

## Pusa neem golden urea for increasing nitrogen use efficiency in rice

Rice occupies about 23 million hectares of cultivated land and uses more than one-third of the total fertilizer nitrogen consumed in India<sup>1</sup>. However, nitrogen use efficiency in rice is hardly 30–40% (ref. 2). Recovery of fertilizer N applied to rice and other crops can be increased by the use of nitrification inhibitors<sup>3</sup>. Nitrification-inhibiting property of neem seed extract and neem cake has been reported<sup>4–6</sup>. It has been reported that nitrification-inhibiting compounds are lipid associates<sup>7</sup>. An attempt was therefore made to prepare a urea-neem oil product.

Pusa neem golden urea (PNGU) an urea-neem oil 'adduct' was prepared by the process of crystallization from an oil/water emulsion containing urea. The coral-shaped golden yellow 'adduct' (Figure 1) analysed 35% N as urea and 12% neem oil. The detailed process of preparation of this urea product is covered under a patent application.

PNGU was tested against commercial prilled urea with a high-yielding rice variety Pusa 169 in a microplot field study at the Indian Agricultural Research Institute farm. The soil of the experimental field was a sandy clay loam of pH 8.1 and had 0.6% organic C. The experiment was laid out in a randomized block design with 3 replications. The treatments were all six combinations of 3 sources of N (PNGU, commercial prilled urea and urea-neem oil liquid emulsion) and two levels of N (60 and 120 kg N ha<sup>-1</sup>) and a no nitrogen control. The results are given in Table 1. At 60 kg N ha<sup>-1</sup> all the three sources of N were equally effective but at 120 kg N ha<sup>-1</sup>, which is the general recommended dose for high-yielding varieties of rice, PNGU produced 1.7 t ha<sup>-1</sup> more grain than commercial urea, the difference was statistically significant. The increase in grain yield of rice was 36% over that of commercial urea. Neem oil urea liquid emulsion without drying and crystallization was no better than urea. This is a preliminary report and more laboratory and field trials are planned in future.

Small amounts of PNGU can be



Figure 1. Pusa neem golden urea.

Table 1. Relative efficiency of commercial prilled urea, neem oil-urea emulsion and Pusa neem gold on grain yield of rice (t ha<sup>-1</sup>)

Source	kg N ha <sup>-1</sup>	
	60	120
Urea	5.0	4.7
Neem oil-urea emulsion	4.2	5.2
Pusa neem gold	4.5	6.4
CD 5%	1.06	

obtained by researchers for laboratory/pot culture studies from the authors.

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