pounds in small quantity of alcohol and making the desired volume with warm water. The 35 days old nursery plants from treated seeds and the root-treated nursery plants were planted in 3 and 4 replications respectively in the field. The plant-to-plant and row-to-row distances were kept at 15 and 20 cm respectively. The plot size in the seed-treated trial was 8 m^2, whereas it was 3.45 m^2 for the seedling-treated trial. The yield was determined on a dry weight basis and the results obtained with different compounds are presented in the table.

Interestingly, we report that Santonin (**10**), Zerumbone (**11**) and C_{16}-Guaianolide (**4Z**) enhanced the rice yield. The highest increase in yield over control, 12.50 and 14.17%, was shown by Zerumbone, followed closely by Santonin which showed 10.04 and 14.17% increase in yield over control in seed and seedling treated trials respectively. To the best of our knowledge this is the first report of its kind. The authors are hopeful, therefore, that these terpenoids may be in the future prove to be valuable agrochemicals for further improving rice production.

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Elimination kinetics of iopamidol, a new water soluble nonionic radiographic contrast medium, analyzed by radioactivation

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Summary. We have studied the elimination kinetics of iopamidol employing radioactivation and radiochemical separation. This method offers the advantage of guaranteeing absolutely no interference by radiation with tissue distribution or elimination kinetics of the analyzed compound. Our results show that iopamidol does not cross the blood-brain barrier, has no effect on thyroid iodine uptake and does not accumulate in the liver.

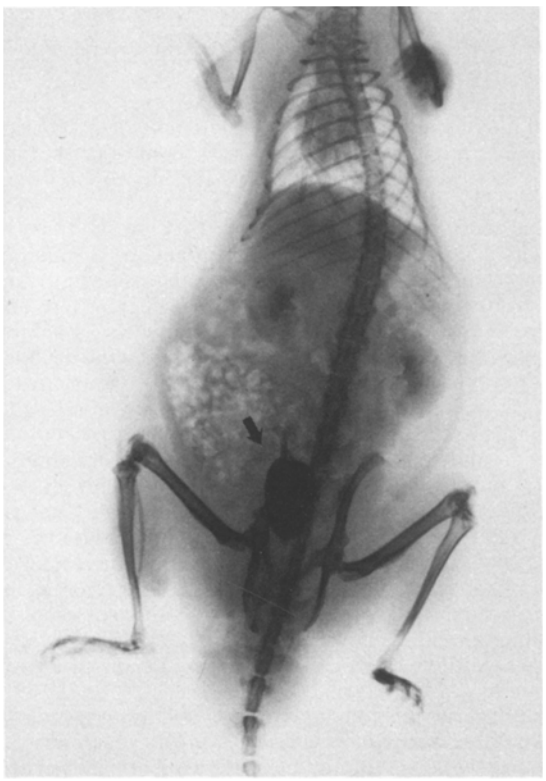
Modern radiographic contrast media (RCM) are derived from benzoic acid, into which 3 iodine atoms are introduced in the 2-4 and 6 positions of the aromatic ring. The carboxyl group has been salified to obtain soluble products which unfortunately possess some toxicity. Studies achieved to correct this toxicity have shown that solubility, viscosity, tolerability, elimination and radioopacity are linked to substitutions in the 6 positions of the ring[3]. Certain salt derivatives may cause a selective toxic action on some parenchymas, as in the case of the toxicity at the myocardial level, where the need for maintaining a physiological concentration of Na^+ ions is especially important. In any case these RCM dissociate in solution to form anions and cations affecting the osmolarity of the solution. The resulting high osmotic pressure has been cited by several authors as a probable cause of diverse side effects seen in their clinical use, including hemodynamic changes[4,5], agglutination of red blood cells and endothelial membrane permeability changes[6], and neurotoxic effects[7].

These distressing side effects prompted the search for water soluble 'nonionic' RCM[8]. Recently, the synthesis of iopamidol, a new water soluble 'nonionic' radiographic contrast medium, has caused great interest, owing to its satisfactory viscosity and solubility characteristics. The analysis of iopamidol solutions has revealed a further unexpected advantage. Lower osmolarity values than expected have been measured, possibly due to the spontaneous formation of polymolecular aggregates. Therefore the use of iopamidol is a decisive step forward in neuroradiology, where osmolarity changes can cause serious consequences[9]. Looking at this, we decided to study the elimination kinetics of iopamidol from the most significant tissues by radioactivation. This method is the most sensitive presently available and in contrast to methods employing previously activated molecules, it offers the advantage of guaranteeing that there will be absolutely no interference by radiation with either the distribution into tissues, or the elimination kinetics of compounds studied. The substance to be analyzed is activated by a capture (n, γ) reaction in a nuclear reactor only as the final step of the experiment, i.e. after animals have been treated and sacrificed. After radioactivation it is possible qualitatively and quantitatively to discriminate between various chemical elements by means of a γ-spectrometry Ge-Li detector.

In our experiments iodine was measured as an index of the iopamidol presence in tissues. The analytical determination of iodine as an index for measurement of modern RCM levels in biological materials is universally accepted, since iodine is covalently bound to the benzene ring. Studies done in vivo on the metabolism of these RCM in different mammals, including man, have not demonstrated the presence of any enzyme capable of breaking the bond between

Iodine levels in different tissues of rats injected with standard iopamidol solution (0.4 ml/100 g b.wt) sacrificed at different times following injection. Values are given in ppm, that is the weight of iodine related to a fresh sample before freeze-drying

Sample	Time from injection	Standards used	Analytical method	ppm and statistical error	No. of rats analyzed
Thyroid	Blank	NH_4I	Direct measure	340± 50	3
	t = 1 min	KI	Direct measure	2500± 400	2
	t = 30 min	NH_4I	Direct measure	1000± 200	3
	t = 60 min	NH_4I	Direct measure	600± 100	4
	t = 24 h	NH_4I	Direct measure	550± 90	3
	t = 62 days	NH_4I	Direct measure	300± 50	4
Kidneys	t = 1 min	NH_4I	Direct measure	15000± 1500	3
	t = 30 min	NH_4I	Direct measure	5000± 700	2
	t = 24 h	NH_4I	Direct measure	20± 5	2
Blood	Blank	NH_4I and beef liver	Radiochemical separation	1± 0.8	3
	t = 1 min	KI	Direct measure	6000± 900	2
	t = 30 min	NH_4I	Direct measure	1600± 350	3
	t = 60 min	NH_4I	Direct measure	400± 80	4
	t = 24 h	NH_4I	Direct measure	40± 8	3
	t = 62 days	NH_4I and beef liver	Radiochemical separation	6± 2	3
Liver	Blank	NH_4I and beef liver	Radiochemical separation	0.5± 0.2	3
	t = 1 min	KI	Direct measure	1600± 350	2
	t = 30 min	NH_4I	Direct measure	700± 150	3
	t = 60 min	NH_4I	Direct measure	300± 50	4
	t = 24 h	NH_4I	Direct measure	3± 1	3
	t = 62 days	NH_4I and beef liver	Radiochemical separation	1± 0.8	4
Brain	Blank	NH_4I and beef liver	Radiochemical separation	0.06± 0.02	3
	t = 1 min	KI	Direct measure	250± 50	2
	t = 30 min	NH_4I	Direct measure	30± 5	4
	t = 60 min	NH_4I	Direct measure	25± 5	4
	t = 24 h	NH_4I	Direct measure	0.25± 0.05	3
	t = 62 days	NH_4I and beef liver	Radiochemical separation	0.02± 0.01	4



X-ray photograph of a rat weighing about 300 g, taken 15 min after injection of a standard solution of iopamidol (370 mg I/ml) corresponding to 0.4 ml/100 g b.wt. The arrow indicates the bladder, which appears full and with a high concentration of the radiographic contrast medium.

iodine and the aromatic ring. Careful studies on the bile and urine of dogs, rabbits and man after injection of solutions of iopamidol have shown that iopamidol is the only iodinated material found in these biological fluids, ruling out any possible enzyme induction or accumulation of metabolites[10]. Moreover Pitrè and Felder[11] have demonstrated that iopamidol solutions are very stable, so the percent of molecular iodine already present in iopamidol solutions before administration is negligible.

Materials and methods. Sprague Dawley rats, each weighing about 300 g, were given i.v. 0.4 ml of standard iopamidol solution (370 mg I/ml) per 100 g b.wt. Animals were sacrificed at 1, 30, 60 min, 24 h and 62 days following administration of iopamidol. Controls were sacrificed to determine the basal values for iodine naturally present in different tissues. Blood and organs were removed, weighed, and pre-frozen at −80 °C for 24 h, then freeze-dried in a FTS Systems freeze dryer (model FDX-1-54). Freeze-dried organs and blood were weighed and dry-homogenized. Then 120 mg of each tissue preparation were sealed in a quartz tube. For each tissue 2 samples were prepared.

The sealed samples were activated by capture (n, γ) reaction in a nuclear reactor (Triga Mark II) whose thermal neutron flux was 5×10^{12} n × cm^{-2} × sec^{-1}. Sample transport was obtained by a pneumatic high speed system. 2 different standards were used: a NH_4I solution (10 µg I/ml) for samples with high iodine content and lyophilized bovine liver, titrated by NBS, for samples with low iodine content. Samples containing a large amount of iodine were measured directly in a γ-spectrometry Ge-Li detector. For blanks and low iodine containing samples, we used a radiochemical separation method[12,13]. The instrument consisted of a quartz tube made up of 3 parts with decreasing diameters. Oxygen flowed into the 1st tube; in the middle part a fixed amount of HMD resin (inorganic exchanger) was present; the final part contained silver quartz wool (Ag-wool). After irradiation the sample was removed from

the vial, and put into a fire-proof vessel inside the 1st tube in the presence of the O_2 flow. The organic matrix of the sample was burned by placing the tube in a furnace whose temperature reached 900 °C. After 10–15 min, the halogens were carried by the O_2 flow to the HMD resin, which retains Br_2 and Cl_2, but not I_2. I_2 is fixed by the Ag-wool, forming AgI. Finally we placed the Ag-wool in a suitable vessel, in order to get the same counting geometry for standards and samples treated with radiochemical separation. The sensitivity of this method allows the measurement of iodine concentrations as low as 0.02 ppm.

Results and discussion. In the table we summarize the results obtained; iopamidol is quickly eliminated from the most significant tissues. 15 min after its administration most has already passed through the kidneys and can be found in the bladder (see X-ray photograph). After 1 min we find the greatest amount of iopamidol in the kidneys (15,000 ± 1500 ppm); with blood, thyroid, liver and brain levels following in decreasing order. With regard to the decrease in the hematic level, diffusion of this compound to extravascular compartments seems to be slow; in fact we can see that the amount of iopamidol in the blood remains constantly much higher than expected relatively to the amount in the liver and brain. Even total thyroid iodine levels remain significantly lower until thyroid basal values are reached. Brain iodine values remain much lower than hematic values and 24 h after injection near basal levels have been reached, suggesting that iodine measured in the brain is due to iodine present in residual blood in the cerebral vessels and that iopamidol does not pass the blood-brain barrier. On the contrary, some extravascular diffusion is seen at the hepatic level, where measured values, even though remaining constantly lower than hematic values, are significantly higher than those measured in the brain and the elimination kinetics seem to be similar to those seen in the blood. This phenomenon could be due to the structure of the liver itself, where plasma is known to filter freely through the sinusoidal plexus into Disse space. The percent increase of iodine with regard to basal values is greatly inferior for the thyroid when compared to other compartments of the organism and after 24 h iodine concentration has almost reached basal values. Subsequent experimental data demonstrate a return to original values. From the results obtained in our study, the 60 day waiting period usually required before testing thyroid iodine incorporation in patients who have undergone iodate RCM administration seems to be excessive.

Two months later, the sensitivity of the method employed allows us to ascertain that blood iodine levels are only slightly higher than basal values. At this time we can see even less additional iodine present in the liver, but considering the incidence of statistical error, this experimental value can be considered as equal to physiological values. On the whole our results show that iopamidol is quickly eliminated and not likely to accumulate in the most significant tissues; moreover it has no effect on thyroid iodine uptake.

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A holder for Ralph knives for cutting sections for high performance optical microscopy with a Minot type microtome

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Summary. We present plans for an original holder for long-edged glass knives (Ralph knives). Knives are prepared by hand-breaking of commercial window glass (3 mm thick), for cutting large blocks of tissue embedded in a water-miscible plastic resin, glycol methacrylate.

Recent years have seen the development of high performance optical microscopy (HPOM) which allows a clear visualization of the intimate structure of cells and tissue organisation by standard light microscopes. HPOM makes use of plastics as embedding media, instead of paraffin wax, which has been the traditional embedding medium for