



2-Naphthol (2-NAP) PM2.5 Air Pollution ELISA

Cat # NAP1: ELISA kit for measuring 2-NAP in biological samples

This competitive ELISA kit is for determination of 2-NAP levels in biological samples (detection limit, <10 pg/ml).

The 2-NAP and metabolites were detected in urine samples (n=54) from male (43%) and female (57%) and sewage water samples collected for 5 days from 3 counties of Metro Detroit using the Detroit R&D 2-NAP ELISA^{1,2}. Burning fossil fuels and woods produce toxic PMs 2.5 and 10 mixed with polycyclic aromatic hydrocarbons (PAHs)^{3,4} which increase risk of cardiovascular diseases and lung cancer⁸⁻¹¹. Naphthalene is one of the major PAHs in the PMs (4.5%-13.5%)⁵. Inhaled PAHs through ambient air or occupationally exposed are biologically oxidized and excreted primarily by urine^{3,6}. Among various PAH metabolites, urinary 2-NAP level was significantly correlated with PM2.5 or PM10 exposure^{3,4,7}, especially after wood smoke exposure⁷. Burn pit smoke exposure may correlate to various health problems of soldiers. Asthma among children was significantly associated with urinary 2-NAP levels¹². The 2-NAP level in urine can be measured using the 2-NAP ELISA without ethyl acetate extraction after dilution of the sample. Each kit for triplicate analyses of up to 24 samples contains one 96-well plate, one tube of 2-NAP standard, one tube of 2-NAP-conjugated HRP and buffers for sample and HRP dilutions and plate washing.

Specificity of the 2-Naphthol ELISA

2-Naphthol	100%
8-Amino-2 naphthol	<0.01%
BPA	<0.01%
BPS	<0.01%

Related ELISA Kits Oxidative Stress ELISA kit:

- 8-Isoprostane ELISA kit

Hypertension ELISA kits:

-14,15-DHET ELISA kit

-11,12-DHET ELISA kit

- 20 HETE ELISA kit

Environmental Estrogen ELISA kit:

-BPA ELISA kit

-BPS ELISA kit

- Joiakim A, Santos JM, Jeon P, Kaplan D, Jurban M, Friedrich K, Kim H. Differential levels of 2-naphthol, a urinary biomarker of exposure to air pollution, in sewage wastewater effluents from metro Detroit communities. The SOT abstract, 2024, #4006.
- Santos JM, Kennedy T, Zhu J, McPike A, Kim H, Dechant J. The link between Bisphenol-A and -S and 2-naphthol exposure with anaerobic-peak power, risk factor for cardiovascular diseases in active healthy young adults. The SOT abstract, 2024, #4002.
- Yang M, Koga M, Katoh T, Kawamoto T. A study for the proper application of urinary naphthols, new biomarkers for airborne polycyclic aromatic hydrocarbons. Arch Environ Contam Toxicol. 1999 36:99-108.
- Kang JW, Cho SH, Kim H, Lee CH. Correlation of urinary 1-hydroxypyrene and 2-naphthol with total suspended particulates in ambient air in municipal middle-school students in Korea. Arch Environ Health. 2002 57:377-82.
- Panther BC, Hooper MA, Tapper NJ. A comparison of air particulate matter and associated polycyclic aromatic hydrocarbons in some tropical and temperate urban environments. Atmos Environ 1999; 33:4087-99.
- Nan HM, Kim H, Lim HS, Choi JK, Kawamoto T, Kang JW, Lee CH, Kim YD, Kwon EH. Effects of occupation, lifestyle and genetic polymorphisms of CYP1A1, CYP2E1, GSTM1 and GSTT1 on urinary 1-hydroxypyrene and 2-naphthol concentrations. Carcinogenesis. 2001 22:787-93.
- Li Z, Trinidad D, Pittman EN, Riley EA, Sjodin A, Dills RL, Paulsen M, Simpson CD. Urinary polycyclic aromatic hydrocarbon metabolites as biomarkers to woodsmoke exposure - results from a controlled exposure study. J Expo Sci Environ Epidemiol. 2016 26:241-8.
- Guan L, Geng X, Stone C, Cosky EEP, Ji Y, Du H, Zhang K, Sun Q, Ding Y. PM_{2.5} exposure induces systemic inflammation and oxidative stress in an intracranial atherosclerosis rat model. Environ Toxicol 2019 34:530-538.
- Shu Y, Zhu L, Yuan F, Kong X, Huang T, Cai YD. Analysis of the relationship between PM2.5 and lung cancer based on protein-protein interactions. Comb Chem High Throughput Screen. 2016;19:100-8.
- Byrd JB, Morishita M, Bard RL, Das R, Wang L, Sun Z, Spino C, Harkema J, Dvonch JT, Rajagopalan S, Brook RD. Acute increase in blood pressure during inhalation of coarse particulate matter air pollution from an urban location. J Am Soc Hypertens. 2016 10:133-139.e4.
- Fedak KM, Good N, Walker ES, Balmes J, Brook RD, Clark ML, Cole-Hunter T, Devlin R, L'Orange C, Luckasen G, Mehaffy J, Shelton R, Wilson A, Volckens J, Peel JL. Acute Effects on Blood Pressure Following Controlled Exposure to Cookstove Air Pollution in the STOVES Study. J Am Heart Assoc. 2019 16;8:e012246.
- Lin TJ, Guo YL, Hsu JC, Wang IJ. 2-Naphthol Levels and Allergic Disorders in Children. Int J Environ Res Public Health. 2018, 15:1449.

