

## Variation of molar mass of natural rubber from new IAC clones

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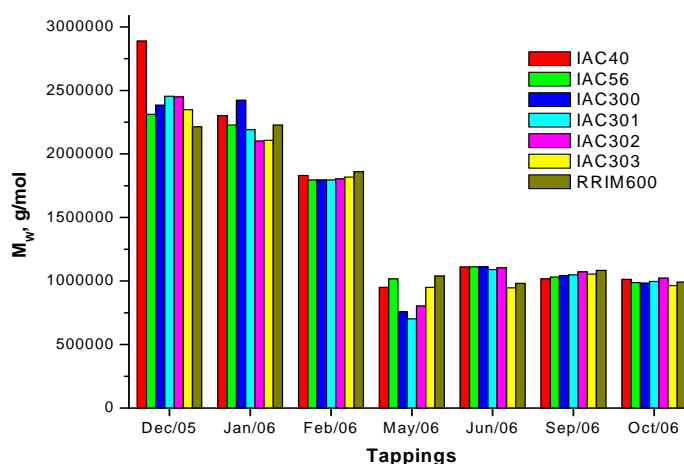
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**Abstract** – The natural rubber from new IAC clones was studied by Size Exclusion Chromatography with Multi-Angle Laser Light Scattering (SEC-MALLS) to evaluate the molecular weights. The SEC-MALLS results indicated small differences between the clones and new IAC clones presented similar average values and higher variation in values of the  $M_w$  in relation to the RRIM 600. The results were similar than those in the literature.

The major commercial source of natural rubber (NR) is *Hevea brasiliensis*. The Agronomic Institute and Embrapa Agricultural Instrumentation have improved and evaluated new *Hevea* clones (IAC series) in order to increase the production and quality of the NR more appropriate to the Brazilian soil and climate. The technological properties of NR are susceptible by environmental conditions [1-3]. In this sense, this work evaluate and to monitor the molar mass ( $M_w$ ) of NR from new IAC clones. In this work, it is presented the results of monitoring of the  $M_w$  of raw NR from new IAC clones [IAC 40, IAC 56, IAC 300-303 and RRIM 600 (witness)]. Molecular weights of rubber in solution were determined by Size Exclusion Chromatography with Multi-Angle Laser Light Scattering (SEC-MALLS). Fifteen microliters liquid latex was dissolved overnight in 3mL of 0.2m filtered THF in 8mL borosilicate vials with Teflon coated lids. Molecular weights and their distributions were determined using a Hewlett-Packard 1100 series HPLC, coupled to a Wyatt Dawn DSP laser photometer and a HP 1047 refractive index detector. For each sample, following a THF blank run, a 50  $\mu$ L subsample was injected and run through a Phenogel 5  $\mu$ m Linear/Mixed Guard Column (Phenomenex) and a PLgel 10  $\mu$ m mixed-B exclusion column. The flow rate used was 1mL/min, column temperature 35  $^{\circ}$ C, and the wavelength 632.8 nm. In general, there was a decrease in the values of  $M_w$  between the months of December/2005 to May/2006, where the clone IAC 40 showed this behavior more pronounced than the other clones. In relation to the witness, the new IAC clones presented similar average values and higher variation in values of the  $M_w$  (Figure 1); clone IAC 40 presented the higher variation. The average values of  $M_w$  were similar than those obtained by Martins et al. [4].



**Figure 1:** Variation of molar mass of natural rubber from new IAC clones in seven tappings.

### References

- [1] A. Malmonge, E. C. Camillo, R. M. B. Moreno, L. H. C. Mattoso and C. M. McMahan, J. Appl. Polym. Sci. 111 (2009), 2986-2991.
- [2] R. M. B. Moreno, M. Ferreira, P. de S. Gonçalves and L. H. C. Mattoso, KGK 10 (2008), 528-530.
- [3] R. M. B. Moreno, M. Ferreira, P. de S. Gonçalves and L. H. C. Mattoso, KGK 12 (2007), 659-661.
- [4] M. A., Martins, R. M. B., Moreno, C. M., McMahan, J. L. Brichta, P de S., Gonçalves and L. H. C. Mattoso, Thermochim. Acta, 474 (2008), 62-66.