

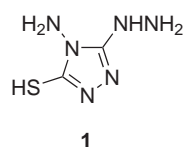
Technical Bulletin

Purpald®

(4-Amino-3-hydrazino-5-mercapto-1,2,4-triazole; 4-Amino-5-hydrazino-4H-1,2,4-triazole-3-thiol)

Catalog Numbers: 162892 and 08095

Technical Bulletin AL-145



Properties:

CAS No. 1750-12-5

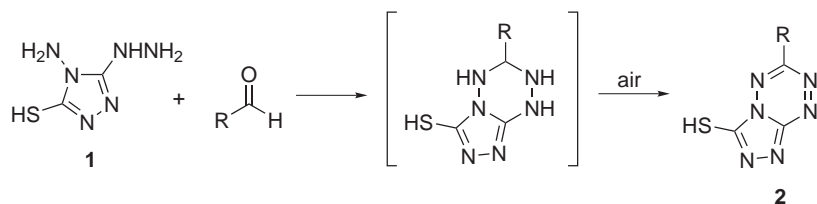
Formula weight: 146.17

Appearance: white powder

Molecular formula: C₂H₆N₆S

Melting point: 230–231 °C (dec.)

Dickinson and Jacobsen¹ have described the exceedingly specific and sensitive (up to 10⁻⁴ M sensitivity) reaction of aldehydes with Purpald® (**1**) to yield purple-to-magenta-colored 6-mercapto-s-triazolo[4,3-*b*]-s-tetrazines (**2**). Ketones, esters, formic acid, amides, hydroxylamines, quinones, uric acid, hydrazines and aminophenols do not react with **1** to yield purple products.



Procedure for Detection of Aldehydes

One drop of the aldehyde is added to 10–20 mg of Purpald dissolved in 2 mL of 1 N sodium hydroxide. Aeration of the reactants produces the intense color within a few minutes. Very hindered aldehydes may require longer reaction times. **Table 1** lists some representative aldehydes and reaction times necessary for color changes.

Table 1*

Aldehyde	Color	Time
5-Hydroxypentanal	purple	<30 seconds
Crotonaldehyde	purple	–
Benzaldehyde	purple	<1 minute
2-Nitrobenzaldehyde	purple-brown	<30 seconds
<i>trans</i> -Cinnamaldehyde	purple	<5 minutes
α -Methylcinnamaldehyde	purple	<10 minutes
β -Phenylcinnamaldehyde	purple	–
4-Acetamidobenzaldehyde	purple-brown	<5 minutes
2-Chloro-6-nitrobenzaldehyde	purple	<5 minutes
10-Methylanthracene-9-carboxaldehyde	purple	very slow

* Tests were performed in the Aldrich Quality Control Laboratories

Applications

Since the original work by Dickinson and Jacobsen,¹ a variety of methods and applications have been developed for the detection of aldehydes with Purpald. The reagent has been used in conjunction with enzymatic systems for the colorimetric detection of creatinine,² free fatty acids,³ and uric acid.⁴ Also, triglycerides have been determined in biological samples.⁵⁻⁸

Other applications from current literature include the detection of:

- formaldehyde in periodate-oxidized glycols,⁹ air,¹⁰ vaccines,¹¹ urea/formaldehyde resins,^{12,13} and plastic products,¹⁴
- acetaldehyde in liver tissue sections¹⁵ and on the surface of spoiling fruit;¹⁶
- formaldehyde generated from alkyl 2-cyanoacrylate vapor in air.¹⁷

Purpald is also used in TLC spray reagents,¹⁸ filter paper test strips,¹⁹ and phase-transfer catalysis.²⁰

Storage and Stability

Purpald should be stored in well closed containers at room temperature. It is relatively stable under normal laboratory conditions.

Toxicity and Handling

To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated. The usual safe laboratory precautions and procedures should be observed when handling this material.

Number AL-145 Purpald® is a registered trademark of Aldrich Chemical Co., Inc.

©2007 Sigma-Aldrich Co. All rights reserved. SIGMA, SAFAC, SAFAC, SIGMA-ALDRICH, ALDRICH, FLUKA, and SUPELCO are trademarks belonging to Sigma-Aldrich Co. and its affiliate Sigma-Aldrich Biotechnology, L.P. Sigma brand products are sold through Sigma-Aldrich, Inc. Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.

References

1. Dickinson, R.G.; Jacobsen, N.W. *Chem. Commun.* **1970**, 1719.
2. Morishita, Y. *et al. Eisei Kensa* **1980**, *29*, 811; *Chem. Abstr.* **1981**, *94*, 61043d.
3. Kosaka, K.; Kikuchi, T.; Mitsuhida, N.; Kawaguchi, A. *J. Biochem. (Tokyo)* **1981**, *89*, 1799.
4. Watanabe, T.; Suga, T. *Chem. Pharm. Bull.* **1978**, *26*, 1945.
5. Fujiwara, M. *et al. Rinsho Byori* **1981**, *29*, 1151; *Chem. Abstr.* **1982**, *96*, 65147e.
6. Nishimura, T. *et al. ibid.* **1973**, *21*, 839; *Chem. Abstr.* **1974**, *80*, 142625h.
7. Pen, C.-H. *Chung-hua I Hsueh Chien Yen Tsa Chih*, **1978**, *1*, 93; *Chem. Abstr.* **1980**, *92*, 90266t.
8. Miyashita, Y. *et al. Japan Kokai* 74 23 693, 1974; *Chem. Abstr.* **1974**, *81*, 60501w.
9. Avigad, G. *Anal. Biochem.* **1983**, *134*, 499.
10. Lambert, J.; Chiang, Y. U.S. Patent 4 511 658, 1985; *Chem. Abstr.* **1985**, *103*, 10756k.
11. Fujiwara, M.; Tomita, S.; Nishimura, T. *Nippon Saikingaku Zasshi* **1982**, *37*, 789; *Chem. Abstr.* **1982**, *97*, 188351v.
12. Schriever E. *Holz Roh-Werkst* **1981**, *39*, 227; *Chem. Abstr.* **1981**, *95*, 99568n.
13. Harkin, J.; Obst, J.; Lehmann, W. *Forest Prod. J.* **1974**, *24*, 27.
14. Shimada, H.; Tamura, M. *Japan Kokai* 75 62 694, 1975; *Chem. Abstr.* **1975**, *83*, 132542b.
15. Ryvardeen, G.; Kaeferstein, H. *Acta Histochem.* **1974**, *49*, 151.
16. Agatsuma, M.; Ohshima, E. *Fr. Demande* 2 513 377, 1983; *Chem. Abstr.* **1983**, *99*, 18094n.
17. Walker, R.; Guiver, R. *Am. Ind. Hyg. Assoc. J.* **1981**, *42*, 559; *Chem. Abstr.* **1981**, *95*, 174473h.
18. Rahn, C.; Schlenk, H. *Lipids* **1973**, *8*, 612.
19. Fischer, W.; Langkau, H. *Ger. Offen.* 2 809 475, 1979; *Chem. Abstr.* **1979**, *91*, 203901w.
20. Durst, H.D.; Gokel, G.W. *J. Chem. Ed.* **1978**, *55*, 206.

For pricing and ordering information, call toll-free USA/Canada 800-558-9160.

Aldrich warrants that its products conform to the information contained in this and other Aldrich publications. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Aldrich Chemical Company, Inc.

P.O. Box 355, Milwaukee, WI 53201 USA
 Technical Service 800-325-5832

sigma-aldrich.com/techservice