Scientific Report for the European Science Foundation – COST programme (by Magdalena Maciejewska):

1. Purpose of the visit:

To carry the pulse radiolysis experiments in order to investigate the behaviour of aliphatic aminoacid peroxyradicals (represented by valine amino acids) in water and in Igepal CO-520/cyclohexane reverse micelles solutions by means of the indicator – diammonium 2,2'-azino-bis(3-ethylbenothiazoline-6-sulfonate), ABTS.

To learn how to analyse the results of the experiments and how to establish what processes take place in the systems and what is their kinetics by means of programme Acuchem.

The general aim was to investigate the early stages of damage on aminoacids caused by radicals, such damage of aminoacids and formation of amino acid peroxides seems to be the beginning of the negative influence of free radicals on living organisms.

2. Description of the work carried out during the visit:

- Pulse radiolysis experiments of the following systems:
  1. Aqueous solution containing ABTS: 0.15 or 0.3, or 0.6 mM and 50mM NaSCN, N_2O saturated.
  2. Igepal reverse micelles containing in water pools: 0.3 or 0.6 mM and 50mM NaSCN, N_2O saturated.
  3. Aqueous solution containing ABTS: 0.3 or 0.6 mM and 50mM Valine, N_2O or N_2O:O_2 (4:1) saturated.
  4. Igepal reverse micelles containing in water pools: 0.3 or 0.6 mM and 50mM Valine, N_2O or N_2O/O_2 (4:1) saturated.

3. Description of the main results obtained:

I took the absorption spectra in the range 370 – 800 nm of the ABTS radical cation in the above mentioned systems.
The kinetic analysis of the obtained results at wavelengths 415, 650 and 735 (ABTS cation radical characteristic wavelenghts) was focused on the simulations of the processes in water containing ABTS and Valine or NaSCN.
I tried to find out if the proposed mechanism of the reactions occuring in the systems is correct. The results obtained allow to conclude that further collaboration with the Leipzig group is needed to find out the full mechanism of processes proceeding in the investigated systems. I have learned much on the practical use of the kinetic simulation programme Acuchem.

4. Future collaboration with host institution:

It would be valuable to perform more experiments and to take advantage of the knowledge and experience of the colleagues working in the host institution as far as the way how to work with Acuchem programme is concerned. The host (Prof. O. Brede) confirms his willingness to continue the collaboration.

5. Projected publications/articles resulting or to result from the STSM.

My aim is to write the articles concerning ABTS radical cation in reactions initiated by OH radicals in homogeneous and heterogeneous systems and to describe whether and how one can use this radical cation as an indicator of the reactions of OH radicals with valine and glycine amino acids.

6. Confirmation by the host institute of the successful execution of the mission:

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