Table 1 *Effect of divalent and monovalent ions and EDTA on the flocculation pattern of Zymomonas mobilis ATCC 12526*

Ions used (10^{-2} M)	Flocculation rate ($\times 10^{-3}$)
Control	4.6
Ba^{++}	1.6
Mn^{++}	2.8
Mg^{++}	9.2
Ca^{++}	10.0
K^{+}	4.2
Na^{+}	5.0
EDTA (5×10^{-3} M)	Nil

Table 2 *Effect of divalent ions on flocculation and fermentation of Zymomonas mobilis ATCC 12526*

Divalent ions used (10^{-2} M)	Ethanol production % (w/v)[a]	Flocculation rate
Control	6.6	4.6×10^{-3}
Mg^{++}	6.6	9.2×10^{-3}
Ca^{++}	2.5	1.0×10^{-2}

[a]Ethanol produced from 15% (w/v) initial sugar concentration at 72 hr.

various divalent ions (table 1) next to Ca^{++}, Mg^{++} facilitate the flocculation.

Monovalent ions KCl (10^{-2} M) and NaCl (10^{-2} M) had no effect, while EDTA (5×10^{-3} M) strongly inhibited the flocculation of *Z. mobilis* ATCC 12526, presumably by chelating divalent ions as in the flocculation of yeast[2-4,6].

From all the above experiments, it is clear that Ca^{++} and Mg^{++} could be used to enhance flocculation. In order to find out whether these divalent ions could be useful for flocculation in cell-recycling systems, we conducted batch fermentation of *Z. mobilis* ATCC 12526 with these ions. Mg^{++} (10^{-2} M) did not affect the ethanol production at 15% (w/v) initial sugar concentration[8] but Ca^{++} (10^{-2} M) drastically reduced the ethanol production (table 2). From these it is evident that although Ca^{++} and Mg^{++} enhance the flocculation of *Z. mobilis* ATCC 12526, Mg^{++} alone could act as the efficient flocculating agent in cell-recycling systems.

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A PRELIMINARY REPORT ON VENOM APPARATUS IN *CONUS AMADIS* (GMELIN) FROM PORTO NOVO COAST

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There are about 400 species recorded so far in the family: Conidae (Gastropoda: Mollusca), mostly tropical and characteristically associated with coral reefs. The cones are nocturnal carnivores[1]. All have a venom bulb and a harpoon-shaped radula. Some important studies on the cones were made earlier[1-5]. In Indian waters, there is no information on the structure and function of the venom apparatus of cones. Habermeh[6] described the effects of venom in the human body; the sting is painful, and the site of the sting swells and the pain gradually spreads over the whole body especially the lungs and mouth leading to visual disturbance, vomiting and death may ensue in human beings[4]. The present study deals with the structure of venom apparatus in *Conus amadis*.

C. amadis were collected from a depth of 3–13 fathoms in the Porto Novo Coast (Lat. 11 29'N; Long 79°46'E) and dissected to examine the structure of venom bulb and associated structures. The venom apparatus as a whole has one cucumber-shaped venom bulb, about 1.6 cm in length and 0.5 cm in diameter with a blunt tip of 0.2 cm diameter (figure 1).

The venom bulb is embedded in the muscles near the anterior oesophagus connected with the pharynx through the venom duct. The coiled venom duct originates at the right end of the venom bulb and passes under the bulb. The portion of the duct just after

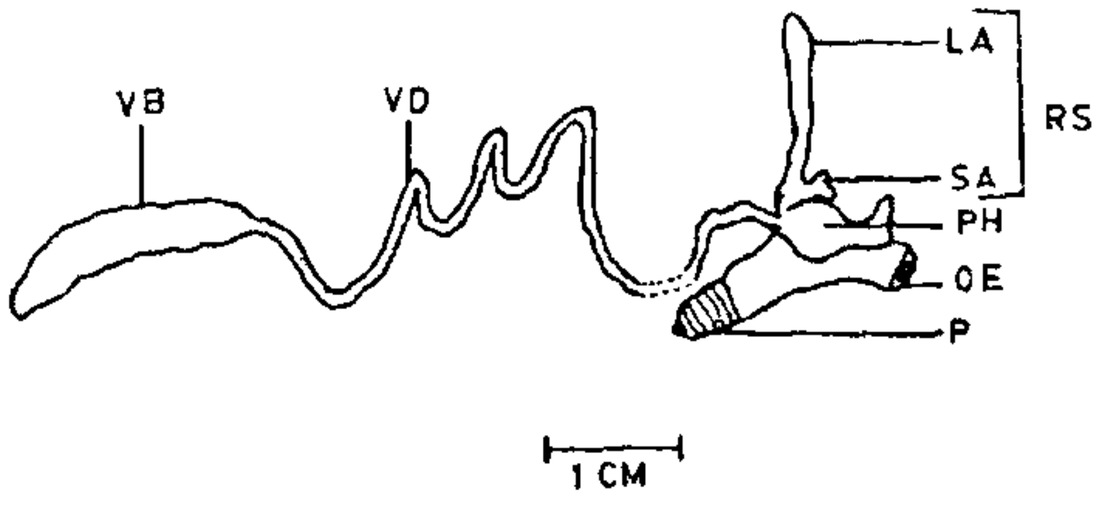

Figure 1. The venom apparatus of *Conus amadis*. LA-Long arm; OE-Oesophagus; P-Proboscis; PH-Pharynx; RS-Radular sheath; SA-Short arm; VB-Venom bulb; VD-Venom duct.

leaving from the bulb is flexible and generally flattened. The duct continues with a diameter of about 0.1 cm and passes ventrally to the right side of the pharynx to which it joins. The total length of the venom duct is approximately 27 cm in a cone having a length of 7.45 cm.

The radular sheath below the bulb is divided into an elongated dorsal long arm (0.35 cm) and ventral short arm (figure 2). Instead of having centrals, laterals and marginals as in other gastropods, this animal has all the radular teeth modified as harpoon-shaped spears (Toxoglossan type) helping in making punctures upon the tissue of the victim. The radular teeth are arranged one by one in proboscis; the first and foremost tooth points forward like a spear. While stinging, the proboscis extrudes from which the radular tooth rushes out. Hashimoto[7] reported that each tooth is used only once and if it fails to shoot the prey, a new one from the radular sheath is charged with poison. The sting of *Conus* is normally used by the animal to paralyze the prey before feeding.

The effects of toxins varied from species to species[7]. The chemistry of the *C. amadis* toxin and its effects on the animals such as rat, fishes and other molluscs are being carried out.

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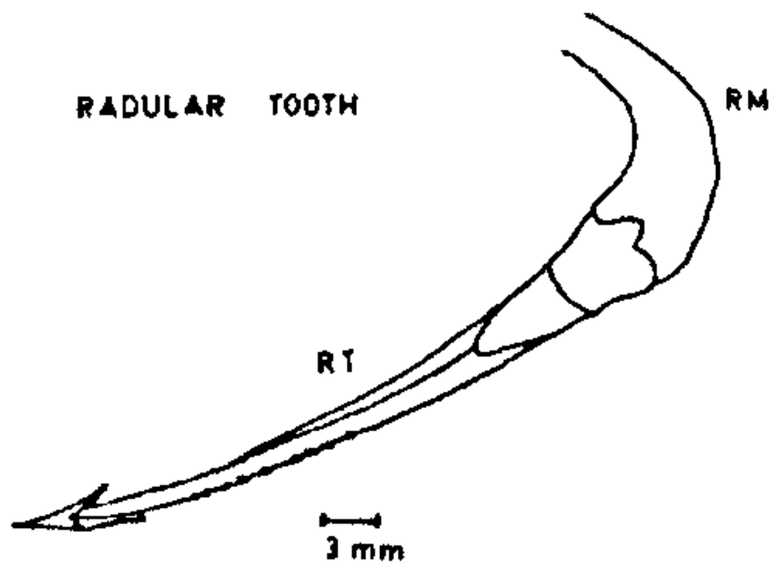

Figure 2. Figure showing a radular tooth. RT-Radular tooth; RM-Radular muscle.

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INHERITANCE OF 2,4-D TOLERANCE IN WHEAT

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A number of herbicides are now commercially used for selective weed killing in many crops. 2,4-Dichlorophenoxy acetic acid (2,4-D) is also recommended for controlling broad leaf weeds in cereals. 2,4-D has, however, been found to be phytotoxic to a high yielding wheat (*Triticum aestivum* L em Thell) variety HD 2009. The present study was, therefore, conducted to investigate the inheritance of 2,4-D tolerance in wheat.

The materials comprising of three 2,4-D tolerant varieties (WL 711, CPAN 1874 and CPAN 1922); two susceptible varieties (HD 2009 and PBW 94); 24 F_3 plant progenies derived randomly from a cross WL 711 × HD 2009; F_1 and F_2 generations of the crosses HD 2009 × CPAN 1874 and PBW 94 × CPAN