EXPERIMENTAL RESULTS

Luminal pH of the gastro-intestinal tract and pH of bile one hour after feeding

Name of the specimen	Oesopha-gus	Intestinal bulb	Stomach	Anterior intestine	Duode-num	Posterior intestine	Intes-tine	Bille
Cyprinus carpio Linn. (American Carp)	6.0	5.2	-	6.0	-	6.4	-	7.0
Ophicephalus punctatus Bloch. (Lata fish)	6.0	-	5.1	7.0	-	7.0	-	7.2
Bufo melan-ostictus Schn (Indian toad)	7.0	-	3.0	-	6.4	-	7.5	7.0
Mabuia carinata Schn. (Glass lizard)	3.5	-	3.0	-	6.3	-	7.2	7.0

DIGESTIVE ENZYMES

(a) Amylase :

Amylolysis was measured by the amount of maltose liberated with the hydrolysis of amylopectin by the enzymes produced in 100 mg tissue from the oesophagus of Cyprinus carpio, Ophicephalus punctatus, Bufo melanostictus and Mabuia carinata; intestinal bulb of C. carpio and stomach of Ophicephalus, Bufo and Mabuia; anterior intestine of Cyprinus and Ophicephalus and duodenum of Bufo and Mabuia; posterior intestine of Cyprinus and Ophicephalus and intestine of Bufo and Mabuia; hepatopancreas of Cyprinus and Ophicephalus and liver and pancreas of Bufo and Mabuia and the enzyme present in 0.016 ml bile of all the four species.

The amylolytic activity in the oesophagus was highest - 41.0 mg maltose in Cyprinus. The amount was 2.4 mg and 2.0 mg in Ophicephalus and Mabuia respectively, and absent in Bufo (Fig.87).

The activity of amylase in the intestinal bulb of C. carpio was 42.6 mg maltose, and 11.8 mg, 1.2 mg and 2.6 mg respectively in the stomach of Ophicephalus, Bufo and Mabuia (Fig.88).

The amylase activity of the anterior intestine was 48.2 mg and 26.2 mg maltose respectively in Cyprinus and Ophicephalus, and 1.8 mg and 15.8 mg respectively in the duodenum of Bufo and Mabuia (Fig.89).

43.4 mg and 35.8 mg maltose was hydrolysed in the posterior intestine of Cyprinus and Ophicephalus, on the other hand the amount was only 1.6 mg and 2.0 mg in the intestine of Bufo and Mabuia respectively (Fig.90).

In the hepatopancreas of Cyprinus and Ophicephalus, the amylolytic activity was 50.0 mg, 28.4 mg maltose, and in the liver of Bufo and Mabuia 10.8 mg and 6.8 mg respectively (Fig.91).

Amylolytic activity of the pancreas in Bufo and Mabuia was 68.0 mg and 21.0 mg maltose respectively (Fig.92).

Amylase activity of bile was highest in Cyprinus - 45.8 mg maltose, 0.4 mg and 0.8 mg maltose in case of Ophicephalus and Mabuia; absent in Bufo (Fig.93)

(b) Proteinase :

Protein hydrolysing ability was measured by the amount of bovine albumin split into amino acids with the enzyme produced by 50 mg tissue of different zones of the gut and digestive glands and the enzyme present in 0.016ml bile.

The proteinase activity in the oesophagus was similar 20.83 units in Cyprinus and Ophicephalus. The amount was 16.66 units both in Bufo and Mabuia (Fig.94).

The proteinase activity in the intestinal bulb of Cyprinus and stomach of Ophicephalus, Bufo and Mabuia was 41.66, 25.0, 29.17 and 25.0 units respectively(Fig.95).

The proteinase activity of anterior intestine of Cyprinus and Ophicephalus was 29.17 and 25.0 units respectively; in case of Bufo and Mabuia the activity of duodenum was 33.33 and 16.66 units respectively(Fig.96).

33.33, 25.0, 20.83 and 16.66 units was the activity of the posterior intestine of Cyprinus, Ophicephalus and intestine of Bufo and Mabuia respectively(Fig.97).

In the hepatopancreas of Cyprinus and Ophicephalus and liver of Bufo and Mabuia, the proteolytic activity was 37.5, 33.33, 25.0, and 25.0 units respectively(Fig.98).

In the pancreas of Bufo and Mabuia the activity was 41.66 and 141.66 units respectively (Fig.99).

Proteolytic activity of bile in *Cyprinus* and *Ophicephalus* was 29.17 units while in *Bufo* and *Mabuia* it was 25.0 and 16.66 units respectively (Fig.100).

(c) Esterase :

Esterase activity of 4 mg tissue of the different zones of the alimentary canal, digestive gland and 0.016 ml bile was measured from the spliting of esteric linkage in phenyl benzoate.

Esteolytic reaction in the oesophagus was 11.66, 38.16, 9.56, and 13.88 in Cyprinus, Ophicephalus, Bufo and Mabuia respectively (Fig.101).

Esterase activity recorded from the intestinal bulb in C. carpio and stomach of Ophicephalus, Bufo and Mabuia was 15.9, 43.46, 9.75 and 15.9 respectively(Fig.102).

Esterase activity in anterior intestine of Cyprinus and Ophicephalus was 20.14 and 53.94 respectively. In the duodenum of Bufo and Mabuia the activity was 19.08 and 17.38 respectively (Fig.103).

The activity was 16.96 and 34.98 in posterior intestine of Cyprinus and Ophicephalus and on the other hand it was 13.25 and 16.96 in the intestine of Bufo and Mabuia respectively (Fig.104).

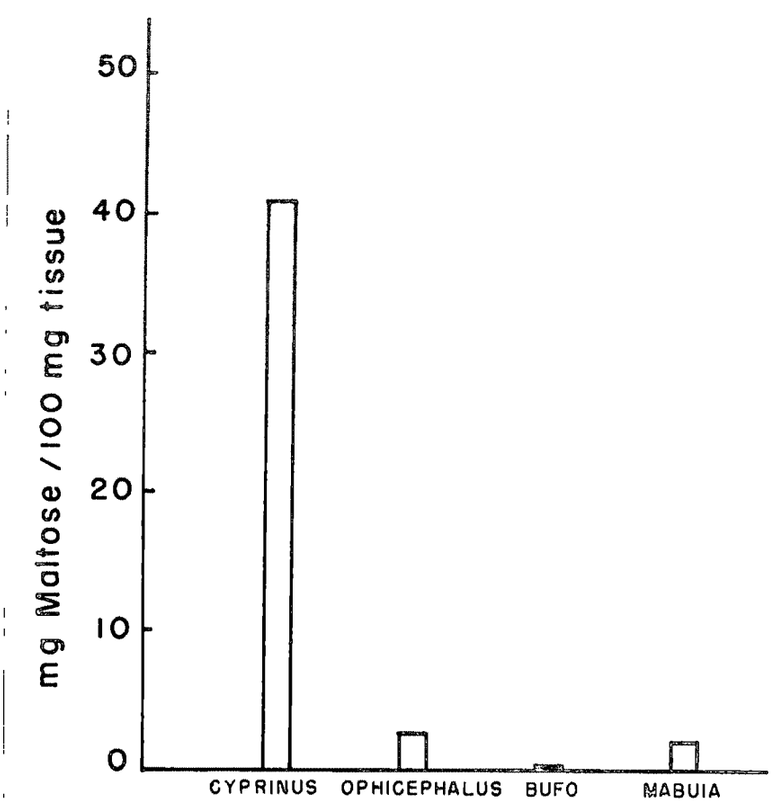
In the hepatopancreas of Cyprinus and Ophicephalus and liver of Bufo and Mabuia the esteolytic activity was recorded to be 23.32, 50.88, 31.80, and 39.22 respectively (Fig.105).

Esteolytic activity of pancreas in Bufo and Mabuia was 20.14 and 19.08 respectively (Fig.106).

Esteolytic reaction in the bile of Cyprinus, Ophicephalus, Bufo and Mabuia was 21.2, 18.08, 8.48 and 3.18 respectively (Fig.107).

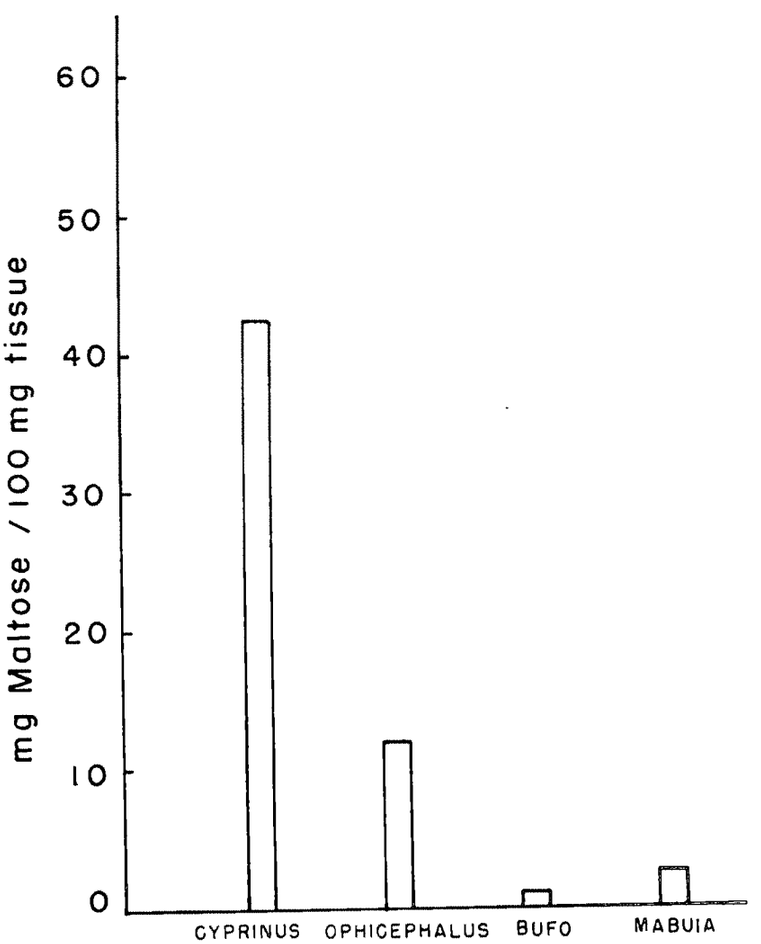
EXPLANATION OF FIGURE

Fig. 87. Amylolytic activity of the enzyme extracted from 100 mg tissue of the oesophagus of *Cyprinus*, *Ophicephalus*, *Bufo* and *Mabuia* measured by mg of maltose liberated from 1% amylopectin solution in 10-minute hydrolysis.


mg Maltose / 100 mg tissue
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

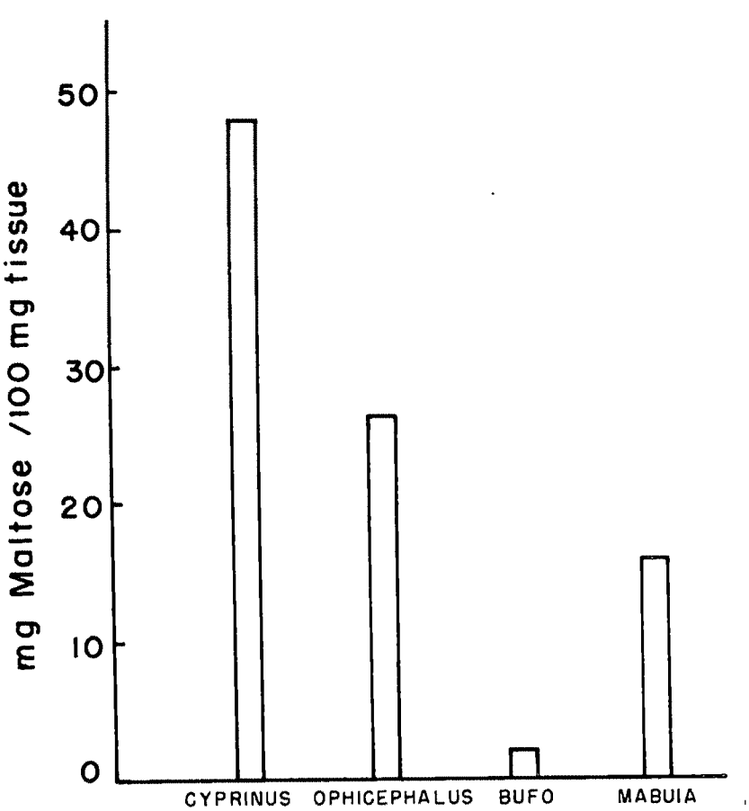
EXPLANATION OF FIGURE

Fig. 88. Amylolytic activity of the enzyme extracted from 100 mg tissue of the intestinal bulb of *Cyprinus* and stomach of *Ophicephalus*, *Bufo* and *Mabuia* measured by mg of maltose liberated from 1% amylopectin solution in 10-minute hydrolysis.


mg Maltose / 100 mg tissue
60
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

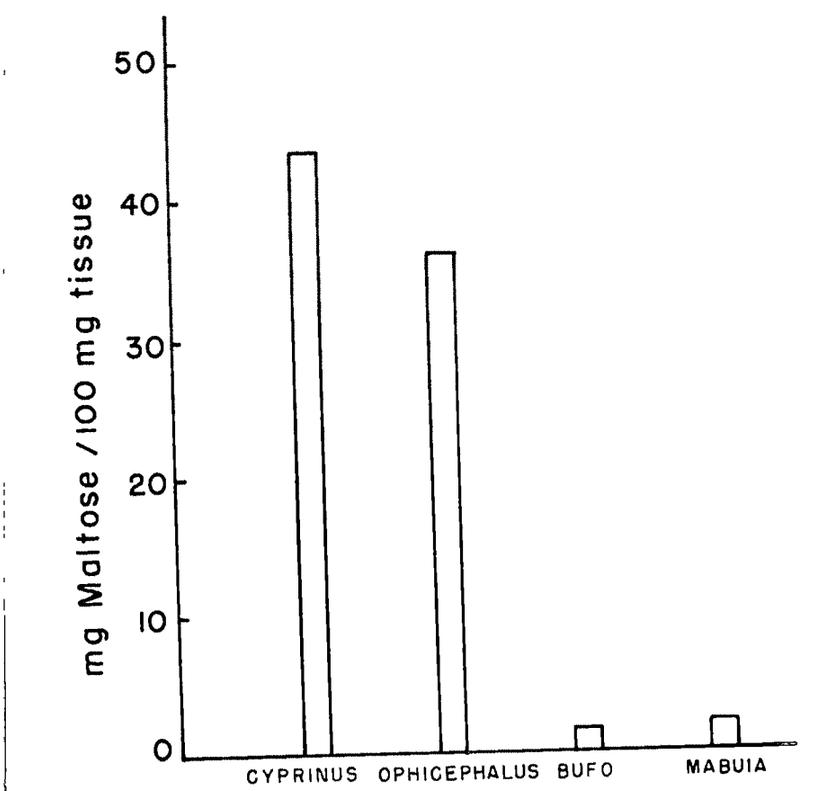
EXPLANATION OF FIGURE

Fig. 89. Amylolytic activity of the enzyme extracted from 100 mg tissue of the anterior intestine of *Cyprinus* and *Ophicephalus* and duodenum of *Bufo* and *Mabuia* measured by mg of maltose liberated from 1% amylopectin solution in 10-minute hydrolysis.


mg Maltose /100 mg tissue
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

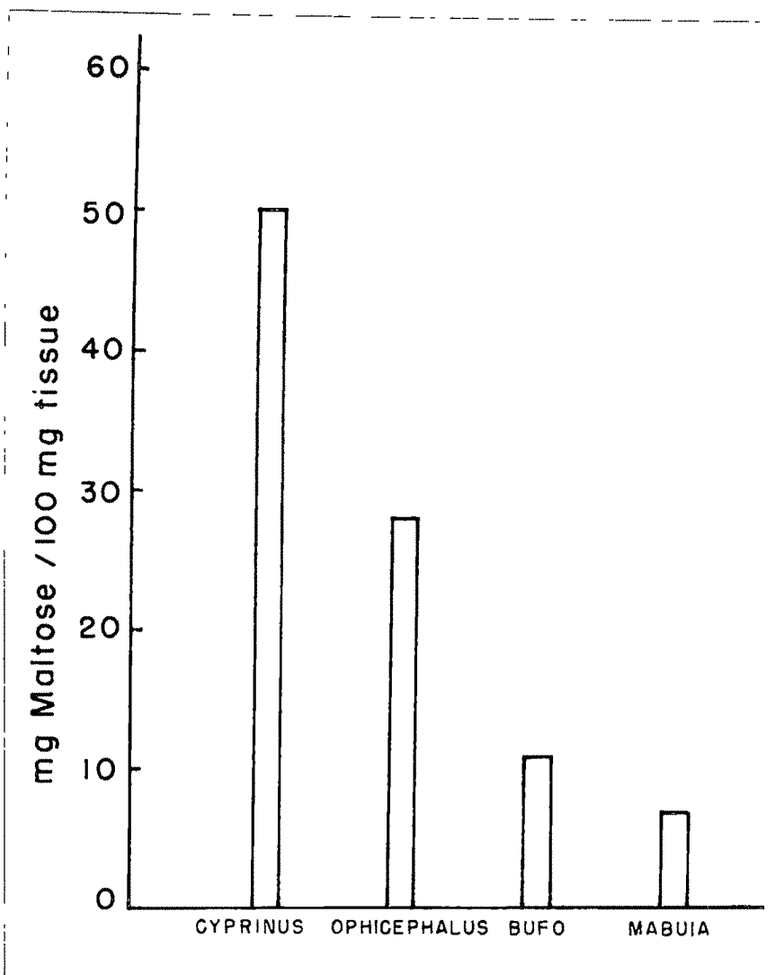
EXPLANATION OF FIGURE

Fig. 90. Amylolytic activity of the enzyme extracted from 100 mg tissue of the posterior intestine of *Cyprinus* and *Ophicephalus* and intestine of *Bufo* and *Mabuia* measured by mg of maltose liberated from 1% amylopectin solution in 10-minute hydrolysis.


mg Maltose /100 mg tissue
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

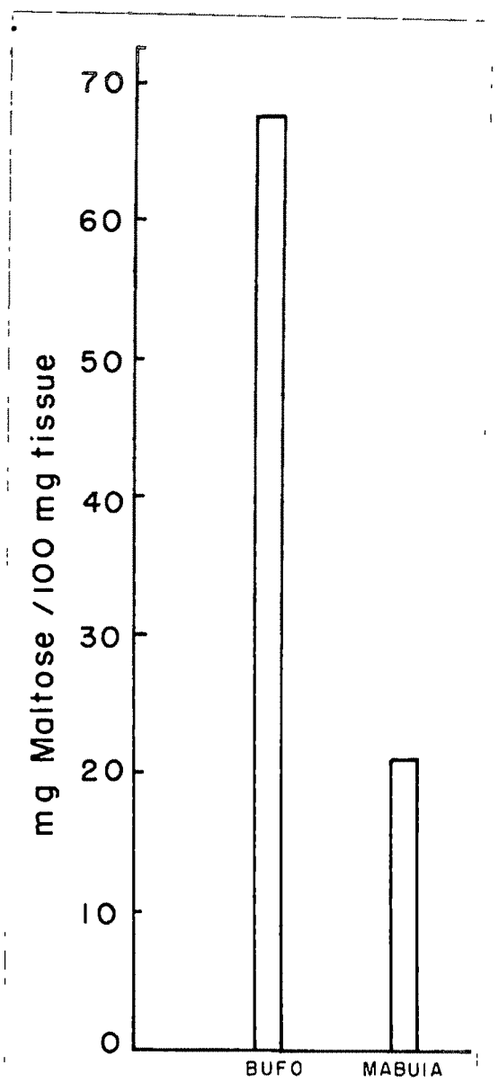
EXPLANATION OF FIGURE

Fig. 91. Amylolytic activity of the enzyme extracted from 100 mg tissue of the hepatopancreas of *Cyprinus* and *Ophicephalus* and liver of *Bufo* and *Mabuia* measured by mg of maltose liberated from 1% amylopectin solution in 10-minute hydrolysis.


60
50
40
30
20
10
0
mg Maltose / 100 mg tissue
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

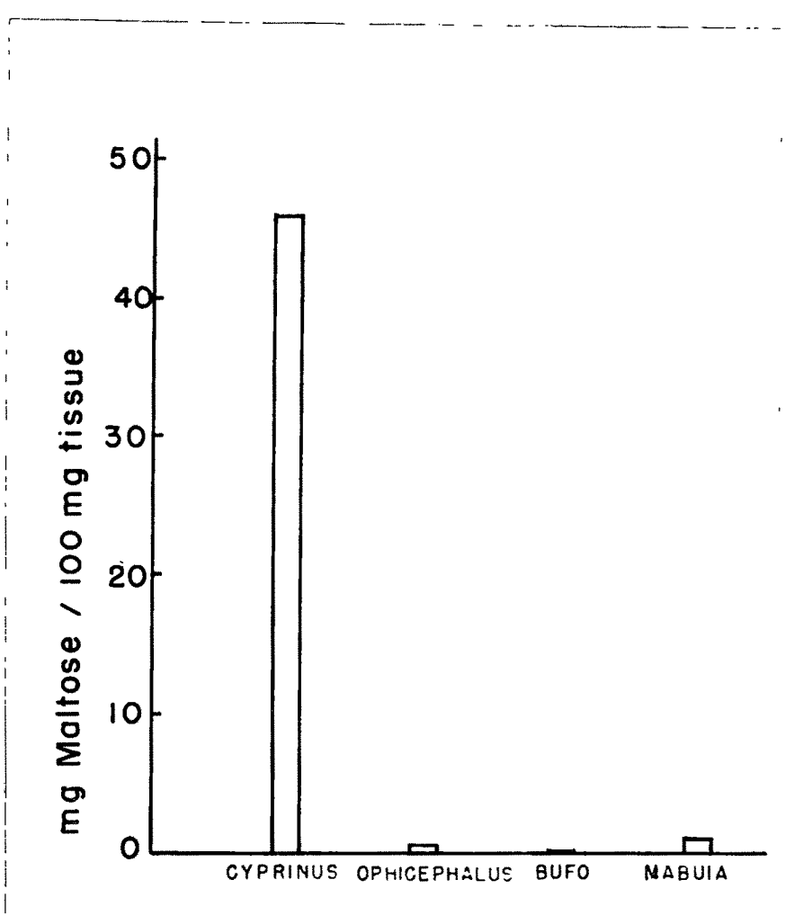
EXPLANATION OF FIGURE

Fig. 92. Amylolytic activity of the enzyme extracted from 100 mg tissue of the pancreas of Bufo and Mabuia measured by mg of maltose liberated from 1% amylopectin solution in 10-minute hydrolysis.


70
60
50
40
30
20
10
0
mg Maltose /100 mg tissue
BUFO
MABUIA

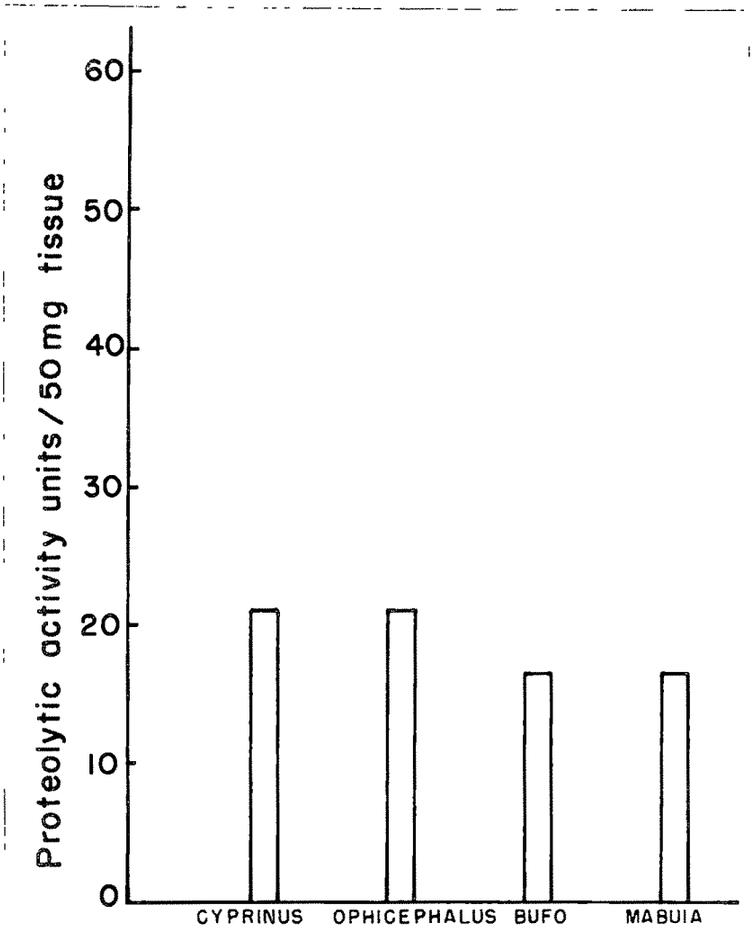
EXPLANATION OF FIGURE

Fig. 93. Amylolytic activity of the enzyme present in 0.016 ml (diluted to one ml) bile of *Cyprinus*, *Ophicephalus*, *Bufo* and *Mabuia* measured by mg of maltose liberated from 1% amylopectin solution in 10-minute hydrolysis.


50
40
30
20
10
0
mg Maltose / 100 mg tissue
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

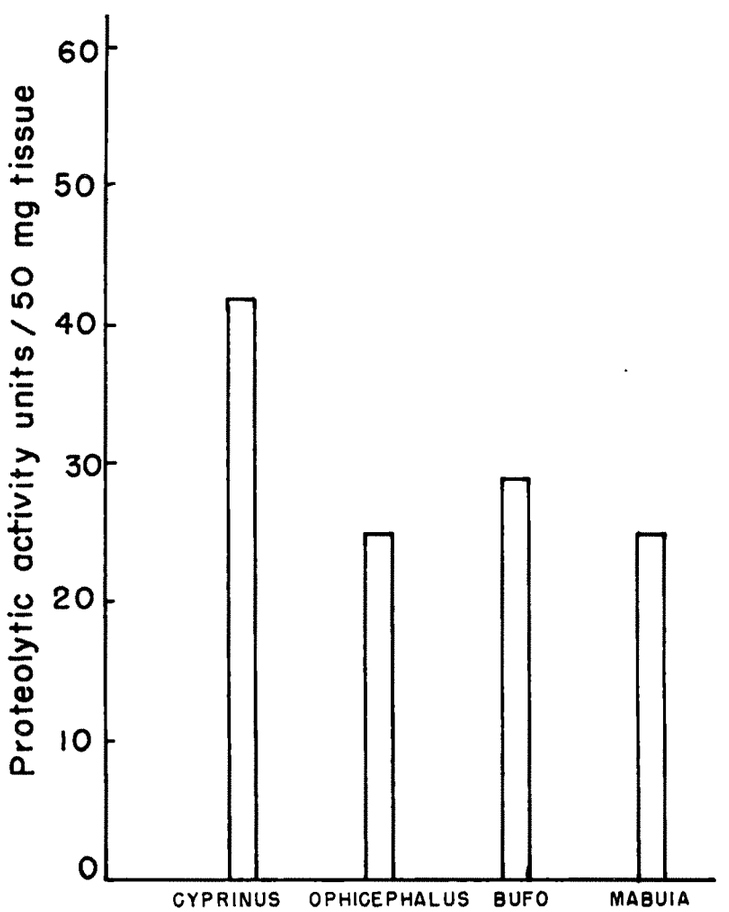
EXPLANATION OF FIGURE

Fig. 94. Proteinase activity of the enzyme extracted from 50 mg tissue of the oesophagus of *Cyprinus*, *Ophicephalus*, *Bufo* and *Mabuia* measured by the amount of protein split (in term of units of proteolytic activity) from 5.6% bovine albumin solution in 15-minute hydrolysis.


Proteolytic activity units / 50 mg tissue
60
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

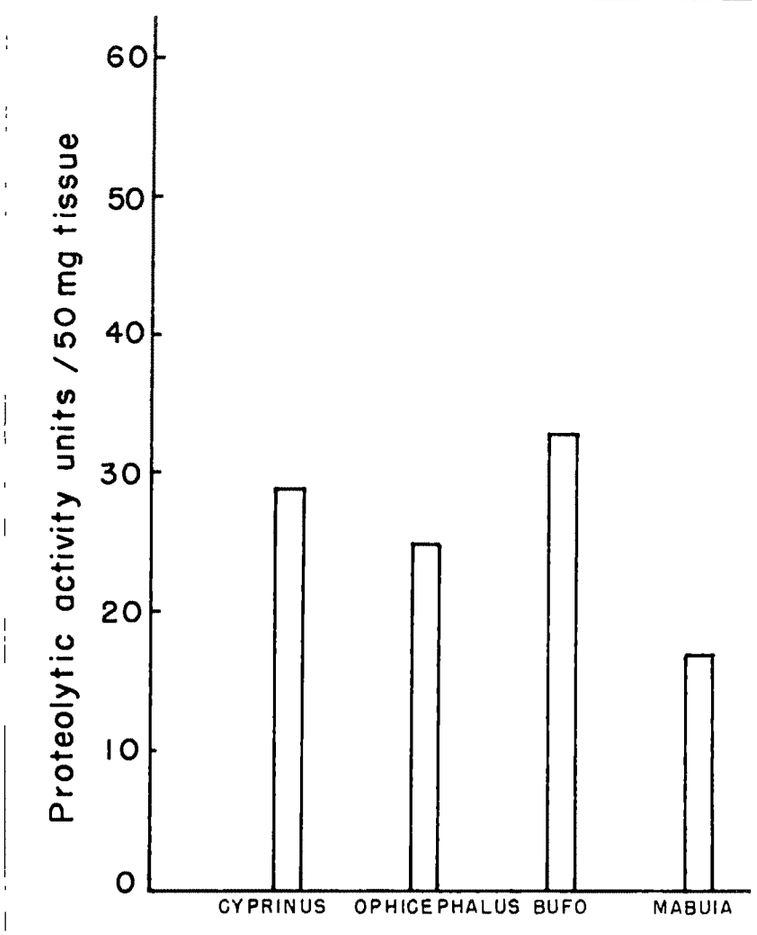
EXPLANATION OF FIGURE

Fig. 95. Proteinase activity of the enzyme extracted from 50 mg tissue of the intestinal bulb of Cyprinus and stomach of Ophicephalus, Bufo and Mabuia measured by the amount of protein split (in term of units of proteolytic activity) from 5.6% bovine albumin solution in 15-minute hydrolysis.


Proteolytic activity units / 50 mg tissue
60
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

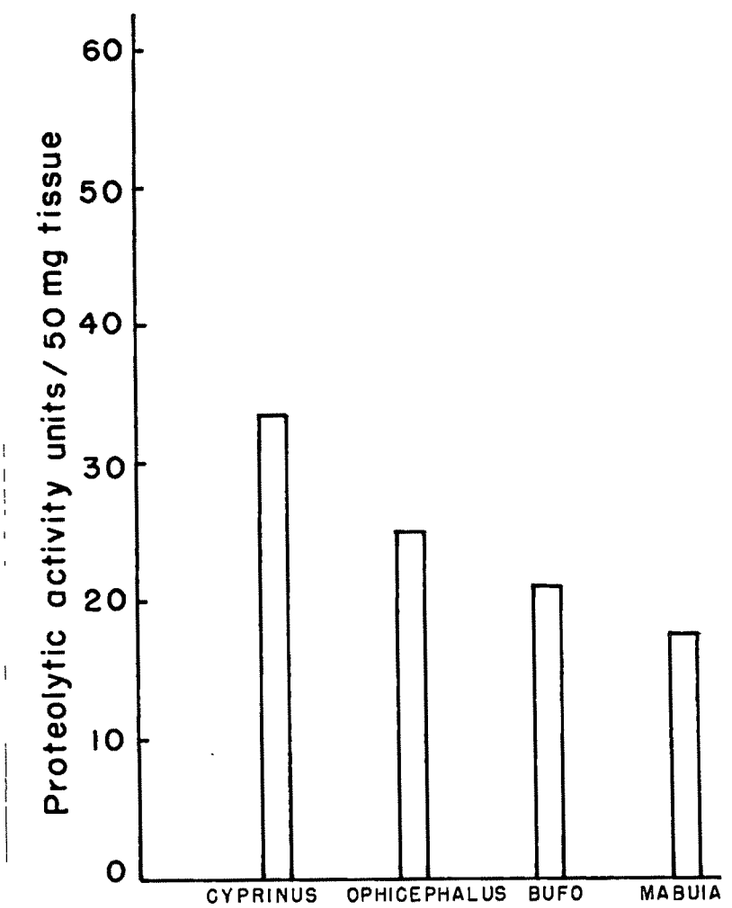
EXPLANATION OF FIGURE

Fig. 96. Proteinase activity of the enzyme extracted from 50 mg tissue of the anterior intestine of *Cyprinus* and *Ophicephalus* and duodenum of *Bufo* and *Mabuia* measured by the amount of protein split (in term of units of proteolytic activity) from 5.6% bovine albumin solution in 15-minute hydrolysis.


Proteolytic activity units / 50 mg tissue
60
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

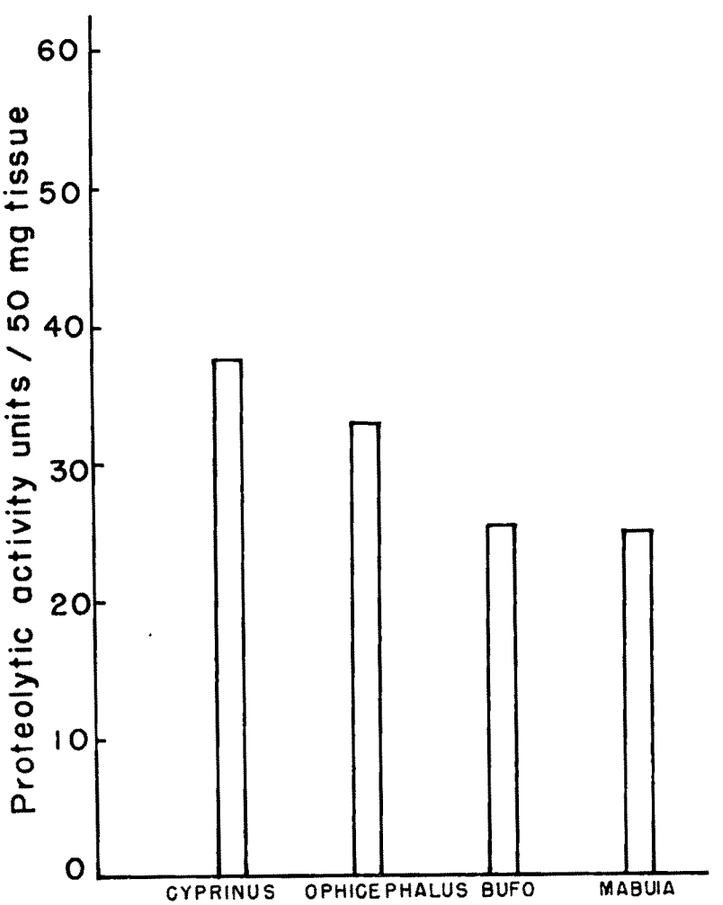
EXPLANATION OF FIGURE

Fig. 97. Proteinase activity of the enzyme extracted from 50 mg tissue of the posterior intestine of *Cyprinus* and *Ophicephalus* and intestine of *Bufo* and *Mabuia* measured by the amount of protein split (in term of units of proteolytic activity) from 5.6% bovine albumin solution in 15-minute hydrolysis.


Proteolytic activity units / 50 mg tissue
60
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

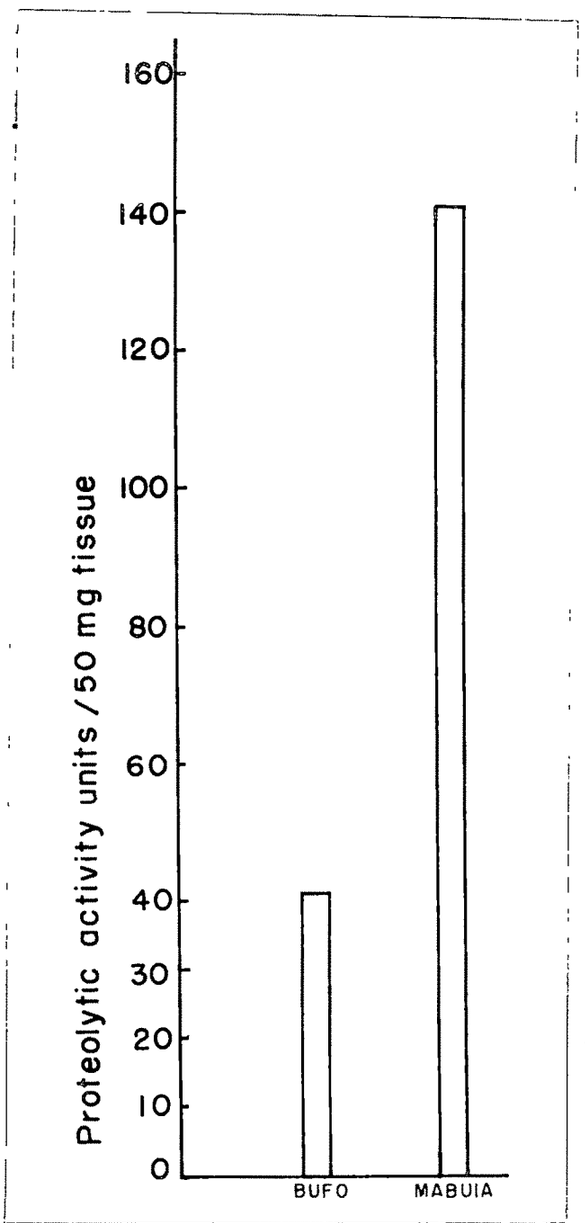
EXPLANATION OF FIGURE

Fig. 98. Proteinase activity of the enzyme extracted from 50 mg tissue of the hepatopancreas of *Cyprinus* and *Ophicephalus* and liver of *Bufo* and *Mabuia* measured by the amount of protein split (in term of units of proteolytic activity) from 5.6% bovine albumin solution in 15-minute hydrolysis.


Proteolytic activity units / 50 mg tissue
60
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

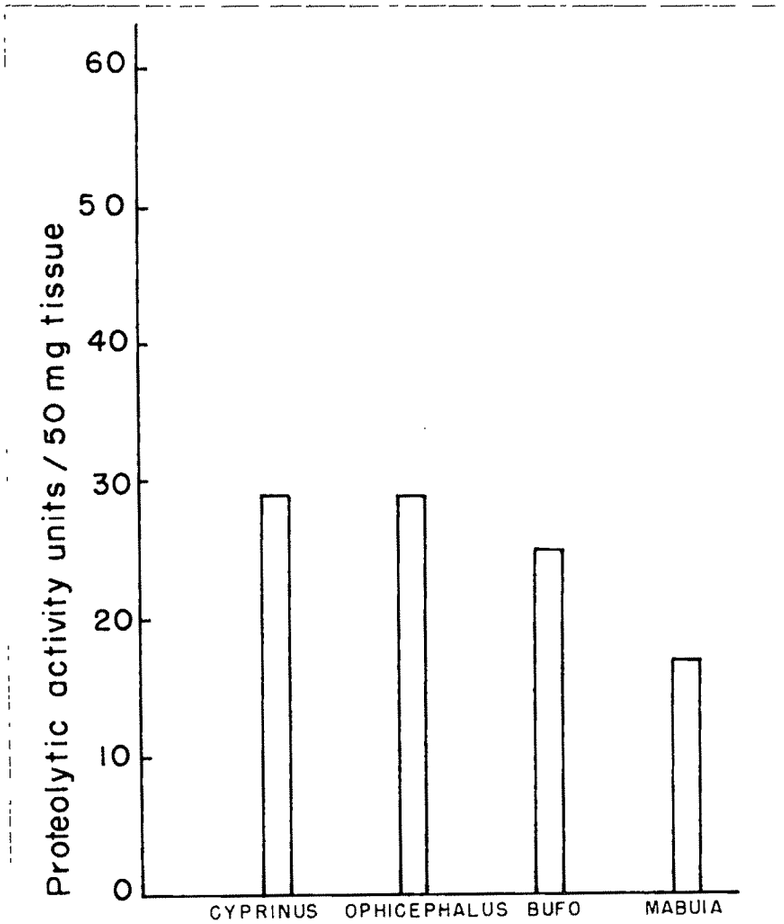
EXPLANATION OF FIGURE

Fig. 99. Proteinase activity of the enzyme extracted from 50 mg tissue of the pancreas of Bufo and Mabuia measured by the amount of protein split (in term of units of proteolytic activity) from 5.5% bovine albumin solution in 15-minute hydrolysis.


Proteolytic activity units / 50 mg tissue
160
140
120
100
80
60
40
30
20
10
0
BUFO
MABUIA

EXPLANATION OF FIGURE

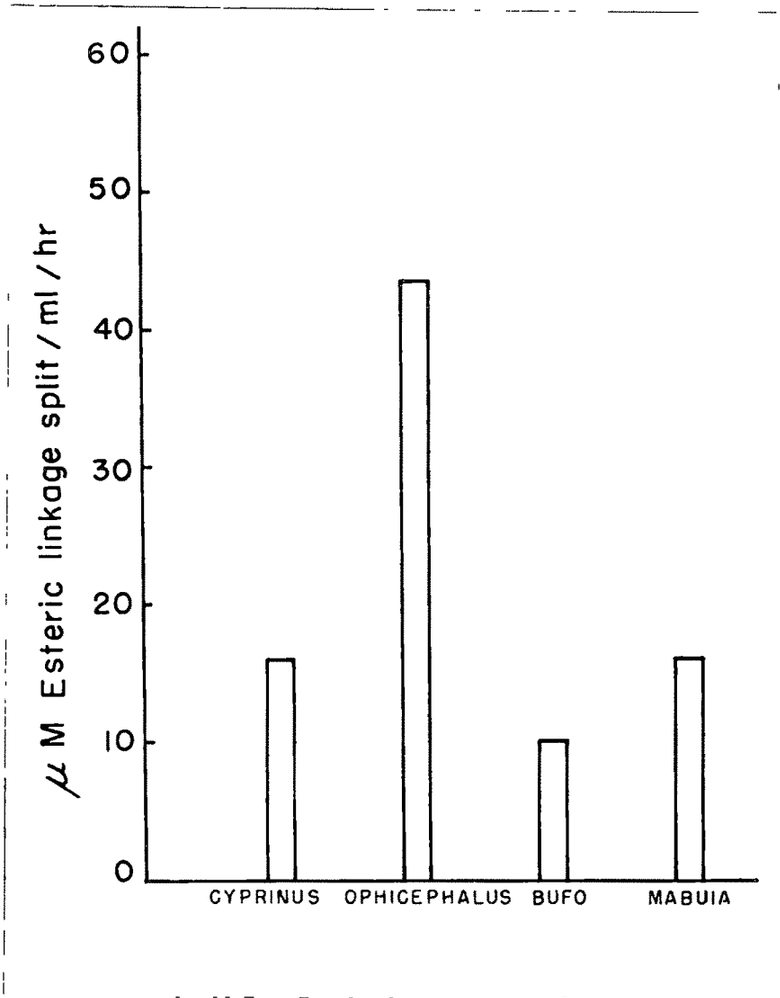
Fig.100. Proteinase activity of the enzyme present in 0.016 ml bile (diluted to one ml) of *Cyprinus*, *Ophicephalus*, *Bufo* and *Mabuia* measured by the amount of protein split (in term of units of proteolytic activity) from 5.6% bovine albumin solution in 15-minute hydrolysis.


Proteolytic activity units / 50 mg tissue
60
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

EXPLANATION OF FIGURE

Fig.101. Esteolytic activity of the enzyme extracted from 4 mg tissue of the oesophagus of *Cyprinus*, *Ophicephalus*, *Bufo* and *Mabuia* measured in term of esteric linkages split in phenyl benzoate solution in 1-hour hydrolysis.

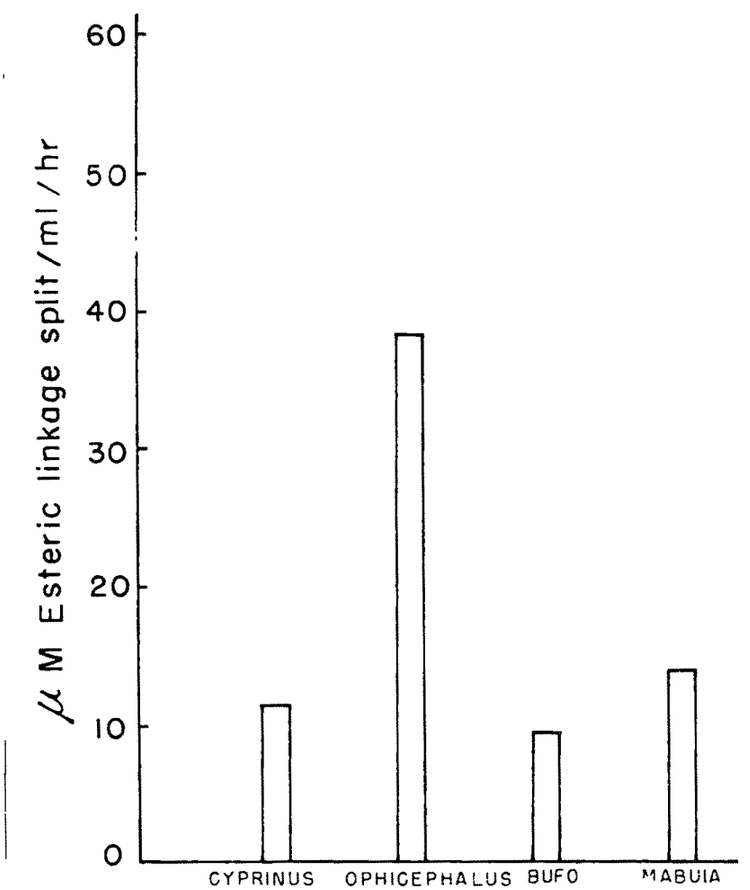
The enzyme solution (1 ml) was thoroughly mixed with 5 ml buffered substrate (1 ml 2% phenyl benzoate solution in methanol, mixed with 500 ml C.1N pH 6.3 Na-phosphate buffer) and incubated for one hour at 37°.


60
50
40
30
20
10
0
μ M Esteric linkage split / ml / hr
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

EXPLANATION OF FIGURE

Fig.102. Esteolytic activity of the enzyme extracted from 4 mg tissue of the intestinal bulb of Cyprinus and stomach of Ophicephalus, Bufo and Mabuia measured in term of esteric linkages split in phenyl benzoate solution in 1-hour hydrolysis.

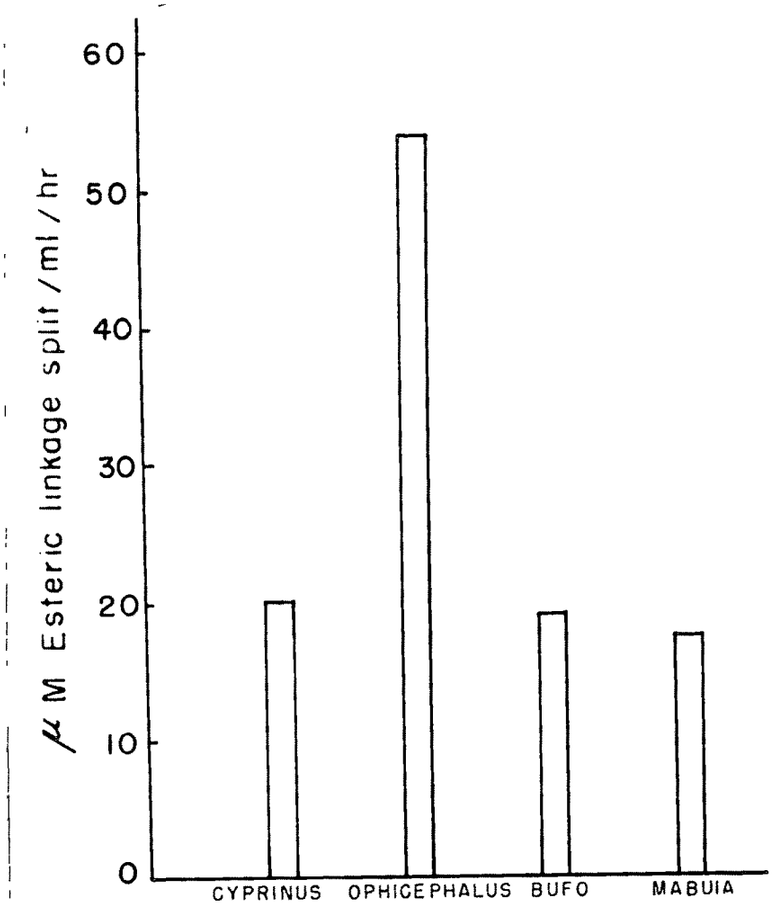
The enzyme solution (1 ml) was thoroughly mixed with 5 ml buffered substrate (1 ml 2% phenyl benzoate solution in methanol, mixed with 500 ml 0.1N pH 6.3 Na-phosphate buffer) and incubated for one hour at 37°.


60
50
40
30
20
10
0
μ M Esteric linkage split / ml / hr
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

EXPLANATION OF FIGURE

Fig.103. Esteolytic activity of the enzyme extracted from 4 mg tissue of the anterior intestine of Cyprinus and Ophicephalus and duodenum of Bufo and Mabuia measured in term of esteric linkages split in phenyl benzoate solution in 1-hour hydrolysis.

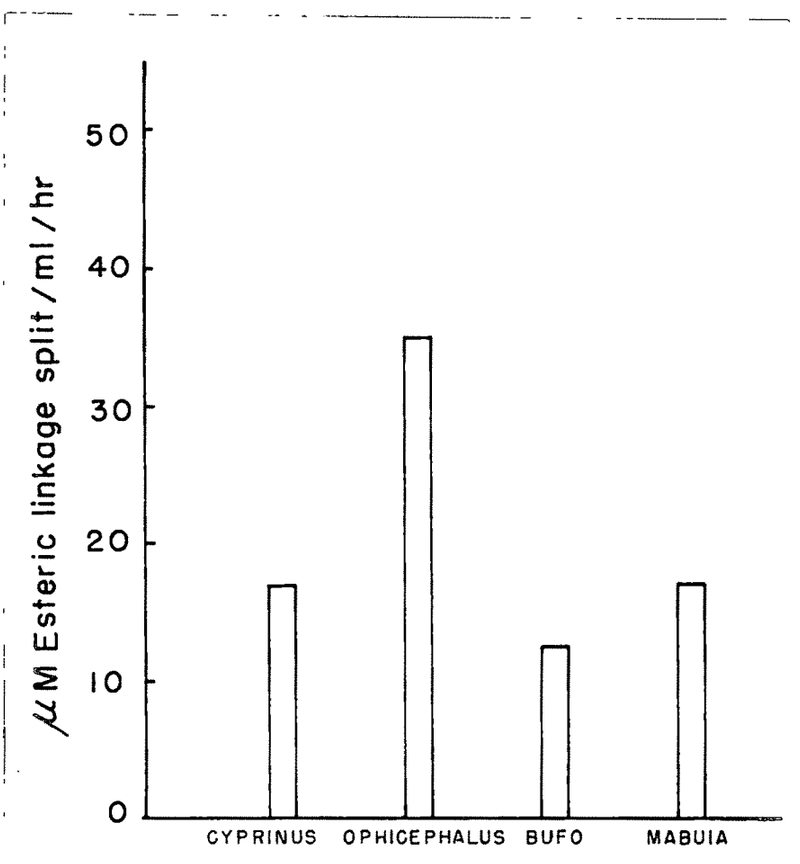
The enzyme solution (1 ml) was thoroughly mixed with 5 ml buffered substrate (1 ml 2% phenyl benzoate solution in methanol, mixed with 500 ml 0.1N pH 6.3 Na-phosphate buffer) and incubated for one hour at 37°.


μM Esteric linkage split / ml / hr
60
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

EXPLANATION OF FIGURE

Fig.104. Esteolytic activity of the enzyme extracted from 4 mg tissue of the posterior intestine of Cyprinus and Ophicephalus and intestine of Bufo and Mabuia measured in term of esteric linkages split in phenyl benzoate solution in 1-hour hydrolysis.

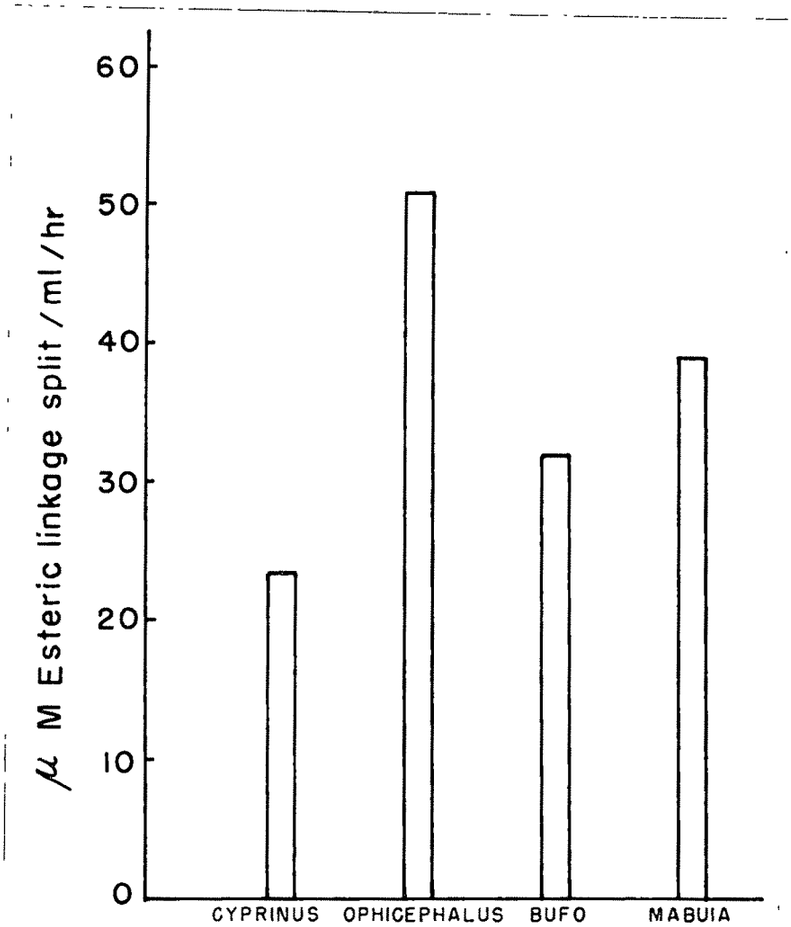
The enzyme solution (1 ml) was thoroughly mixed with 5 ml buffered substrate (1 ml 2% phenyl benzoate solution in methanol, mixed with 500 ml 0.1N pH 6.3 Na-phosphate buffer) and incubated for one hour at 37°.


μM Esteric linkage split / ml / hr
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

EXPLANATION OF FIGURE

Fig.105. Esteolytic activity of the enzyme extracted from 4 mg tissue of the hepatopancreas of Cyprinus and Ophicephalus and liver of Bufo and Mabuia measured in term of esteric linkages split in phenyl benzoate solution in 1-hour hydrolysis.

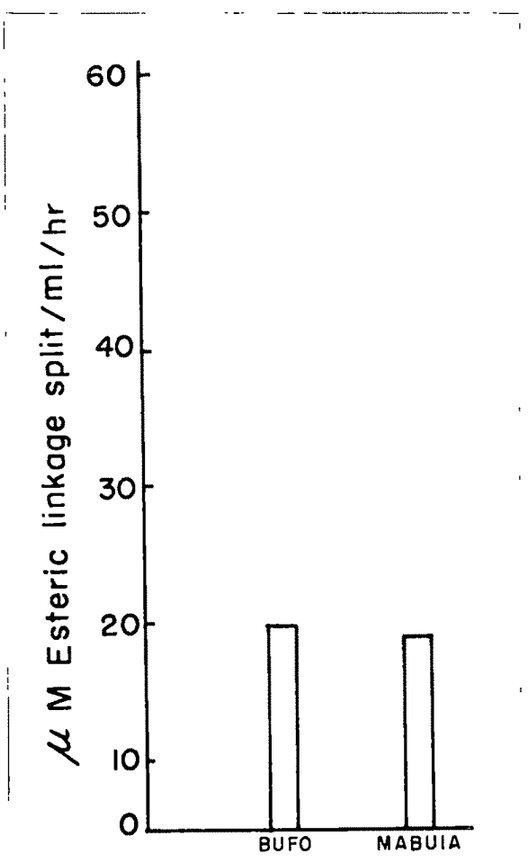
The enzyme solution (1 ml) was thoroughly mixed with 5 ml buffered substrate (1 ml 2% phenyl benzoate solution in methanol, mixed with 500 ml 0.1N pH 6.3 Na-phosphate buffer) and incubated for one hour at 37°.


μ M Esteric linkage split / ml / hr
60
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA

EXPLANATION OF FIGURE

Fig.106. Esteolytic activity of the enzyme extracted from 4 mg tissue of the pancreas of Bufo and Mabuia measured in term of esteric linkages split in phenyl benzoate solution in 1-hour hydrolysis.

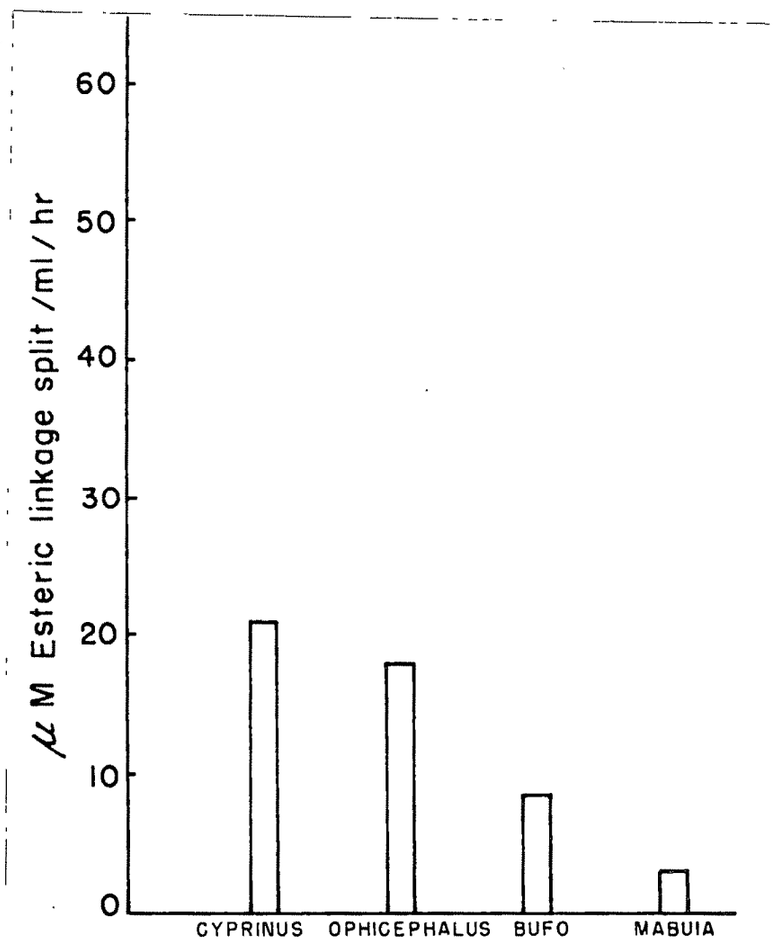
The enzyme solution (1 ml) was thoroughly mixed with 5 ml buffered substrate (1 ml 2% phenyl benzoate solution in methanol, mixed with 500 ml 0.1N pH 6.3 Na-phosphate buffer) and incubated for one hour at 37°.


60
50
40
30
20
10
0
μ M Esteric linkage split/ml/hr
BUFO
MABUIA

EXPLANATION OF FIGURE

Fig.107. Esteolytic activity of the enzyme present in 0.016 ml bile (diluted to one ml) of Cyprinus, Ophicephalus, Bufo and Mabuia measured in term of esteric linkages split in phenyl benzoate solution in 1-hour hydrolysis.

The diluted bile (1 ml) was thoroughly mixed with 5 ml buffered substrate (1 ml 2% phenyl benzoate solution in methanol, mixed with 500 ml 0.1N pH 6.3 Na-phosphate buffer) and incubated for one hour at 37°.


μ M Esteric linkage split /ml/ hr
60
50
40
30
20
10
0
CYPRINUS
OPHICEPHALUS
BUFO
MABUIA