

Hemin Assay Kit

(Catalog #K672-100; 100 assays; Store kit at -20°C)

I. Introduction:

Free hemin results from the breakdown of hemin-containing proteins such as hemoglobin and myoglobin. It can be detected in various body fluids such as saliva, urine and CSF under various pathological states. Free hemin exists in cells at very minute concentrations ($< 1\mu\text{M} \approx 650\text{ ng/ml}$) exerting regulatory functions such as repression of nonspecific δ -aminolevulinatase synthase expression and induction of microsomal hemin oxygenase-1. Hemin can stimulate growth of oral bacteria involved in gingivitis and is an indicator of possible pathological conditions when found in the urine or feces. BioVision's Hemin Assay Kit utilizes peroxidase activity in the presence of hemin to provide a simple, exquisitely sensitive assay which causes the conversion of a colorless probe to a strongly colored ($\lambda = 570\text{ nm}$) compound. Trace amounts of Hemin can be quantified in the 5 - 160 pg (10 - 250 fmol) range.

II. Kit Contents:

Components	100 assays	Cap Code	Part Number
Hemin Assay Buffer	25 ml	WM	K672-100-1
Hemin Probe (in DMSO)	0.2 ml	Red	K672-100-2
Enzyme Mix	1 vial	Green	K672-100-3
Hemin Substrate	1 ml	Blue	K672-100-4
Hemin Standard (1 nmol; lyophilized)	1 vial	Yellow	K672-100-5

III. Reagent Preparation and Storage Conditions:

Probe: Warm at 37°C for 1 - 2 min to completely melt) before use. Mix well, store at -20°C, protect from light and moisture. Use within two months.

Enzyme Mix: Dissolve in 0.5 ml Hemin Assay Buffer, mix well. Store at -20°C.

Hemin Substrate: Ready to use as supplied. **Store at 4°C.** Use within two months.

Hemin Standard: Dissolve with 100 μl DMSO to make a 10 μM solution. Stable for two months

IV. Hemin Assay Protocol:

- Standard Curve Preparations:** Immediately before use, dilute the 10 μM Hemin Standard to 100 nM by adding 10 μl of the Standard to 990 μl of Hemin Assay Buffer, mix well. Dilute further to 10 nM (= 10 fmol/ μl) by adding 100 μl to 900 μl Hemin Assay buffer. Add 0, 4, 8, 12, 16, 20 μl into a series of wells. Adjust volume to 50 μl /well with Hemin Assay Buffer to generate 0, 40, 80, 120, 160, 200 fmol/well of the Hemin Standard.
- Sample Preparations:** Depending upon the hemin content, samples should be diluted typically 100 to 10,000 fold and added at about 1 - 10 μl of diluted sample per well. Samples can be assayed without any prior treatment*. Hemin concentration in samples may have a wide range. For different sample types, we suggest using ~ 0.04 μl serum sample, ~ 50 μg of feces, ~ 1 - 5000 cultured cells or ~ 0.05 μl urine. Place diluted samples directly in wells and adjust well volumes to 50 μl with Hemin Assay Buffer in a 96-well plate. We suggest using several doses of your sample to ensure the readings are within the standard curve range.

*The presence of hemoproteins may interfere with the assay although in our experience, the very high dilution factor reduces the concentration of any such proteins to undetectable levels. You may do a sample background control without the Enzyme Mix in the reaction, then subtract the sample background from your sample readings.

- Reaction Mix Preparation:** Immediately before use, mix enough reagent for the number of assays performed. At this time, dilute the substrate 1:20 by adding 50 μl of substrate to 950 μl of Hemin Assay Buffer. For each well, prepare a 50 μl Reaction Mix containing the following components.

2 μl Probe
 2 μl Substrate
 3 μl Enzyme Mix
 43 μl Assay Buffer

- Add 50 μl of the Reaction Mix to each well containing the Hemin Standard or test samples, mix well.
- Incubate the reaction for 30 min at room temperature, protect from light. As this is an enzyme activity assay it is important to incubate and measure your samples at the same time and under exactly the same conditions as the standards. The 30 minute incubation time has been selected as the best compromise between linearity, speed and sensitivity.
- Measure the OD at 570 nm.
- Calculation:** Correct background by subtracting the value derived from the 0 Hemin control from all sample and standard readings (Note: The background reading may be significant and must be subtracted from sample readings). Plot standard curve pmol/well vs. OD 570 nm readings. Then apply the sample readings to the standard curve to get Hemin amount in the sample wells (Hy). Calculate the Hemin concentrations in the test samples as follows:

$$C \text{ (fmol}/\mu\text{l or nM)} = \text{Hy/Sv} \times \text{Ds}$$

Where: Hy is the amount of Hemin (fmol) of your sample from standard curve.

Sv is the sample volume (μl) added into the sample well.

Ds is the dilution factor of the sample, i.e. 100 or 10,000

Hemin molecular weight: 652. Hemin concentration in your sample can be expressed as pmol/ml, ng/ml, $\mu\text{g/dL}$ or μM ($\mu\text{mol/liter}$); 1 μM = 1 nmol/ml = 652 ng/ml.

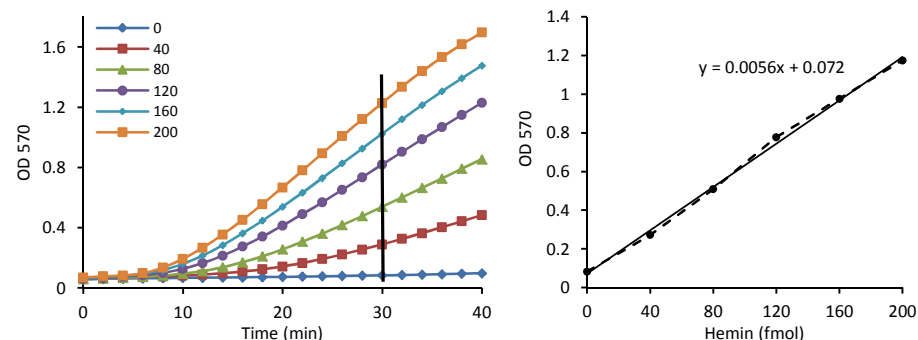


Fig. 1 A: Time course of development of color and B: Standard Curve at 30 minutes for Hemin standard as performed according to this protocol

RELATED PRODUCTS:

Lactate Assay Kit
 Ascorbic acid Assay Kit
 NAD(P)/NAD(P)H Assay Kit
 Cell Proliferation Assay Kit

Glutathione Assay Kit
 Free Fatty Acid Assay Kit
 ATP/ADP Assay Kit
 Cytotoxicity Assay Kit

GENERAL TROUBLESHOOTING GUIDE:

Problems	Cause	Solution
Assay not working	<ul style="list-style-type: none"> • Use of ice-cold assay buffer • Omission of a step in the protocol • Plate read at incorrect wavelength • Use of a different 96-well plate 	<ul style="list-style-type: none"> • Assay buffer must be at room temperature • Refer and follow the data sheet precisely • Check the wavelength in the data sheet and the filter settings of the instrument • Fluorescence: Black plates (clear bottoms) ; Luminescence: White plates ; Colorimeters: Clear plates
Samples with erratic readings	<ul style="list-style-type: none"> • Use of an incompatible sample type • Samples prepared in a different buffer • Samples were not deproteinized (if indicated in datasheet) • Cell/ tissue samples were not completely homogenized • Samples used after multiple free-thaw cycles • Presence of interfering substance in the sample • Use of old or inappropriately stored samples 	<ul style="list-style-type: none"> • Refer data sheet for details about incompatible samples • Use the assay buffer provided in the kit or refer data sheet for instructions • Use the 10 kDa spin cut-off filter or PCA precipitation as indicated • Use Dounce homogenizer (increase the number of strokes); observe for lysis under microscope • Aliquot and freeze samples if needed to use multiple times • Troubleshoot if needed, deproteinize samples • Use fresh samples or store at correct temperatures till use
Lower/ Higher readings in Samples and Standards	<ul style="list-style-type: none"> • Improperly thawed components • Use of expired kit or improperly stored reagents • Allowing the reagents to sit for extended times on ice • Incorrect incubation times or temperatures • Incorrect volumes used 	<ul style="list-style-type: none"> • Thaw all components completely and mix gently before use • Always check the expiry date and store the components appropriately • Always thaw and prepare fresh reaction mix before use • Refer datasheet & verify correct incubation times and temperatures • Use calibrated pipettes and aliquot correctly
Readings do not follow a linear pattern for Standard curve	<ul style="list-style-type: none"> • Use of partially thawed components • Pipetting errors in the standard • Pipetting errors in the reaction mix • Air bubbles formed in well • Standard stock is at an incorrect concentration • Calculation errors • Substituting reagents from older kits/ lots 	<ul style="list-style-type: none"> • Thaw and resuspend all components before preparing the reaction mix • Avoid pipetting small volumes • Prepare a master reaction mix whenever possible • Pipette gently against the wall of the tubes • Always refer the dilutions in the data sheet • Recheck calculations after referring the data sheet • Use fresh components from the same kit
Unanticipated results	<ul style="list-style-type: none"> • Measured at incorrect wavelength • Samples contain interfering substances • Use of incompatible sample type • Sample readings above/below the linear range 	<ul style="list-style-type: none"> • Check the equipment and the filter setting • Troubleshoot if it interferes with the kit • Refer data sheet to check if sample is compatible with the kit or optimization is needed • Concentrate/ Dilute sample so as to be in the linear range
Note: The most probable list of causes is under each problem section. Causes/ Solutions may overlap with other problems.		