S-2238 is a chromogenic substrate for thrombin.

**COMPOSITION**
Each vial contains chromogenic substrate S-2238 25 mg and mannitol 120 mg as a bulking agent.

**PRECAUTIONS AND WARNINGS:**
- **Hazard class:** None
- **Hazard statements:** None
- **Precautionary statements:** None
- **Supplemental Hazard Information:** Up to 2.5% of the mixture consists of component of unknown acute toxicity (oral, dermal, inhalation) for the human health and unknown hazard to the aquatic environment.

**CHEMISTRY**
- **Chemical name:** H-D-Phenylalanyl-L-pipecolyl-L arginine-p-nitroanilide dihydrochloride.
- **Formula:** H-D-Phe-Pip-Arg-pNA · 2 HCl
- **Mol. wt:** 625.6
- **ε₃₁₆ nm⁻¹:** 1.27 · 10⁴ mol⁻¹ · L · cm⁻¹
- **Solubility:** > 10 mmol/L in H₂O
- **Stability:** Substance: Stable until expiry date if stored at 2-8°C. Avoid exposure to light. The substance is hygroscopic and should be stored dry. Solution: 1 mmol/L in H₂O is stable for more than 6 months at 2-8°C. Contamination by microorganisms may cause hydrolysis.

**Suitable stock solution:** 1-2 mmol/L in H₂O.

**PRINCIPLE**
H-D-Phe-Pip-Arg-pNA → H-D-Phe-Pip-Arg-OH+pNA

The method for the determination of activity is based on the difference in absorbance (optical density) between the pNA formed and the original substrate. The rate of pNA formation, i.e. the increase in absorbance per second at 405 nm, is proportional to the enzymatic activity and is conveniently determined with a photometer.
KINETIC DATA

Human thrombin: \[ K_m = 0.7 \cdot 10^{-5} \text{ mol/L} \]
\[ V = 1.7 \cdot 10^{-7} \text{ mol/min \cdot NIH-U} \]

Bovine thrombin: \[ K_m = 0.9 \cdot 10^{-5} \text{ mol/L} \]
\[ V = 2.2 \cdot 10^{-7} \text{ mol/min \cdot NIH-U} \]

Both determined at 37°C in 2.5 mL 0.05 mol/L Tris buffer pH 8.3, I 0.15.

STANDARDIZATION

An activity of \( \Delta A/\text{min} = 0.05 \) (37°C) is obtained by using 0.1 mmol/L substrate and:
1. 0.03 NIH-U/mL of bovine thrombin (Roche or Parke-Davis)
2. 0.04 U/mL of human thrombin (MRC standard thrombin)

Aprotinin (Trasylol®) may be added to the buffer in a concentration of 75 KIU/L in order to inhibit other activities than that of thrombin.

Note: For thrombin standardization against the MRC-standard the natural substrate fibrinogen, is recommended as the primary substrate. The clotting and amidolytic activities of degraded thrombins do not always develop in parallel.

APPLICATIONS

The substrate has been used for the determination of:
1. Prothrombin in plasma (1,2)
2. Antithrombin in plasma (3,4)
3. Platelet factor 3 in plasma (5,6)
4. Heparin in plasma (7)

S-2238

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LANGUAGES

ENGLISH

TECHNICAL SPECS

PAPER: White paper, 50-60 g/m² weight.
SIZE: 4.1 x 5.9" (104 x 150 mm.).
PRINT: Front/Back.
PRINT COLOR: All type in black.