

Automated Lipstick Formulation on Chemspeed's Formax

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Introduction

Chemspeed's Formax robotic platform (Figure 1) for automated formulation research and development is fast becoming the industry standard instrument for increasing output in the personal care, home care, cosmetics, and paints & coatings industries. Its formulation vessels provide fast and efficient mixing (100 – 6000 rpm) and precise temperature control (± 0.1 °C). But it is the integration of these vessels with Chemspeed's dispensing tools that makes the Formax such a valuable research tool. The ability to add solids and viscous liquids gravimetrically, whilst heating (or cooling), refluxing and stirring that makes the translation of manual workflows on to our platforms very straightforward.

An excellent example of the dispensing capability of the Formax is provided by lipstick formulation. Lipsticks contain a large variety of ingredients in a number of different forms. In this example there are four hot wax additions, four solid additions, 13 viscous liquid additions and one viscous (premix) aspiration and dispense. Six lipsticks were made in parallel, varying the relative amounts of several ingredients.



Figure 1. The Formax platform.

Workflow

The workflow is shown in Figure 2. The tools required are the Gravimetric Dispensing Unit for Highly Viscous materials (GDU-HV) – which is capable of aspirating and dispensing liquids with a viscosity up to 500,000 cps, and the Gravimetric Dispensing Unit for Powders (GDU-P).

First of all premix A was made in a feed vessel. Whilst this was in progress the formulation vessels were heated to 85 °C, as was a feed vessel containing the wax base. After the molten wax base had been dispensed stirring began, then, after addition of the emollient, the scrapers were turned on; premix A was aspirated from its feed vessel and dispensed into the formulation vessels. Two glitters and the second gloss (all solids) were added, and after the solids were fully dispersed (visually checked < 5 min) the emulsifier, third gloss, hardener, moisturiser, fourth gloss and stabiliser (all viscous liquids, pastes or waxes) were dispensed with the GDU-HV. After complete dispersion (< 5 min) the second emollient was added, then after dispersion of that, the flavour (solid) was introduced, dispersed, and finally the antioxidant was dispensed. After a final check that everything was dispersed, the stirring and scraping was stopped and the molten lipstick was poured into moulds (Figure 3).

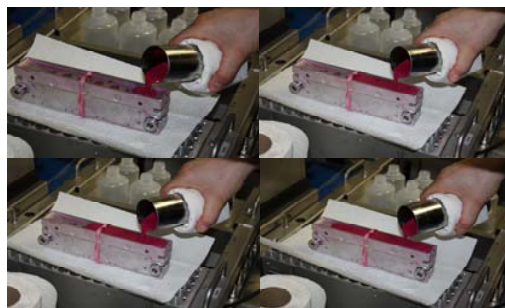


Figure 3. Pouring the molten lipstick into moulds.

Results

After cooling the moulds in the fridge for an hour, the lipsticks were removed (Figure 4), and found to compare favourable with manually formulated product.

Summary

The Formax has proven itself to be an ideal tool for the standardization and acceleration of R&D in lipstick formulation. Whilst a single formulator can make 2 – 4 lipsticks per day, the Formax platform can make 24 – 40 per day and, depending upon the formulation, performing 2 runs in a day is possible.



Figure 4. The lipsticks coming out of the moulds.

Note: this work was carried out for a customer in order to evaluate the capability of the system. Therefore, no analytical data are available.



Figure 2. The formulation workflow.