
Product Data Sheet

Product Name: PI-55
Cat. No.: GC63299

Chemical Properties

Cas. No. 1122579-42-3

Formula $C_{13}H_{13}N_5O$ M.Wt 255.28

Solubility Storage Store at $-20^{\circ}C$

General tips For obtaining a higher solubility, please warm the tube at $37^{\circ}C$ and shake it in the ultrasonic bath for a while. Stock solution can be stored below $-20^{\circ}C$ for several months.

Shipping Condition Evaluation sample solution: ship with blue ice All other available size: ship with RT, or blue ice upon request.

Structure

Protocol**Kinase experiment [1]:**

Preparation Method PI-55 (6-(2-hydroxy-3-methylbenzylamino)purine) was first dissolved in DMSO to obtain a 10mM stock solution and was kept at low temperature in the dark. Immediately before use, the stock was diluted with kinase assay buffer so that the final DMSO content in the reaction did not exceed 1%. Recombinant *Arabidopsis thaliana* cytokinin receptors (CRE1/AHK4 or AHK3) were incubated in a defined reaction mixture containing ATP and an appropriate peptide or protein substrate. PI-55 was added at the indicated concentrations to evaluate its ability to interfere with cytokinin-dependent receptor activity, typically in the presence of a natural cytokinin such as trans-zeatin.

Reaction Conditions 1–50 μ M, 30min.

Caution: Product has not been fully validated for medical applications. For research use only.

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Applications	PI-55 acted as a competitive antagonist of cytokinin receptors. At low micromolar concentrations it suppressed trans-zeatin-induced signaling, with <i>CRE1/AHK4</i> exhibiting the highest sensitivity.
Cultured tissue experiment [2]:	
Cultured tissue lines	<i>Arabidopsis thaliana</i> tissues such as seedlings, root explants, and ARR5:GUS reporter lines, together with medicinal plant seedlings including <i>Bulbine natalensis</i> and <i>Rumex crispus</i> maintained on MS-based media, are commonly used systems for evaluating the biological activity of PI-55 in plant research.
Preparation Method	PI-55 was prepared as a 10 mM DMSO stock and diluted into sterile culture medium immediately before use. Explants or seedlings were transferred onto solid or liquid medium supplemented with PI-55 at the required concentrations, while control cultures received the same amount of DMSO without PI-55. The compound was present throughout the cultivation period to continuously modulate cytokinin perception during organogenesis and stress treatments. In experiments combining PI-55 with heavy metal stress, cadmium was added to the medium together with PI-55, and seedlings were grown under controlled light and temperature conditions for several days to weeks.
Reaction Conditions	0.1–5 μ M, 7–21 days.

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Applications

PI-55 suppressed cytokinin signaling, shifting organogenesis toward root formation. At low micromolar concentrations (0.1–10 μ M, 7–21 days), it reduced cadmium-induced growth inhibition, supported biomass accumulation, maintained balanced hormone activity, and enhanced stress tolerance.

References:

- [1]. Spíchal, Lukás et al. "The purine derivative PI-55 blocks cytokinin action via receptor inhibition." *The FEBS journal* vol. 276,1 (2009): 244-53.
- [2]. Aremu, Adeyemi O et al. "Dissecting the role of two cytokinin analogues (INCYDE and PI-55) on in vitro organogenesis, phytohormone accumulation, phytochemical content and antioxidant activity." *Plant science : an international journal of experimental plant biology* vol. 238 (2015): 81-94.

Background

PI-55 is a selective cytokinin receptor antagonist with an IC₅₀ of approximately 1–5 μ M for receptor inhibition^[1]. PI-55 targets *Arabidopsis thaliana* histidine kinase receptors CRE1/AHK4 and AHK3, and competitively blocks natural cytokinins such as trans-

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zeatin^[2]. Applications of PI-55 are mainly in plant developmental biology and plant stress physiology research, including organogenesis and cadmium stress tolerance^[3].

In *Arabidopsis thaliana* ARR5:GUS reporter assays, PI-55 competitively blocked trans-zeatin with an IC₅₀ of ~1–5µM, reducing cytokinin-induced signaling at 1–50µM for 30min to several hours^[4]. In cultures of medicinal plants such as *Bulbine natalensis* and *Rumex crispus*, treatment with 0.01–10µM for 7–21 days suppressed shoot induction, promoted root growth, and under cadmium stress improved biomass and antioxidant status^[5].

PI-55 at 0.1–10µM for 7–21 days in growth medium decreased ARR5:GUS reporter activity in *Arabidopsis thaliana* seedlings and modified root development. PI-55 at 0.01–10µM for 14–21 days in MS medium alleviated cadmium-induced growth inhibition in *Eucomis autumnalis* plantlets, increasing biomass and antioxidant capacity^[4]. PI-55 at 0.01–10µM for 14–21 days in MS medium mitigated cadmium stress in *Bulbine natalensis* and *Rumex crispus* seedlings, maintaining higher fresh weight and balanced hormone levels^[6].

References:

- [1] Spíchal, Lukás et al. "The purine derivative PI-55 blocks cytokinin action via receptor inhibition." *The FEBS journal* vol. 276,1 (2009): 244-53.
- [2] Nisler, Jaroslav et al. "Cytokinin receptor antagonists derived from 6-benzylaminopurine." *Phytochemistry* vol. 71,7 (2010): 823-30.
- [3] Gemrotová, M., et al. "Seedlings of Medicinal Plants Treated with Cytokinin Antagonist PI-55 or INCYDE Are Protected against Cadmium Stress." *Plant Growth Regulation* vol. 71, 2 (2013): 137-145.
- [4] Berková, Veronika et al. "Arabidopsis Response to Inhibitor of Cytokinin Degradation INCYDE: Modulations of Cytokinin Signaling and Plant Proteome." *Plants (Basel, Switzerland)* vol. 9,11 1563. 13 Nov. 2020.
- [5] Zahajská, Lenka et al. "Preparation, characterization and biological activity of C8-substituted cytokinins." *Phytochemistry* vol. 135 (2017): 115-127.
- [6] Werner, Tomás, and Thomas Schmülling. "Cytokinin action in plant development." *Current opinion in plant biology* vol. 12,5 (2009): 527-38.

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