

Water is not only an important ingredient of textile auxiliaries, but also a major component of the formulation. Textile chemicals sold the world over as ready-to-use formulations have a solid content varying from 10% to 30%, and in exceptional cases only 2%!

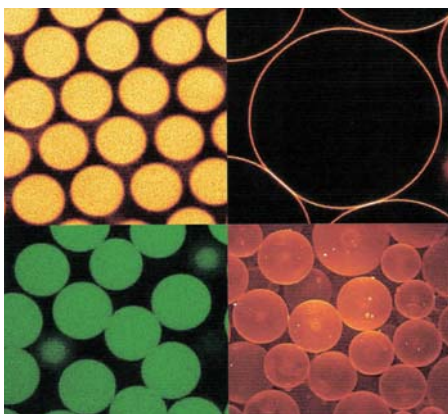
Until now there were no complaints about buying large quantities of water at fancy prices. But with globalisation and the opening-up of trade barriers, customers and formulators might source their requirements from any corner of the world. The longer the geographical distance between the textile-auxiliary manufacturer and the end-user, the greater the transportation cost. Also, with an increase in the cost of packaging material, the chemical cost has become disproportionate to the transportation and packing-material cost.

This has led to protests from the formulators, or the 'Aqua Technologists', as mixing of Rhine water with Holy Ganges water, or Holy Ganges water with Rhine water, can no longer be seen as profitable. The disposal/recycling of large quantities of HDPE drums was another problem. This problem was addressed to a certain extent by offering simple products, such as cationic softeners, nonionic softeners and disperse levelling agents, in concentrated form.

We, at Sarex, worked hard to eliminate diluted products wherever possible, to offer cost-effective, easy-to-dilute concentrates to formulators. Also, for customers whose chemical consumption is huge due to large production volumes, these products offer value for money.

This task has not been simple, as it

Figure 1. Uniformity of particle size in well made emulsion.



Concentrating on Concentrates

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amounts to striking a delicate balance between having large quantities of actives in the dispersed phase, or emulsified in very small quantities of the continuous phase, which is normally water (Fig.1).

Various factors need to be clearly addressed and answered in order to achieve trouble-free working with the diluted products:

- Stability of high active concentrate (Fig.2)
- Physical form and appearance of the product
- Viscosity of the concentrate
- Ease of diluting such products with mild stirring in soft water

Once such a concentrate is synthesised, it is to be packed easily and transported in standard, easily handlable packages

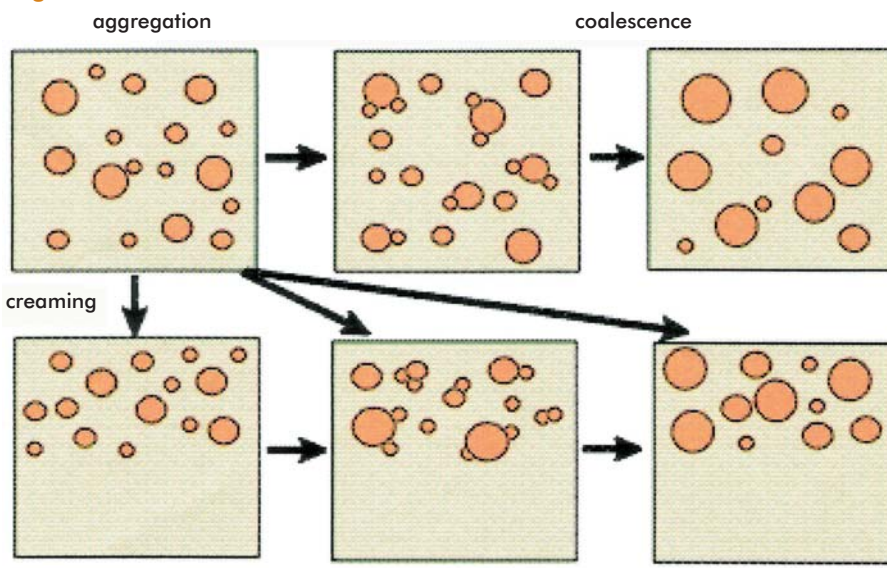
Pretreatment

Detergents, wetting, scouring agents – Conventionally available in 15% to 40%. We have been able to formulate a highly

concentrated, APEO-free, low-foaming product, namely Saralan-JET LF, which is a pumpable mobile liquid having 80% actives. The incorporation of a defoamer and deaerator in such a formulation, with a high active surfactant system, is a tricky part of retaining the clarity of the surfactant, the stability of the blend and the avoidance of any detrimental influence on the performance. Saradet-NEW is another low-foaming, high-performance detergent, deaerator and scouring agent for all substrates, with excellent alkali stability and available in concentrated form.

Stabiliser – One of the vital ingredients of cotton pretreatment, which is popularly misconceived as the bleaching species – the true role being just to act as a process modulator, to allow the peroxide to liberate the nascent oxygen and perhydroxyl ion at a pace that gives effective bleaching and without damage to the cotton. Compared to the conventional

Figure 2. Destabilisation of emulsions



20-30% product, Sarex has been able to make a 50% Sarastabil-M (Conc). The effort, research and the quest to develop a powder form of silicate-free product is still going on in the lab.

Non-silicone defoamer – The initial role of the defoamer is to eliminate space-robbing foam in high-turbulence equipment, which otherwise could cause fabric entanglement. Saradefoam is a 100% active silicone-free defoamer, based on polyolefins along with metallic esters.

Desizing enzyme – An α amylase normally available at low concentrations. Sara D Size (Conc), being a concentrated enzyme, offers the advantages of less storage space and the reduced chance of activity reduction of the enzyme during storage.

Optical whiteners – Cotton optical brightening agents, normally available as liquids, have been modified to be marketable in a free-flowing powder, Sarawhite (conc), a high-affinity optical brightening agent for cellulosic blends. Similarly, the polyester whitening agent Whitex, having a strength of 330%, is empowering the customer with good advantages on saving space and inventory.

Peroxide killer – A catalase enzyme generally sold in the diluted form. We at Sarex have Saroxy (Conc), a catalase enzyme in concentrated form for removing traces of hydrogen peroxide before dyeing.

Dyeing

Lubricants – Based on acrylates or other organic substances such as phosphate esters, typically employed to avoid creasing or occurrence of crease marks, rope marks during fabric processing. They are normally available as liquid dispersions ranging from 2% to 25%. We have been able to synthesise the lubricant in the form of a 100% active polymer powder, Saracream (Conc).

Dispersing agents – The role of dispersing agent in textile processing is to achieve and maintain stable dyestuffs dispersion during the exhaust dyeing of polyester and blends. Many users unwittingly are still using liquid dilutions of dispersing agents to assist during dyeing. Saragen-SO, available in the form of a powder, can be easily used for such applications.

Mild oxidizing agent – To prevent premature reduction and bronzing of shades during dyeing of sulphur and reactive vat dyeing and printing, it is

surprising to note that some auxiliary manufacturers sell solution of such products. Super R Salt, available in the form of a granular pill, can be effectively used for such applications.

Dyebath conditioner for reactive dyes and washing-off agent for reactivs - These are polymeric products with preferential sequestering action on calcium and having very good dispersing action. Also used for washing off for reactive dyes. Such products are available in ready-to-use form in 20-40% solids. We at Sarex have recently launched a powder version, Sarakol-PDR, available as a 100% product, which is readily miscible in water at room temperature.

Dye Transfer Inhibitor in washing off of acid and reactive dyes - This product is also available in 100% strength in powder form, which is readily miscible in water. Due to its affinity for anionic dyes and excellent dispersing action, it is suitable for washing off acid, metal-complex and reactive dyeings and prints. Particularly in washing of tweeds with reactive prints, it prevents cross-staining of white or light dyed ground. Sarakol-DTI is also recommended for stripping of vat, sulphur and reactive dyes without any colour patches.

Anti-back-staining agent – Normally available in 20-30% solutions, whereas Sarakol-BSA (Conc) is a 100% concentrate in powder form, designed to prevent

Figure 3. Aminoethylaminopropyl functional silicone.

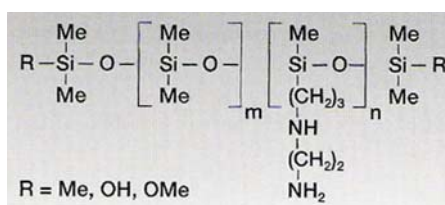


Figure 5. Amine value or Nitrogen Content

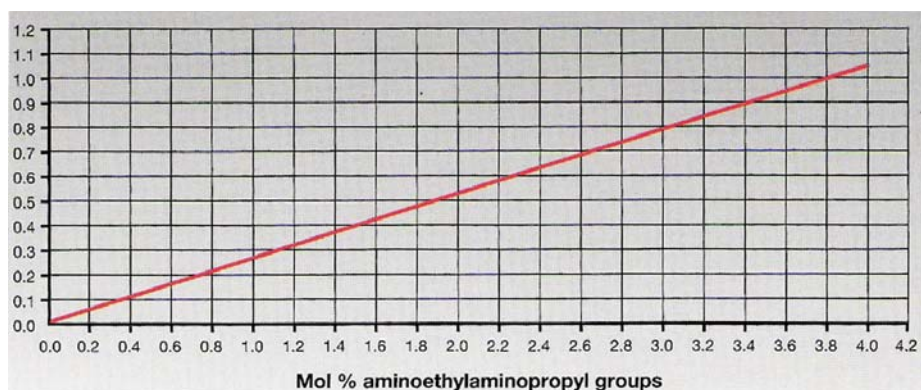
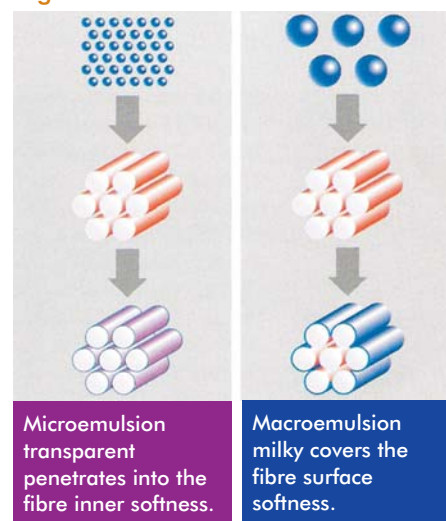


Figure.4 Micro & Macro emulsions.



staining of pocketing and undyed weft yarns in indigo-dyed denim garments. The product is easily soluble in water.

Finishing

Amino silicones – Versatile softeners such as amino silicones, of the likes of amino ethyl amino propyl polysiloxanes (Fig.3), are conventionally available in the form of 15% to 30% emulsions. The performance of an amino silicone depends on the following factors:

- Particle size resulting in the emulsions being micro, macro or nano (Fig. 4)
- Viscosity of fluid
- Amine value or nitrogen content responsible for softness & yellowing tendency (Fig.5)
- Refractive index of the oil
- Emulsification technique (Fig.6)

The challenge of a formulator is to marry the above factors suitably to achieve an optimum performance at an economical cost.

We at Sarex took up the gauntlet and developed a series of micro-emulsions,

Figure 6. Emulsion mycelle

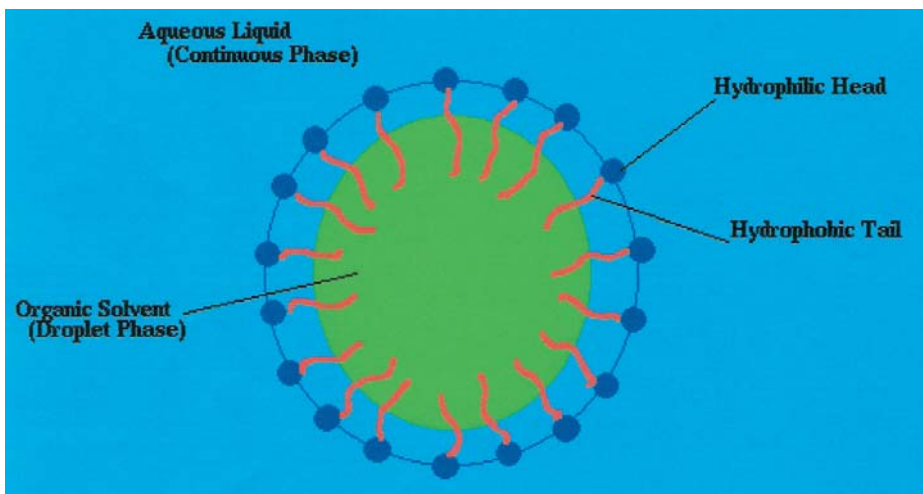
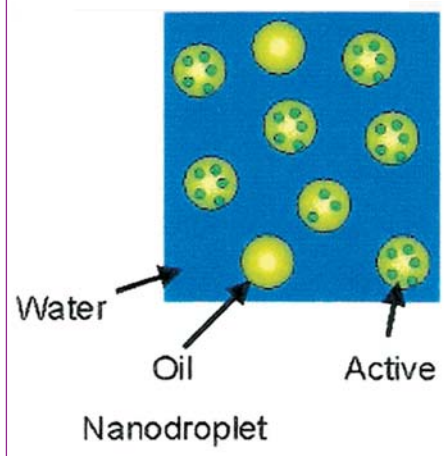


Figure 7. Advantage of Microemulsions



macro-emulsions, nano-emulsions and hydrophilic silicones, at concentrations ranging from 50% to 75%.

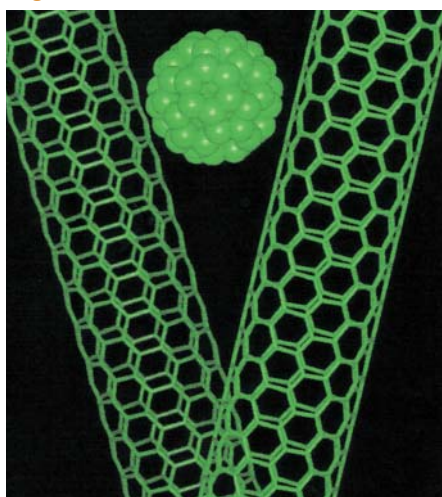
Micro-amino – Fabsoft (Conc), a 75% micro-amino silicone concentrate in easy-to-dilute form, with mild stirring, to give 20-30% emulsion with a blue tinge. (Fig.7)

Macro amino – A 75% macro amino silicone concentrate. To formulate a macro-emulsion concentrate is an uphill task due to the extremely low quantities of surfactant in the system to emulsify and stabilise large quantities of functional silicone actives. Supercone-4000, when diluted, gives a ready-to-use milky emulsion, depending on the concentration required.

Semi-micro – Sarex-408, a free-flowing semi-micro emulsion with 50% solids, having very low emulsifier content, can be readily used as such or after suitable dilution.

Non-yellowing silicone – A non-yellowing piperidine-modified, shear-stable,

Figure 8. Nano emulsions



exhaustible concentrate with 70% strength, in a free-flowing form, easily dilutable to working strength. Sarasoft-485 (Conc) imparts very good softness and whiteness to all fabrics.

Jet-stable silicones – A shear-stable, jet-stable and exhaustible micro-emulsion concentrate, with 70% strength, of a substantive quarternised functional polysiloxane, having excellent body-breaking properties, suitable for both wovens and knits. Sarafinish-655 (conc) can be easily diluted.

Nano-emulsion – The newest addition to the silicone family, with ultra-low particle

size of the likes of 10-9 metres. The unique advantage of the low particle size is that the particles get into the fibre interstices, giving great internal softness and luxurious and durable handle to the fabric. Texsoft Ultra (Conc) is based on a silicone-blocked co-polymer with three functional groups in the linear chain, viz. amino, quaternary and glycidoxy. This has 80% solids, can be used by the exhaust method, is stable to mildly alkaline pH and shear forces and performs extremely well at concentrations as low as 0.5%. (Fig.8)

Wicking, soil-release, antistat and softener – A polyester resin-based product to give antistat-cum-soil-release effect as well as softness to polyester-based fabrics. This is commonly available in 10 to 15% strength. We at Sarex have been able to synthesize such a product Fabfeel (Conc) in 95-97% active soft-paste form, which can be easily diluted at the user's end.

Hydrophilic softeners – They can be divided into two types, silicone based and organic based. Both are available in the form of 15-20% paste or emulsions. Sarex developed a unique hydrophilic silicone concentrate, viz. Sarasoft-1434 (Conc), a 45% soft gel having good softness and hydrophilicity without impairing the whiteness of terry towels. Similarly, organic terry-towel softeners are usually available as 20% paste. We at Sarex developed a 95% active, free-flowing product, Terryfinish-PM (Conc), which can be easily diluted and used effectively.

Polyethylene emulsions – The age-old warhorse of a sewability improver cum strength protector in resin finishing is normally available in 20-30% dispersions. We at Sarex have developed a 97% solids Supernol-PE (Conc) polyethylene emulsion, which can be dispersed to required strengths. (Fig.9)

All-in-one finish – A unique formulation with 60% solids, allowing resin finishing and softening to be done with a single product. Sarafinish-OST can be effectively used for wrinkle-free and easy-iron finishes. ○

Figure 9. Low density type

