

PERSPECTIVES IN MARICULTURE

Editors

N. G. Menon and P. P. Pillai

Central Marine Fisheries Research Institute, Cochin



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Description of a simple prototype pelletizer for preparation of hormone pellets

L. Krishnan

Central Marine Fisheries Research Institute, Cochin - 682014

ABSTRACT

The design and working of a simple prototype pelletizer for

preparation of hormone pellets, to be used in cultivable fishes, for inducing maturation as well as spawning is described.

Introduction

Administration of reproductive hormones in the form of pellets has come to be accepted in recent years as the method of inducement for maturation and spawning in fishes. It has already been established that implantation of hormone in a pelleted-powder matrix assures long term hormone delivery in the treated animal. The fact that the high potency analogues of Luteinizing hormone releasing hormone (LHRHa) in a cholesterol matrix pellet is able to provide prolonged releasing hormone activity has been demonstrated in mammals (Kent *et al.*, 1980), and fish (Crim *et al.*, 1983). Two distinct advantages are offered by the pelleted hormone technique. Pellets are easy and cheap to fabricate and pellets maximise the effect of hormonal application in species where prolonged and elevated hormone levels are a pre-requisite for spawning (Garcia, 1989). Crim (1985) describes methods for acute and chronic hormone administration in fishes.

Lee *et al.* (1986) described a cheap and simple device for pellet making using 2 plastic sheets with holes drilled in one of them to form the pellet die. Many workers like Sherwood *et al.*, (1988) used a pellet press - parr instrument Co., Moline IL in making the pellets.

This paper describes the design and working of a low cost, portable and simple pelletizer.

Description of pelletizer

The instrument (Fig. 1) is made of two 'S' shaped cast iron pieces secured in the anterior 2/3 rd with a thread nut and bolt forming the fulcrum, but still allowing free movements of both the limbs like a 'Plier'. The 'handle' portion of the instrument is 14 cms long, rectangular in cross section and has a thickness of 1 cm. The anterior short portion in front of the fulcrum is 6 cms. long. The anterior upper and lower arms are provided with a cylindrical piston (4.5 cms long and 3mm dia) and the socket (length 3.4 cms and dia. 3.3 mm) respectively which help in the making of the pellet.

A rectangular piece of cast iron (2.5 cms long/5mm thick) is fixed vertically at the centro-dorsal portion of the anterior dorsal arm. The top portion of this piece is cut into a 'U' shaped slot. The central portion of a 'M' shaped iron lever (2mm thick and 5mm wide) is loosely hinged on to the 'U' shaped slot at the top of the vertical piece of cast iron with the help of a pin allowing free movement of the lever backwards and forwards. The posterior arm of this 'M' shaped lever is attached to a handle lever in a loose manner with the help of a hinge pin. The handle lever is also supported in the middle with the help of a thread bolt 4 cms long. The

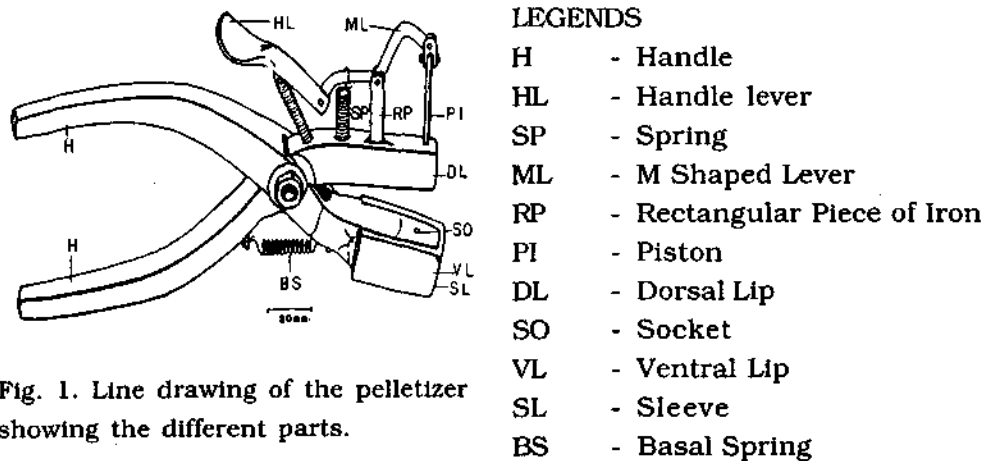


Fig. 1. Line drawing of the pelletizer showing the different parts.

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upper end of this bolt is shaped like a bulb and fits itself loosely into the groove like lower portion of the handle lever in one way retaining it and in another way acting as fulcrum on which the handle lever moves. The thread bolt itself is screwed into a slot drilled on the dorsal lip of the instrument.

When the handle lever is pressed, the posterior tip of the 'M' shaped lever is raised and indirectly lowering the anterior tip since the lever is loosely hinged in the centre. A 2 cms long spring attached a little ahead of the posterior edge of the 'M' shaped lever (and further fixed on the dorsal side of the instrument) allows the 'M' lever to return to its original position and in turn allows the handle lever also to come to the resting position, when the pressure on the handle lever is lessened.

The anterior tip of the 'M' lever is attached to a 4.5 cms long cylindrical piston having a dia. of 3 mm. The 'M' lever and the piston are connected through a movable link piece allowing free movement. The piston also passes through a neatly drilled cylindrical socket cutting through the dorsal lip of the instrument vertically. A portion of the piston always remains inside the socket even when the anterior upper and lower arms of the pelletizer are apposed to each other. The internal dia. of the cylindrical socket is 3.3 mm and measures 1.7 cms in length.

The anterior portion of the ventral lip of the pelletizer is also rectangular and has a well polished upper surface with a width of 1.7 cms. In the centre of this polished surface is also a vertically drilled cylindrical socket of an internal dia. of 3.3 mm and going down to a length of 1.7 cms and opening on the ventral side of the ventral lip. This cylindrical socket is positioned such that once the upper and lower lips of the pelletizer are apposed to each other the sockets of the respective lips become contiguous with one another forming a single socket.

When the handle lever is pressed, the cylindrical piston, already having passed through the cylindrical socket on the dorsal lip also moves freely through the socket on the ventral lip and juts a little outside the ventral side of the ventral lip of the pelletizer.

The rectangular dorsal surface of the lower lip of the pelletizer has two longitudinal grooves on either side. These grooves facilitate sliding

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in of a metallic, box like rectangular sleeve (Length 3.8 cms, 2.1 cms wide) which has its upper portion exposed. Once this sleeve is fitted to the dorsal grooves and pressed, it slides inside fitting tightly like a jacket on the lower lip of the pelletizer and at the same time closing the opening of the cylindrical socket on the ventral side of the ventral lip. Once the sleeve is removed, the ventral opening is exposed.

The upper and lower lips of the pelletizer are kept opened with the help of the basal spring attached horizontally on both the arms of the pelletizer.

Working of the pelletizer

The pelletizer is useful in the preparation of pellets containing LHRHa hormone in a cholesterol matrix, the methodology of which is described by Lee *et al.* (1985). After a thorough cleaning of the instrument, the metal sleeve is first slided on to the anterior lip of the ventral arm of the instrument. The dried hormone mixture kept ready is then filled little by little into the socket on the ventral lip. Intermittently the mixture is compressed by depressing the handle lever. Once the socket is 3/4th full, the remnants of the hormone mixture sticking on the sides of the sockets are all carefully shoved into the socket. The hormone mixture is then compressed progresively harder using the handle lever controlling the piston. The metal sleeve is then slided out exposing the ventral opening on the ventral lip. The pellet is then ejected out by pressing the handle lever carefully and the pellet is collected in a container. The pelletizer is then cleaned using a cloth dipped in alcohol helping the removal of the sticky cholesterol remnants. At a time a single pellet of 10 mm length with 3 mm dia. can be extruded by operating the pelletizer. This pellet can be cut into two using a sharp blade. The pellet is then dried for two hours inside an incubator (set at 37° C). The pellet can further be kept closed inside a glass vial padded with cotton and stored in a refrigerator for further use.

Discussion

Procedural guides to the production and implantation of LHRHa cholesterol pellet into milk fish is given by Lee *et al.* (1985,1986). Crim (1985) described methods for acute and chronic hormone administration in milk fish. But it was Lee *et al.* (1986) who devised a simple method for

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making of pellets using two plastic plates. The pellet mould consists of one plastic plate with 15 holes drilled on to it. An undrilled plastic sheet of similar dimension was used as a base for the drilled sheet. The hormone mixture is filled into the holes of the top sheet using a nail and compressed well with a hammer. The pellets 2.4 mm in dia. by 5.0 mm are then ejected out pushing them out with a hard substance. The design and model of the hormone pelletizer given in this work is the first of its kind in India. The pelletizer is portable, easy to make and handle, and very useful in the making of pellets even in field conditions. The pellets made using this device were tried in *Lates calcarifer* with good success (Anon, 1992).

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