Aloe Extracts

Aloe extracts, obtained from the *Aloe vera* plant, have found many uses in cosmetics and pharmaceuticals. The extracts from this plant have long been known to help the wound healing process and relieve the pain from burns, cuts, and abrasions. Moreover, aloe also helps prevent infection and it moisturizes dry skin. Recently, aloe has been show to relieve symptoms of AIDS and to fight cancer when taken orally. The active ingredients of aloe extracts are lectins and mucopolysaccharides. Producers of aloe believe that the molar mass and its distribution contribute to its efficacy. In this application note, two aloe products are characterized by multi-angle light scattering (MALS).

The samples were analyzed using size-exclusion chromatography (SEC) combined with MALS and DRI detection. Three SEC columns were used to cover the broad range of molar masses of these samples: Shodex OHpak SB-806 HQ, SB-804 HQ, and SB-803 HQ. The MALS and DRI detectors were the Wyatt Technology DAWN EOS and Optilab DSP, respectively.

Two products are compared in a molar mass *versus* elution time plot in Figure 1. The results show a broad distribution with strong light scattering signals at *early* elution times (20-25 minutes). These correspond to areas where the DRI signals are weak, which indicates low amounts of high molar mass polymers (up to millions of daltons). The high molar mass range of these two samples is quite different. At *later* elution times two peaks (29 and 31 minutes, respectively) with strong DRI and weak LS signals were observed in both samples. The molar masses of these peaks are as small as 250-800 daltons.

For one of the products, the molar mass was found to change over time (as illustrated by Figure 2). The sample was analyzed at three, six, and twenty-four hours *after* preparation. The LS signals are superimposed. The peak at twenty-four minutes decreases while the peak at 20 minutes *increases*. The molar mass distribution appears to become broader over time. The results suggest possible degradation (decrease of molar mass at twenty-four minutes) as well as aggregation (increase of molar mass at earlier elution time).

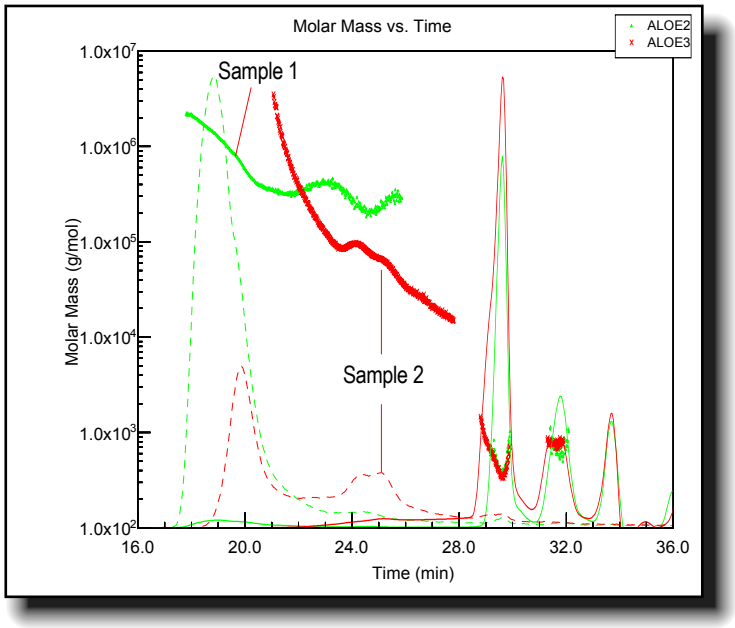

Figure 1. Molar mass versus *time plot for two aloe samples superimposed with signals from the LS at 90° (dashed) and DRI (solid) detectors.*

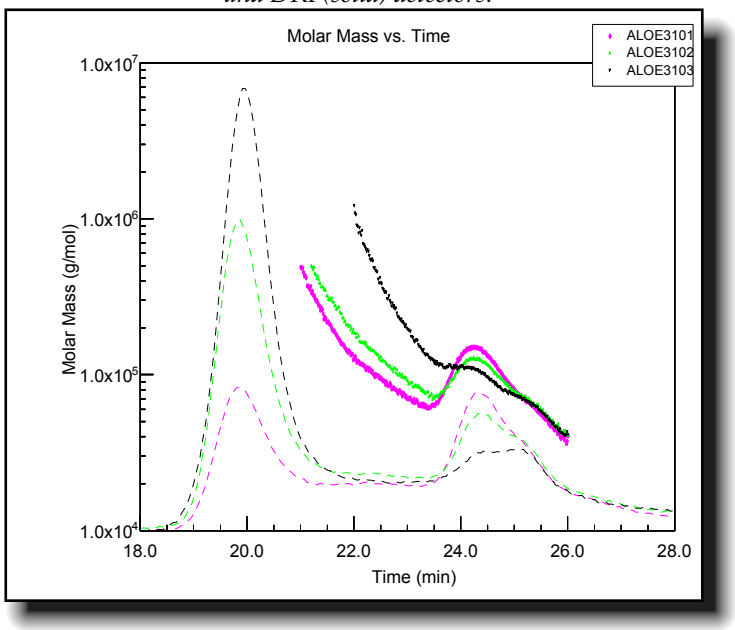

Figure 2. Molar mass versus *time superimposed with LS signals for the same sample at 3, 6, and 24 hours after preparation.*

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