THE PRESENCE OF ACETYLCHOLINE IN THE FRUIT OF *PHYSALIS EDULIS*

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SUMMARY. *The presence of a cholinomimetic activity in the aqueous extract of the fruit of the* P. edulis *was detected through the following pharmacological tests: contraction of isolated jejunum of rats, contraction of isolated abdominal rectum of toads, and incubation of the extract with human serum. The effects produced were selectively blocked by atropine, gallamine, and were potentiated by neostigmine.*

Physalis edulis L. is a plant of the family of the Solanaceae, popularly known in Brazil as "balãozinho" or "camapu". According to the Brazilian folk medicine, it is indicated for inflammation of the bladder, dermatosis, tubercolosis, diabetes and heart diseases.

Since acetylcholine has been identified in various plants, especially those of the Solanaceae, [1-3, 5-9, 11, 14] we were led to study *P. edulis* to verify the presence of acetylcholine through parmacological tests. The action of this substance in the plants is not well understood yet. However, there is a strong evidence that it is a neuro-transmitter with an activity analogous to that in the animals.[13] This agent acts as a phyto-hormone capable of regulating and mediating a variety of phytochromic responses which involve changes in the permeability of the membranes.[12, 16]

EXPERIMENTAL

Material from the plant. P. edulis, botanically identified, was collected from around the Campus of Universidade Federal de Pernambuco where it grows widely everywhere and a specimen was deposited in the Herbarium of the Antibiotics Department of the University (UFPE).

The crude aqueous extract from fresh fruits (solid matter 17 mg/ml) was stored at –8°C for biological tests.

Jejunum isolated from rats. A segment of 3 cm of the organ was fixed to a 10 ml tray containing Tyrode in an atmosphere 95% O_2 and 5% CO_2 at a temperature of 37°C. The isotonic contractions were registered through a frontal writing stylus on a smoked drum. The preparation was left at rest for 30 minutes and stabilized with doses of acetylcholine of 10^{-3}M, before the experiment began. [15]

Abdominal rectum of toads. The muscle was mounted in a 10 ml tray containing Ringer solution and aired at room temperature (37°C). After 30 min of rest, the isotonic contractions of the muscle were registered trough a frontal writing stylus on a smoked drum. The muscle was stabilized with doses of acetylcholine at 10^{-3}M, before beginning the experiment.[4]

Incubation of the extract with human serum. After obtaining the simple dosage effect curves, a dosage producing between 20 and 80% of the maximum contraction was incubated with twice the volume of human serum and tested in the stabilized preparation.[1]

RESULTS

Jejunum isolated from rats. The muscarine action was verified in this preparation. The atropine in a dosage of 10^{-5}M produced the inhibition of the action of the acetylcholine in the dosage of 10^{-4}M and of the extract in the dosage of 3 mg. Fig. 1 A and B.

Abdominal rectum of toads. The nicotinic action was verified in this preparation. The dosage of 10^{-4}M of acetylcholine and of 4 mg of the extract were blocked by gallamine in a dosage of 10^{-5}M and potentiated by neostigmine in the dosage of 10^{-6}M, Fig. 2 A, B and C.

Incubation of the extract with human serum. Both, that incubated from acetylcholine and that from the extract, did not produce muscle response. Fig. 2 D.

DISCUSSION AND CONCLUSION

The presence of the cholinomimetic activity in the extract from *P. edulis* was shown by its effects on the contractions of the jejunum isolated from rats and of the abdominal rectus of toads. Since the activity of the extract was blocked by atropine and gallamine respectively, it may be concluded that the

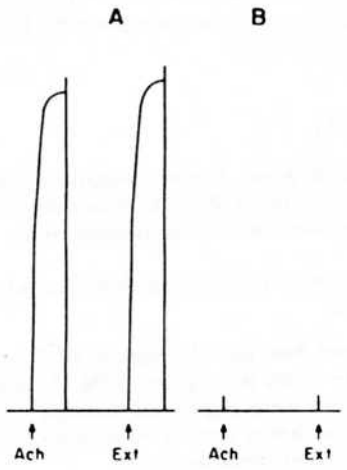

Fig. 1 - Response of rat jejunum.
A) Ach: acetylcholine 10^{-1} M; Ext: extract 3 mg
B) 10^{-5} M; atropine was added to the bath. Ach: same as A. Ext: same as A.

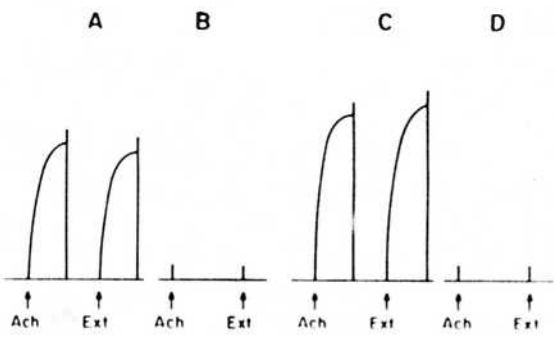

Fig. 2 - Responses of toad rectus abdominis.
A) Ach: acetylcholine 10^{-4} M; Ext: extract 4 mg
B) 10^{-5} M gallamine. Ach: same as A. Ext: same as A.
C) 10^{-6} M neostigmine. Ach: same as A. Ext: same as A.
D) acetylcholine, extract and serum were incubated during 40 minutes at 37°C.

aqueous extract from *P. edulis* possesses the same muscarinic and nicotinic action of acetylcholine. On the other hand, the extract effects were potentiated by neostigmine; they disappeared due to the action of the acetylcholinesterasis of the blood.

These results show that the cholinomimetic substance present in the fruits of *P. edulis* was a nature similar to or is acetylcholine.

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