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## LAKES OF SYNTHETIC DYES

Synthetic food dyes are soluble in water and, in some cases, in alcohol. These dyes may be transformed into pigments obtaining the **colour lakes**. The difference is that a **dye** colours by dissolution in a proper solvent or in the same product where it is applied, whereas a **pigment** is a product that colours by dispersion and it is insoluble in the media where is applied.

### MANUFACTURING PROCESS

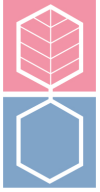
Synthetic food dyes are sodium salts, and they are transformed into colour lakes converting the sodium salt into aluminium salt, and absorbing it on an aluminium hydroxide substrate. This aluminium hydroxide, which is used as substrate, is a special aluminium hydroxide, and a great part of important properties of the lake depends on it, as particle size, colouring strength and shade. It is obtained by adding a solution of sodium carbonate in a solution of aluminium sulphate in strict conditions of dilution, temperature and pH. A solution of the dye is added to the aluminium hydroxide in suspension, and this dye is fixed to the substrate by adding a solution of aluminium chloride.

### CONCENTRATION AND TINCTORIAL STRENGTH

Lakes can be obtained with dye content up to 40%. The variation of dye content influences on the shade of the lake. A dye of 80% concentration can be substituted by another dye of 40% concentration, only doubling the quantity to use. This is not possible in the case of lakes because the colouring strength is not proportional to the concentration and moreover the concentration determines the shade of the lake.

Normally three types of lakes are developed:

- Lakes of high dye concentration: 35-40%
- Lakes of middle concentration: 20-25%
- Lakes of low concentration: around 10%



## **STABILITY**

Colour lakes are stable within a pH of 4-9. Out of these pH status, the substrate breaks.

In general, lakes have better heat and light resistance than the dyes from which they come from. Besides, lakes avoid colour migration as they are insoluble in the media where they are used.

## **ADVANTAGES OF LAKES AGAINST DYES**

Besides their higher stability, the lakes have other advantages over the dyes. The main advantage is their higher dispersion power due to their lower particle size. This favours the use of lakes to give an uniform colour to dry mixtures, avoiding the specks that a lot of times are produced when a soluble dye is used.

Lakes are also well dispersed in fatty media, whereas there are not synthetic food dyes soluble in fatty media.

Another advantage of lakes is that lakes can be obtained from mixtures of dyes. That favours the uniformity of shade as it is not a mixture of lakes of different dyes, but that the mixture is made in the dissolution of the dye previous to precipitation in lake form, and therefore specks from original dyes never appear.

## **LAKE DISPERSION**

Lakes have a very small particle size but electrostatic cohesive forces between particles give agglomeration. To disperse the lakes this agglomerates should be broken to get full colouring power and to avoid speckling.

To disperse this lakes a high speed stirrer should be used to wet any individual particle. Once dispersed the dispersing media prevents new agglomeration if some deposit occurs stir the dispersion before use. Dispersion media common are edible oils, sugar syrups, propylene glycol and glycerine or waxes.

## **LEGISLATION**

In force legislation allows the use of aluminium lakes from allowed synthetic dyes in food industry. Dosage and application are regulated in EU by Regulation (UE) 1333/2008 and correspondent modifications. Take special consideration to Regulation (UE) 380/2012 around application and dosage of aluminium containing additives.



## **APPLICATIONS**


















Lakes are mainly recommended for the following applications:

- Confectionery: coated tablets, compressed tablets, products that present layers of different colours, coloured sugars.
- Pastry: fatty fillings, coatings, dry mixtures of flour and other ingredients, decoration sugars.
- Dairy products: waxy coatings for cheese, fruit yoghurts, dairy products submitted to heating processes.
- Food in general: powder products of instantaneous preparation, extruded products for snacks, sauces, condiments, petfood...
- Pharmacy: coated tablets, compressed tablets, granulations, pharmaceutical suspensions, ointments and fatty creams.
- Cosmetic: compact powders, lipsticks, rouges, eye-shadows, tooth- pastes and creams.
- Packing material: plastics, inks and coatings of cans.

## **STANDARD LAKES**

PROQUIMAC FOOD&PHARMA has a range of standard lakes of which usually has a certain stock. However, if the required quantities of material are enough, we can manufacture lakes from a dye or from a mixture of dyes at any required concentration,

## CONALAKE : Aluminium lakes for food, cosmetic and pharmaceutical products

	TIPO	C.I./n°EEC	DYE RANGE
	CONALAKE QUINOLINE YELLOW	47005	12-14%
		E-104	18-22%
	CONALAKE TARTRAZINE	19140	15-18%
		E-102	23-27%
			35-40%
	CONALAKE SUNSET YELLOW	15985	10,5-12,5%
		E-110	21-25%
	CONALAKE PONCEAU 4R	16255	20-26%
		E-124	
	CONALAKE ALLURA RED (RED 40)	16035	22-26%
		E-129	
	CONALAKE ERYTHROSINE	45430	17-20%
		E-127	35-40%
	CONALAKE CARMOISINE	14720	19-23%
		E-122	
	CONALAKE AMARANTH	16185	18-21%
		E-123	
	CONALAKE INDIGO CARMINE	73015	9-11%
		E-132	13-16%
	CONALAKE PATENT BLUE V	42051	21-25%
		E-131	
	CONALAKE BRILLIANT BLUE FCF	42090	12.5-14.5%
		E-133	
	CONALAKE BLACK PN	28440	32-37%
		E-151	
	CONALAKE GREEN 778	19140+44090	9-11%
		E-102+E-142	
	CONALAKE GREEN 3076	19140+42090	12-16%
		E-102+E-133	
	CONALAKE GREEN K	47005+73015	6-10%
		E-104+E-132	
	CONALAKE BROWN 2002	15985+16255+73015	20-24%
		E-110+E-124+E-132	
	CONALAKE MARRON 2424	15985+14720+28440	35-40%
		E-110+E-122+E-151	