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Short comunication

Studies on harvest time residue of isoproturon in soil, wheat grain and straw

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The development of isoproturon resistance in *Phalaris minor* due to continuous use of herbicide in rice-wheat system has been noticed in north-west plains of India (Malik and Singh 1995). Though a number of herbicides are being currently used for the control of wheat weeds in India, isoproturon is amongst the most potent and widely used translocated herbicide for controlling grassy weeds in wheat. When it is applied to the soil, it is translocated to the foliage and mature leaves turns light green in colour followed by burning at the tips. Continuous use of isoproturon in wheat crop in this cropping sequence has led to build up of this herbicide in soil at detectable levels (Barooach *et al*. 1996) The present investigation was under taken to determine the harvest time residues of isoproturon in soil, wheat and wheat straw resulting from the continuous application of isoproturon herbicide, to provide protection against the weeds of wheat.

A long term trial on weed control studies in rice-wheat system has been in progress since 1990-1991, In wheat, isoproturon was applied (1.0 kg/ha) for checking the wheat weeds.

The wheat crop (cv. PBW-343) was sown on Nov. 24 and Dec. 02 during the years 2003-04 and 2004-05, respectively at Crop Research Centre, G.B.Pant University of Agriculture & Technology, Pantnagar. Isoproturon was sprayed after 35 days of sowing of wheat. The crop was harvested in the month of April in both the cropping seasons. The experiment was conducted in a randomized block design with three replications. At the time of harvest, samples of soil, wheat grain and straw were collected from the herbicide treated plots.

A 10 g sample of wheat grain and soil and 5 g sample of straw was extracted with dichloromethane (2 x 20 ml) after shaking for an hour on a wrist action shaker. The contents were filtered through Whatman no. 42 filter paper and the filtrate was concentrated to about 20 ml. It was then partitioned with 20 ml of water. After partitioning, the dichloromethane layer was collected and anhydrous 2 g hot Na_2SO_4 was added therein for absorption of any water content. The solution was filtered and the filtrate was concentrated to about 0.5 ml under reduced pressure. Thereafter, a silica gel column was prepared and after washing it with dichloromethane, the sample was loaded on to the column. The sample was eluted with (90:10) dichloromethane-acetone mixture and evaporated under reduced pressure at 32±1°C. The residue was finally made up to 2 ml in the mobile phase.

The reference standard of isoproturon of 98% purity was obtained from M/s Gharda Chemicals and used for quantification, recovery and determination of the retention time of the herbicide. The soil, grain and straw samples were fortified with 100 ppm levels (1ml) for assessing the per cent recovery. A Beckman HPLC equipped with selectable wavelength absorbance detector, Kipp and Zonen BD-40 recorder, Rheodyne injector, 100 A pump,150 x 4.5 mm i.d. packed with 5 µm silica bonded with C_{18} (ODS) - Hichrome column was used. The following parameters were maintained for analysis: mobile phase 80:20 (Methanol: water v/v); flow rate: 1.0 ml/ min; wavelength: 254 nm; chart speed 1 cm/min; attenuation: 0.020 aufs.

Table 1. Per cent recovery after fortification and harvest time residue of isoproturon in soil, wheat grain and wheat straw

Sample	% Recovery (mean ±S.D.)		Harvest time residue
	2003-04	2004-05	
Soil	75.0±0.1	77.0±.01	ND*
Wheat grain	77.5±0.2	79.5±0.2	ND*
Wheat straw	83.2±0.2	88.2±0.4	ND*

The retention time of isoproturon under the present experimental conditions was found to be 5.5 min. (Fig. 1). The mean recovery for soil, grain and straw for 2 years was found 76, 78.5 and 85.7%, respectively. The minimum detection limit of the herbicide on the above HPLC system was 0.001µg/g.The analysis revealed that no residues of isoproturon were detectable at the time of harvest in soil, wheat grain and in wheat straw (Table 1). These results were in corroboration with the findings of several other workers (Perrin *et al*. 1996, Roberts *et al.* 1998) who reported a faster rate of isoproturon dissipation under tropical conditions.

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