

The difference between real and artificial grape juice with chromatography.

It is possible with Solid Phase Extraction (SPE) columns to discriminate between artificial and real grape juice, based on the colours.

Secondary school students can do this experiment in the classroom.

There is a great difference in colours between real and artificial samples.

★ Wim J.Staal

🏠 Hogeschool van Arnhem en Nijmegen (HAN University), Netherlands

🔬 Analytical Chemistry, Chromatography

staalmeesters@planet.nl

www.chromatografie.net

The Mechanism.

The column with the red ring consist of silica particles, chemical coated with a paraffin layer(-C18) (see figure 1).

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

The Samples.

The artificial grape juice (Kool-Aid) has two dyes, Red 40 and Blue 1 (see figure 2).

With bio-ethanol/water mixtures they can be separated.

Real grape juice has natural dyes, eluting in a broad range of ethanol water mixtures (see figure 3).

The Method.

Dissolve the Kool-Aid in 100ml water. Load the column with 2 ml. Extract Red 40 with 20% ethanol and Blue 1 with 40% ethanol.

Load the column with 5ml real grape juice. Extract the dyes with 2m of water, 10%,20% , 30%, 40% , 50%, 60%, 70%, 80% , 90% and 100% ethanol. After cleaning the column with 5ml bleach, the experiment can be repeated.



Figure 1



Figure 2



Figure 3