**Introduction:** Superparamagnetic iron oxide nanoparticles (d<100nm) are a topic of prime interest in the biomedical field because of their numerous applications as biosensors, drug carrier, cell labelling... However, for any of these applications to succeed, the colloidal suspensions need to be stable and preferably monodisperse. Indeed the physicochemical properties of these particles are closely related to their size distribution. Therefore, our method focuses on the stabilization of magnetic nanoparticles through electrostatic interactions with a solid support.

**Method:** A benchtop NMR is used to monitor the changes in water proton relaxation rates induced by the electrostatic interactions of the magnetic nanoparticles with different resins. The solid support is placed in contact with the ferrofluid solution by brief mixing. One particular interaction was noteworthy:

- Solid support = Weakly acidic cation exchange resin
- Divinylbenzene polymer
- Functional group COOH
- Superparamagnetic nanoparticles
- Solution concentration from 0.1mM to 1.5mM
- Functional group NH$_2$

**Results:** The essential parameter in this interaction seems to be the ratio between the cation exchange resin (n$_{COOH}$) and the nanoparticles (n$_{NH2}$). The behavior of the particles is different whether this ratio (n$_{COOH}$/n$_{NH2}$) is less than 1 or more than 1 (Table 1).

From these results, we can conclude that a ratio of 8 seems optimal to stabilize a ferrofluid.

**Advantages of the method:**
- Fast, simple, cost effective
- Monodispersity and improvement of relaxivity (Fig.1)
- Stability (Fig.2)

**References:**