

PREPARATION AND EVALUATION OF NATURAL RUBBER COATED PRILLED UREA

Siby Varghese, Baby Kuriakose and Reethamma Joseph

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Different forms of natural rubber were used for coating prilled urea for developing a slow release fertilizer. The technique involved incorporation of prilled urea at high loading into skim rubber, ISNR 5 and reclaimed rubber using an internal mixer. The highly urea filled rubber was then extruded and granulated. These granules were evaluated for volatilization loss, leaching and slow release characteristics. The results indicated that NR-encapsulated urea has the characteristics of a slow release fertilizer.

Key words : Encapsulation, Natural rubber, Prilled urea, Slow release fertilizer.

Siby Varghese (for correspondence), Baby Kuriakose and Reethamma Joseph, Rubber Research Institute of India, Kottayam - 686 006, India.

INTRODUCTION

The efficiency of urea is reduced due to losses through volatilization, leaching and denitrification and usually ranges from 20 to 30 per cent of the applied nitrogen (Katyál *et al.*, 1985). Apart from the economic disadvantage, severe environmental problems arise due to leaching of nitrates which increases nitrate concentration in drinking water (Anon, 1988; Prasad and Power, 1995). Development of slow-release fertilizers has helped in improving efficiency of water soluble nitrogen fertilizers (Hayase, 1968; Prasad *et al.*, 1971). Encapsulation of soluble fertilizers with natural or synthetic polymers, waxes, resins and oils has been widely investigated (Prasad *et al.*, 1971). However, because of high cost of production, these fertilizers have attained limited commercial importance and are used only in special applications such as for turf grasses and ornamentals. Soong *et al.* (1976) reported the merits of using natural rubber (NR) encapsulated slow-release fertilizers in Malaysian soils. Hephurn and

Arizal (1989 a&b) and Hephurn *et al.* (1989) developed a split feeding mixing technique for encapsulating urea particles within rubber matrix and reported that the product did not have leaching loss and caused no seedling damage associated with free urea.

MATERIALS AND METHODS

In the present study, ISNR 5 (Indian Standard Natural Rubber), skim rubber and reclaimed rubber were used as NR matrix material. The formulations studied are given in Table 1. The characteristics of ISNR 5, skim rubber and reclaimed rubber

Table 1. Formulations, parts by weight

Components	A	B	C	D
ISNR 5	0	100	0	0
Skim rubber	0	0	100	0
Reclaimed rubber	0	0	0	100
Urea	100	600	600	600
Wax	0	5	6	6
Nitrogen %	48	39.17	39.23	39.13