S/N	Metabolite	Reference	PubChem Structure
1.	β-sitosterol	Lee, D. G., Lee, J., Kim, K. T., Lee, S. W., Kim, Y. O., Cho, I. H., Kim, H. J., Park, C. G., & Lee, S. (2018). High-performance liquid chromatography analysis of phytosterols in Panax ginseng root grown under different conditions. Journal of Ginseng Research, 42(1), 16-20. https://doi.org/10.1016/j.jgr.2016.10.004	Yes
2.	Stigmasterol	Lee, D. G., Lee, J., Kim, K. T., Lee, S. W., Kim, Y. O., Cho, I. H., Kim, H. J., Park, C. G., & Lee, S. (2018). High-performance liquid chromatography analysis of phytosterols in Panax ginseng root grown under different conditions. Journal of Ginseng Research, 42(1), 16-20. https://doi.org/10.1016/j.jgr.2016.10.004	Yes
3.	Ocotillol	Lee, D. G., Lee, J., Kim, K. T., Lee, S. W., Kim, Y. O., Cho, I. H., Kim, H. J., Park, C. G., & Lee, S. (2018). High-performance liquid chromatography analysis of phytosterols in Panax ginseng root grown under different conditions. Journal of Ginseng Research, 42(1), 16-20. https://doi.org/10.1016/j.jgr.2016.10.004	Yes
4.	Oleanolic acid	Lee, D. G., Lee, J., Kim, K. T., Lee, S. W., Kim, Y. O., Cho, I. H., Kim, H. J., Park, C. G., & Lee, S. (2018). High-performance liquid chromatography analysis of phytosterols in Panax ginseng root grown under different conditions. Journal of Ginseng Research, 42(1), 16-20. https://doi.org/10.1016/j.jgr.2016.10.004	No
5.	Naringenin	Chung, I. M., Lim, J. J., Ahn, M. S., Jeong, H. N., An, T. J., & Kim, S. H. (2016). Comparative phenolic compound profiles and antioxidative activity of the fruit, leaves, and roots of Korean ginseng (Panax ginseng Meyer) according to cultivation years. Journal of Ginseng Research, 40(1), 68-75.	Yes
6.	Gentisic acid	Chung, I. M., Lim, J. J., Ahn, M. S., Jeong, H. N., An, T. J., & Kim, S. H. (2016). Comparative phenolic compound profiles and antioxidative activity of the fruit, leaves, and roots of Korean ginseng (Panax ginseng Meyer) according to cultivation years. Journal of Ginseng Research, 40(1), 68-75.	Yes
7.	Chlorogenic acid	Chung, I. M., Lim, J. J., Ahn, M. S., Jeong,	Yes

		H. N., An, T. J., & Kim, S. H. (2016). Comparative phenolic compound profiles and antioxidative activity of the fruit, leaves, and roots of Korean ginseng (Panax ginseng Meyer) according to cultivation years. Journal of Ginseng Research, 40(1), 68-75.	
8.	Catechin	Chung, I. M., Lim, J. J., Ahn, M. S., Jeong, H. N., An, T. J., & Kim, S. H. (2016). Comparative phenolic compound profiles and antioxidative activity of the fruit, leaves, and roots of Korean ginseng (Panax ginseng Meyer) according to cultivation years. Journal of Ginseng Research, 40(1), 68-75.	Yes
9.	Rutin	Chung, I. M., Lim, J. J., Ahn, M. S., Jeong, H. N., An, T. J., & Kim, S. H. (2016). Comparative phenolic compound profiles and antioxidative activity of the fruit, leaves, and roots of Korean ginseng (Panax ginseng Meyer) according to cultivation years. Journal of Ginseng Research, 40(1), 68-75.	Yes
10.	Ferulic acid	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	Yes
11.	p-Hydroxybenzoic acid	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	Yes
12.	Kaempferol	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	Yes
13.	m-coumaric acid	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	No
14.	p-coumaric acid	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food	Yes

		Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	
15.	Quercetin	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	Yes
16.	Morin	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	No
17.	Quercitrin	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	Yes
18.	Myricetin	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	No
19.	Apigenin	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	Yes
20.	Epicatechin	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	Yes
21.	4-Methyl-2-oxopentanoic acid	Kim, YJ., Joo, S.C., Shi, J. et al. Metabolic dynamics and physiological adaptation of Panax ginseng during development. Plant Cell Rep 37, 393–410 (2018). https://doi.org/10.1007/s00299-017-2236-7	Yes
22.	Gamma-Aminobutyric Acid	Kim, S. W., Gupta, R., Lee, S. H., Min, C. W., Agrawal, G. K., Rakwal, R., ... & Kim, S. T. (2016). An integrated biochemical, proteomics, and metabolomics approach for supporting medicinal value of Panax ginseng fruits. Frontiers in Plant Science, 7, 994.	Yes
23.	Agmatine	Kim, YJ., Joo, S.C., Shi, J. et al. Metabolic	Yes

		dynamics and physiological adaptation of Panax ginseng during development. Plant Cell Rep 37, 393–410 (2018). https://doi.org/10.1007/s00299-017-2236-7	
24.	DL-Aspartic acid	Kim, S. W., Gupta, R., Lee, S. H., Min, C. W., Agrawal, G. K., Rakwal, R., ... & Kim, S. T. (2016). An integrated biochemical, proteomics, and metabolomics approach for supporting medicinal value of Panax ginseng fruits. Frontiers in Plant Science, 7, 994.	Yes
25.	DL-Asparagine	Kim, S. W., Gupta, R., Lee, S. H., Min, C. W., Agrawal, G. K., Rakwal, R., ... & Kim, S. T. (2016). An integrated biochemical, proteomics, and metabolomics approach for supporting medicinal value of Panax ginseng fruits. Frontiers in Plant Science, 7, 994.	Yes
26.	Guaiacol	Abd El-Aty, A. M., Kim, I. K., Kim, M. R., Lee, C., & Shim, J. H. (2008). Determination of volatile organic compounds generated from fresh, white and red Panax ginseng (CA Meyer) using a direct sample injection technique. Biomedical Chromatography, 22(5), 556-562.	Yes
27.	DL-Pyroglutamic acid	Kim, S. W., Gupta, R., Lee, S. H., Min, C. W., Agrawal, G. K., Rakwal, R., ... & Kim, S. T. (2016). An integrated biochemical, proteomics, and metabolomics approach for supporting medicinal value of Panax ginseng fruits. Frontiers in Plant Science, 7, 994.	Yes
28.	Malic Acid	Kim, S. W., Gupta, R., Lee, S. H., Min, C. W., Agrawal, G. K., Rakwal, R., ... & Kim, S. T. (2016). An integrated biochemical, proteomics, and metabolomics approach for supporting medicinal value of Panax ginseng fruits. Frontiers in Plant Science, 7, 994.	Yes
29.	DL-Glutamic acid	Kim, S. W., Gupta, R., Lee, S. H., Min, C. W., Agrawal, G. K., Rakwal, R., ... & Kim, S. T. (2016). An integrated biochemical, proteomics, and metabolomics approach for supporting medicinal value of Panax ginseng fruits. Frontiers in Plant Science, 7, 994.	Yes
30.	Monoethanolamine	Kim, S. W., Gupta, R., Lee, S. H., Min, C. W., Agrawal, G. K., Rakwal, R., ... & Kim, S. T. (2016). An integrated biochemical, proteomics, and metabolomics approach for	Yes

		supporting medicinal value of Panax ginseng fruits. Frontiers in Plant Science, 7, 994.	
31.	Indole-3-acetic acid	Nishio, M., Zushi, S., Ishii, T., Furuya, T., & Syono, K. (1976). Mass fragmentographic determination of indole-3-acetic acid in callus tissues of Panax ginseng and Nicotiana tabacum. Chemical and Pharmaceutical Bulletin, 24(9), 2038-2042.	Yes
32.	Betaine	Kim, YJ., Joo, S.C., Shi, J. et al. Metabolic dynamics and physiological adaptation of Panax ginseng during development. Plant Cell Rep 37, 393–410 (2018). https://doi.org/10.1007/s00299-017-2236-7	Yes
33.	Ginsenoside Rg3	Park, T. Y., Hong, M., Sung, H., Kim, S., & Suk, K. T. (2017). Effect of Korean red ginseng in chronic liver disease. Journal of Ginseng Research, 41(4), 450-455.	Yes
34.	Ginsenocide CK	Sharma, A., & Lee, H. J. (2020). Ginsenoside compound K: insights into recent studies on pharmacokinetics and health-promoting activities. Biomolecules, 10(7), 1028.	No
35.	Salicylic acid	Liu, J., Jiang, R., Zhou, J., Xu, X., Sun, Z., Li, J., Chen, X., Li, Z., Yan, X., Zhao, D., Zheng, Z., & Sun, L. (2021). Salicylic acid in ginseng root alleviates skin hyperpigmentation disorders by inhibiting melanogenesis and melanosome transport. European Journal of Pharmacology, 910, 174458. https://doi.org/10.1016/j.ejphar.2021.174458	Yes
36.	Ginsenoside F2	Kim, K., Kim, M. H., Kang, J. I., Baek, J. I., Jeon, B. M., Kim, H. M., ... & Jeong, W. I. (2024). Ginsenoside F2 restrains hepatic steatosis and inflammation by altering the binding affinity of liver X receptor coregulators. Journal of Ginseng Research, 48(1), 89-97.	Yes
37.	Oleic acid	Kim, S. H., Kim, S. Y., & Choi, H. K. (2018). Lipids in ginseng (Panax ginseng) and their analysis. Natural Product Sciences, 24(1), 1-12.	Yes
38.	Pantothenic acid	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	Yes
39.	Linolenic acid	Kim, J. S. (2016). Investigation of phenolic,	Yes

		flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	
40.	Menadione	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	Yes
41.	Cobalamin	Kim, J. S. (2016). Investigation of phenolic, flavonoid, and vitamin contents in different parts of Korean ginseng (Panax ginseng C.A. Meyer). Preventive Nutrition and Food Science, 21(3), 263-270. https://doi.org/10.3746/pnf.2016.21.3.263	No
42.	Niacin	Same as above	Yes
43.	Citric acid	Chen, J., Yuan, Y., Ran, X., Guo, N., & Dou, D. (2018). Metabolomics analysis based on a UPLC-Q-TOF-MS metabolomics approach to compare Lin-Xia-Shan-Shen and garden ginseng. RSC Advances, 8(53), 30616-30623.	Yes
44.	Glucaric acid	Liu, J., et al. (2017). GC-MS and LC-MS assay of metabolomics in Panax ginseng. J Pharm Biomed Anal, 135, 176-185. doi: 10.1016/j.jpba.2016.12.026	Yes
45.	Propanedioic acid	Liu, J., et al. (2017). GC-MS and LC-MS assay of metabolomics in Panax ginseng. J Pharm Biomed Anal, 135, 176-185. doi: 10.1016/j.jpba.2016.12.026	Yes
46.	Dehydroascorbate	Liu, J., et al. (2017). GC-MS and LC-MS assay of metabolomics in Panax ginseng. J Pharm Biomed Anal, 135, 176-185. doi: 10.1016/j.jpba.2016.12.026	Yes
47.	Raffinose	Liu, J., et al. (2017). GC-MS and LC-MS assay of metabolomics in Panax ginseng. J Pharm Biomed Anal, 135, 176-185. doi: 10.1016/j.jpba.2016.12.026	Yes
48.	Glutamic acid	Liu, J., et al. (2017). GC-MS and LC-MS assay of metabolomics in Panax ginseng. J Pharm Biomed Anal, 135, 176-185. doi: 10.1016/j.jpba.2016.12.026	Yes
49.	dl-Glutamine	Liu, J., et al. (2017). GC-MS and LC-MS assay of metabolomics in Panax ginseng. J Pharm Biomed Anal, 135, 176-185. doi: 10.1016/j.jpba.2016.12.026	Yes
50.	Squalene	Liu, J., et al. (2017). GC-MS and LC-MS assay of metabolomics in Panax ginseng. J Pharm Biomed Anal, 135, 176-185. doi:	Yes

		10.1016/j.jpba.2016.12.026	
51.	Hexacosane	Liu, J., et al. (2017). GC-MS and LC-MS assay of metabolomics in Panax ginseng. J Pharm Biomed Anal, 135, 176-185. doi: 10.1016/j.jpba.2016.12.026	Yes
52.	Guanosine	Liu, J., et al. (2017). GC-MS and LC-MS assay of metabolomics in Panax ginseng. J Pharm Biomed Anal, 135, 176-185. doi: 10.1016/j.jpba.2016.12.026	Yes

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