

## A new approach in chromatography teaching.



Figure 1



Figure 2



Figure 3

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Eleven new chromatography practica are developed for the secondary school.

New is that the students not have to wait for the result of the separation, but can work at their own speed. With a syringe they can load the sample and solvents on the column. The separation can be

done in several minutes, so many experiments can be performed in a very short time.

Working with coloured samples gives a good visual explanation of the separation mechanism. The Kool-Aid instant food drinks are real samples. The columns are applied in industrial labs.

### The Mechanism.

The column with the red ring consists of silica particles, chemical coated with a paraffin layer (-C18) (see figure 1). That makes the column non-polar.

A non-polar column attracts non-polar samples. The samples are water soluble dyes with large non-polar hydrocarbon groups.

### The Samples.

The samples are food dyes like Yellow 5, Red 40 and Blue 1.

Yellow 5 is the most polar, and the dye Blue 1 is the most non-polar sample (eluting as last dye) (see figure 2).

The extracting solvent is bio-ethanol in combination with water.

### The Manual.

The samples are dissolved in 100ml water. Two ml. of this mixture is loaded on the column. With 5ml 10% ethanol/90% water Yellow 5 is extracted from the column. With 10ml 20% ethanol/80% water Red 40 is extracted from the column. With 5ml 40% ethanol/60% water, Blue 1 is extracted from the column. After flushing with 5ml water the experiment can be repeated (see figure 3).