sensitivities to	hydrolysis34.	Introduction of CF3 groups as a replacement
roducing either syngas (carbon monoxide and	hydrogen)	or bio-oil as an intermediate; this is done
electronic packaging needs good resistance to	hydrolysis.	Therefore aromatic esters 6 and 7 (Fig. 1.1)
ronic catalyst was regenerated by boron ester	hydrolysis	(Scheme 1.3). Further mechanistic studies
(headgroup) and Chapter 1: Introduction 3	hydrophobic	(tailgroup) regions determining the propertie
ated fatty acid which like sucrose contains a	hydrophilic	(water-loving), polar, hydroxyl group (-OH .
s shown in 1951 by Barker and Cromwell that a	-hydroxy-	-piperidyl-1-phenyl-propiophenone decomposes
he parent compound is metabolised to methyl 4	-hydroxy-	2-(((((4-methoxy-6-methyl-1,3,5-triazin-2yl)
hydrotreating followed by hydrocracking and	hydroisomerization.	21 Like biochemical processing an initial ste
operties of AMPs. High amphipathicity,21 high	hydrophobicity,	22 and high proportions of either a-helix or
the enantioselectivity of esterases in ester	hydrolyses.	28 This assay was able to simulate the compet
rds-eye view. To each concentration, 5 cm3 of	hydrochloric	acid (HCl) was added and the stopwatch was st
cross marked on it. upon the addition of the	hydrochloric	acid a stop clock was started and the time it
hiosulphate need to collide with particles of	hydrochloric	acid and vice versa. Collision does not autom

Fig. 1. Search result for words beginning with "hydro"

The student can then develop understanding of the term “hydro” and its usage in different words in different contexts and thereby improve their scientific language comprehension skills.

Developing this greater linguistic dexterity may enable a student with an understanding of the Greek origins of the prefix “Halo” and its connection with the latin orgin of the prefix “sal” to make an educated response to the initial question (both refer to salt *e.g*. halogen – “*salt maker*”). We believe that equipping chemistry students with these linguistics skills can help demystify the subject, improve accessibility and thereby raise achievement.

If you are interested in finding out more about this project and being involved please contact Dr Simon Rees (simon.rees@durham.ac.uk).

References

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