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CARBON BLACK MASTERBATCH USING DIFFERENT FORMS OF NATURAL RUBBER LATEX

K.K. Sasidharan, Rosamma Alex and Thomas Kurian*

Rubber Research Institute of India, Kottayam - 686 009, Kerala, India
*Cochin University of Science & Technology, Kochi - 686022, Kerala, India

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Different forms of natural rubber latex like fresh latex, preserved and concentrated latex were used for producing carbon black masterbatch with fluffy carbon black. Factors like particle size, zeta potential, colloidal stability, rubber content, non-rubber ingredients, sensitivity to acids and raw rubber properties are different for these forms of latex. These parameters can affect the processing and quality aspects of the carbon black masterbatch. Though fresh natural rubber (NR) latex does not coagulate immediately on addition of acids, it can be sensitized for coagulation with acids by addition of suitable surfactants. It was observed that surfactant treated fresh latex, preserved latex and latex concentrate containing filler dispersion coagulated to a consolidated mass quickly on addition of acids. It was observed that the coagulation was more uniform for fresh field latex compared to the other forms. This could be attributed to the type of anions adsorbed on the surface of rubber particles in the latex. A higher rheometric torque and cure time was observed for the masterbatches compared to the conventional dry mix. Within the masterbatches higher rheometric torque was recorded for fresh latex and preserved field latex (PFL) containing skim latex and this could be due to the presence of comparatively higher amount of surfactants in latex. It is found that a higher modulus, tensile strength, hardness, tear strength along with lower compression set, heat build-up and abrasion resistance were recorded for the masterbatches made from fresh latex, PFL and latex concentrate compared to the control dry mixed vulcanizate. Better ageing resistance was also observed for the masterbatches. The over-all mechanical properties shown by masterbatch prepared from fresh field latex was superior to others. The improvement in mechanical and ageing characteristics are attributed to the higher crosslinking and better dispersion of filler as observed from the filler dispersion data.

Key words: Carbon black, Fresh natural rubber latex, Latex concentrate, Latex masterbatch

INTRODUCTION

Latex is a colloidal dispersion of rubber particles in an aqueous medium obtained from latex vessels of *Hevea brasiliensis* with particle sizes varying from 80-3000 nm. Along with rubber particles, latex contains non-rubber ingredients like proteins, phospholipids, carbohydrates, metal ions and inorganic cations (Gomez and Hamzah, 1989; Yip and Gomez; 1980). The composition of non-rubber ingredients changes after latex leaves the tree and the obvious consequence of this is the coagulation of latex within a few hours. This is called spontaneous coagulation. (Van Gils, 1947). Another change that takes place in

Correspondence: K.K. Sasidharan (sasidharan@technologist.com)