

4. Conclusions

We have performed measurements in model systems where effects from restricted diffusion could be separated from effects caused by multiple diffusion coefficients.

An analysis based on multi-exponential models (bi-exponential diffusion model or 2D-Inverse Laplace Transformation) is not able to correctly accounting for effects caused by restricted diffusion in systems with multiple compartments. In contrast, analysis based on separating diffusion components due to differences in dynamics behavior prior to the diffusion analysis (T_2 -filter or D -filter), combined with the second cumulant approximation [1], is more robust and more accurate in such systems.

References

- [1] P.P. Mitra and P. N. Sen, Phys. Rev. E, 45 (1992) 143-156.
- [2] L. Wang, A. Caprihan, E. Fukushima. J Magn Reson Ser A 117 (1995) 209–219.
- [3] D. Woessner, J. Phys. Chem. 67 (1963) 1365–1367.
- [4] D.S. Grebenkov, Concepts Magn. Reson. 36A (2010) 24–35.
- [5] K.G. Helmer, B.J. Dardzinski, C.H. Sotak, NMR Biomed. (1995) 297–306.
- [6] J. G. Seland et al., Appl. Magn. Reson. 24 (2003) 41-53.
- [7] G. H. Sørland et al., Appl. Magn. Reson. 26 (2004) 417-425.
- [8] T. Pavlin et al., Proceedings of ISMRM, 16th Scientific Meeting, Toronto (2008) 287.
- [9] Provided by courtesy of Professor Paul Callaghan.