

## Teaching ideas for Option F, *Food chemistry*

### Questions

Two worksheets of questions are provided:

- the first worksheet deals with the Standard Level part of the syllabus
- the second worksheet is for Higher Level only.

There are also a large number of questions available in the Coursebook and on the accompanying CD-ROM.

### Teaching activities

This option links quite strongly with Option B: *Human biochemistry*.

Wherever possible in this option the material should be related to food that students are familiar with. There is even the opportunity to do some cooking!

- Students should be encouraged to read food labels and look for ingredients such as partially hydrogenated vegetable oil, preservatives, colours and antioxidants. The importance of food labelling could be discussed.
- Students could research the legislation associated with partially hydrogenated fats and discuss why different countries have different laws.
- Students could discuss the use of 'best before' and 'use by' labels on foods and the advantages and disadvantages of these. How are these dates decided on? They could be encouraged to research how much food is thrown away from local supermarkets because it is 'out of date'.
- Students could be encouraged to do a survey of the different ways of extending shelf-life in a visit to a local supermarket.
- Students could investigate some of the scientific mis-conceptions involved in the arguments against GM crops. Students could investigate local regulations on GM foods and product labelling.
- Students should use molecular models to gain practice with the various ways of labelling chiral centres.
- A discussion of colour and structure could be linked to Option A: *Modern analytical chemistry*.

### Practical activities

#### Safety

Extreme care must be exercised when carrying out any practical activities in the classroom and a risk assessment should be conducted before carrying out the experiments.

#### Demonstrations

- Details of demonstrations that could be carried out and videos of these are given at: [http://www.uni-regensburg.de/Fakultaeten/nat\\_Fak\\_IV/Organische\\_Chemie/Didaktik/Keusch/D-Video-e.htm](http://www.uni-regensburg.de/Fakultaeten/nat_Fak_IV/Organische_Chemie/Didaktik/Keusch/D-Video-e.htm)
- The unsaturation of fats/oils can be demonstrated using bromine water (**Care!**). Further information can be found in Teaching Ideas for Chapter 10, *Organic chemistry*.
- The different types of browning reactions could be shown in a cookery demonstration.

#### Student practicals

- The following guide provides more information on the topic and gives a series of experiments/investigations that could be carried out by students:  
[http://www.chemistry-react.org/go/Topic/SpecialStudies/Topic\\_92.html](http://www.chemistry-react.org/go/Topic/SpecialStudies/Topic_92.html)

- Students could determine the iodine number of a particular fat – see Option B, *Human biochemistry*.
- Students could extract colouring matter from substances and investigate their properties:
  - anthocyanin extraction  
<http://www.crscientific.com/newsletter10-anthocyanins.html>  
<http://www.chemistryland.com/CHM107Lab/Lab1/Lab1PreparingCabbageExtract.htm>  
<http://scifun.chem.wisc.edu/homeexpts/acidbase.html>  
[http://www.chem.umn.edu/services/lecturedemo/info/Cabbage\\_Indicator.html](http://www.chem.umn.edu/services/lecturedemo/info/Cabbage_Indicator.html)
  - chlorophyll/carotenoid extraction  
<http://facstaff.bloomu.edu/mpugh/Experiment2.pdf>  
<http://vohweb.chem.ucla.edu/voh/classes%5CWinter09%5C14CLID9%5CSpinachPigmentsAssignment.pdf>  
<http://courses.chem.psu.edu/chem36/Chem36H/36H%20Web%20S'05/Chlorophyll%20TLC.pdf>
- Students could investigate the properties of colloids, e.g.  
<http://www.gpb.org/files/pdfs/gpbclassroom/chemistry/solutionsSuspensionsColloidsLab.pdf>

## ICT

Some useful websites are listed below.

- The PubChem database is useful for looking up the structures of complex molecules such as anthocyanins and carotenoids.
- Experiments, teaching notes and videos:  
[http://www.rsc.org/Education/Teachers/Resources/kitchenchemistry/00\\_food.htm](http://www.rsc.org/Education/Teachers/Resources/kitchenchemistry/00_food.htm)
- GM foods:  
<http://www.bbc.co.uk/news/uk-politics-11631254>  
[http://fora.tv/2008/11/01/Can\\_Genetically\\_Modified\\_Crops\\_Feed\\_the\\_World](http://fora.tv/2008/11/01/Can_Genetically_Modified_Crops_Feed_the_World)  
<http://www.viddler.com/explore/worldwrite/videos/54/>  
[http://www1.teachertube.com/viewVideo.php?video\\_id=154338](http://www1.teachertube.com/viewVideo.php?video_id=154338)  
<http://video.google.com/videoplay?docid=-7727700015953778314#>  
<http://jp.reuters.com/news/video?videoChannel=2604&videoId=79112>
- Databases:  
<http://pubchem.ncbi.nlm.nih.gov/>  
<http://www.nyu.edu/pages/mathmol/library/>
- The science of cooking:  
<http://www.scienceofcooking.com/>
- R/S assignment:  
<http://ochem.jsd.claremont.edu/tutorials.htm#>  
[http://chemwiki.ucdavis.edu/Organic\\_Chemistry/Chirality/Absolute\\_Configuration,\\_R-S\\_Sequence\\_Rules](http://chemwiki.ucdavis.edu/Organic_Chemistry/Chirality/Absolute_Configuration,_R-S_Sequence_Rules)  
<http://chemistry2.csudh.edu/organic/startnewrands.html>
- Carotenoids:  
<http://www.food-info.net/uk/caro/stru.htm>

## Theory of knowledge (TOK)

As mentioned above, the GM food debate could be discussed. How scientific is the debate?