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Effect of Manure, Inorganic Fertiliser and Manure-fertiliser Combination on N Losses, N-use Efficiency and Yield of Oilseed Rape (*Brassica napus* L.)

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Abstract

Farmyard manure is a valuable source for plant nutrition, but high N loss and low N fertiliser use efficiency are serious challenges fronting them. In attention to environmental importance of this problem, we suggested this 2-year experiment on winter rapeseed (*Brassica napus* L.) in rainfed condition (average precipitation was 700mm). Treatments conclude 0, 50,100, 150, 200 kg N ha^{-1} urea (fertiliser treatments), 150 kg N ha^{-1} urea + 50 kg N ha^{-1} manure (Int1), 100 kg N ha^{-1} urea + 50 kg N ha^{-1} manure (Int2), 50 kg N ha^{-1} urea + 100 kg N ha^{-1} manure (Int3), 150 kg N ha^{-1} manure (Org). The inorganic fertiliser plots also received 25 kg P ha^{-1} and 50 kg K ha^{-1}. Optimum fertiliser treatment was 150 kg N ha^{-1}. The greatest seed yield (3 t ha^{-1}) obtained in 150 kg N ha^{-1} + 50 kg N ha^{-1} treatment in two year. Seed yield for organic treatment (org) was nonsignificantly lower in 2002 (2.3 vs. 2.5 t ha^{-1}) and significantly greater in 2003 than optimum fertiliser treatment (2.9 vs. 2.6 t ha^{-1}). Results also showed that Int2 and Int3 treatments decrease N loss (4 and 9.5 kg N ha^{-1} yr^{-1} respectively) compared to manure (25.5 kg N ha^{-1} yr^{-1}) and optimum inorganic fertiliser (38.5 kg N ha^{-1} yr^{-1}). Apparent N use efficiency was calculated as [(total treatment N uptake in 2 yr — total check N uptake in 2 yr)/ N applied in 2yr] $*100$. This was 20 % for manure (org), 57 % for Fropt, 37 % for int2 and 24 % for int3. This difference may be due to remained 57 % of N in soil from manure treatment at final of experiment. The greatest physiological N use efficiency (average 26 %) was obtained in Int3 treatment, this can be due to better synchronisation of N release and crop uptake.

Keywords: winter oilseed rape, N loss, N-use efficiency , nitrogen, organic

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