

Table S1 Gradient elution conditions.

Time (min)	Elution gradient
0~40	82%~79%A
40~42	79%~75%A
42~48	75%~68%A
48~72	68%~63%A
72~79	63%~51%A
79~82	82%~82%A

Table S2 Ginsenoside standard curve and linear range.

Composition	Equation	R ²	Linear range (μg·mL ⁻¹)
Rg1	$Y=35.572X+49.594$	0.9994	20~200
Re	$Y=17.156X+54.901$	0.9993	20~200
Rf	$Y=10.174X+5.632$	0.9995	10~100
Rg2	$Y=69.952X-28.807$	0.9988	40~400
Rc	$Y=48.479X-10.453$	0.9994	40~400
Rb1	$Y=39.498X-27.238$	0.9994	40~400
Rb2	$Y=16.629X+5.053$	0.9983	20~200
Rb3	$Y=11.230X-7.003$	0.9993	10~100
Rd	$Y=27.398X-19.852$	0.9991	20~200

Table S3 Soil chemical properties

Forest Type	pH	EC (μS·cm ⁻¹)	AHN (mg·kg ⁻¹)	AP (mg·kg ⁻¹)	AK (mg·kg ⁻¹)	OM (%)
MOFG	5.38±0.17 ^a	55.75±22.13 ^c	256.64±38.73 ^b	13.64±1.88 ^b	153.62±38.95 ^{bcd}	10.55±0.64 ^c
BFG	4.98±0.23 ^{bc}	44.03±6.59 ^c	295.02±15.99 ^{ab}	13.32±2.76 ^b	136.29±4.43 ^{cde}	13.54±2.31 ^a
MWFG	5.13±0.08 ^b	52.85±7.04 ^c	336.29±61.25 ^a	15.64±2.31 ^b	182.52±28.42 ^b	13.21±1.64 ^a
PFG	4.86±0.11 ^c	44.93±3.24 ^c	332.96±22.67 ^a	13.83±0.94 ^b	123.48±8.54 ^{de}	13.51±0.90 ^a
DfG	5.16±0.19 ^b	261.72±10.31 ^b	249.38±7.11 ^b	15.87±2.16 ^b	231.95±9.52 ^a	8.58±0.91 ^c
FIG	4.48±0.07 ^d	291.45±15.22 ^a	270.35±8.53 ^b	72.57±1.73 ^a	161.63±2.19 ^{bc}	10.87±0.63 ^{bc}
Forest Type	Ca (mg·kg ⁻¹)	Mg (mg·kg ⁻¹)	Mn (mg·kg ⁻¹)	Fe (mg·kg ⁻¹)	Cu (mg·kg ⁻¹)	Zn (mg·kg ⁻¹)
MOFG	4062.94±240.29 ^{bc}	542.77±40.11 ^{ab}	41.94±13.24 ^a	71.43±31.26 ^{bc}	0.57±0.25 ^b	2.81±0.8 ^{ab}
BFG	3814.43±143.08 ^c	526.15±34.63 ^{ab}	44.27±10.64 ^a	116.41±26.07 ^a	0.63±0.19 ^b	1.67±0.92 ^b
MWFG	4647.51±558.49 ^a	561.07±50.21 ^a	38.06±10.13 ^{ab}	116.51±23.5 ^a	0.85±0.28 ^{ab}	4.29±2.16 ^a
PFG	4266.72±180.53 ^{ab}	536.81±12.77 ^{ab}	39.53±3.24 ^{ab}	118.62±21.9 ^a	0.75±0.17 ^{ab}	2.86±1.54 ^{ab}
DfG	3709.84±51.74 ^c	505.54±9.31 ^b	29.75±0.05 ^c	71.75±0.63 ^{bc}	0.99±0.25 ^a	0.94±0.03 ^b
FIG	3993.04±51.74 ^{bc}	501.28±9.41 ^b	39.26±1.15 ^{ab}	51.86±0.97 ^c	0.82±0.03 ^{ab}	1.96±0.08 ^b

Note: EC: electrical conductivity; AHN, alkali hydrolysable nitrogen; AP, available phosphorus; AK, available potassium; OM, organic matter; MOFG, Mongolian oak forest ginseng; BFG, birch forest ginseng; MWFG, miscellaneous wood forest ginseng; PFG, poplar forest ginseng; FIG, farmland ginseng; DfG, deforestation ginseng. Values are means of five replicates ± SE. Treatment means with different letters are significantly different ($p < 0.05$).

Table S4 Soil enzyme activities

Forest Type	S-SC (mg·g ⁻¹ ·d ⁻¹)	S-ACP (mg·g ⁻¹ ·d ⁻¹)	S-UE (μg·g ⁻¹ ·d ⁻¹)	S-CAT (μmol·g ⁻¹ ·d ⁻¹)
MOFG	8.13±1.75 ^b	17.04±0.21 ^c	282.07±19.37 ^c	102.09±0.36 ^a
BFG	7.66±1.7 ^{bc}	22.47±0.49 ^a	242.04±7.28 ^c	100.86±1.27 ^a
MWFG	12.91±2.69 ^a	20.45±2.36 ^{ab}	437.86±57.75 ^b	86.01±1.93 ^{bc}
PFG	7.16±1.07 ^{bc}	20.04±2.40 ^{ab}	275.16±40.04 ^c	84.75±0.25 ^{bc}
DfG	6.58±0.24 ^c	18.54±1.95 ^{bc}	610.25±30.36 ^a	81.41±5.81 ^c
FIG	4.75±0.15 ^d	12.71±1.31 ^d	604.66±68.94 ^a	84.94±3.22 ^{bc}

Tote: S-SC, soil sucrase; S-ACP, soil acid phosphatase; S-UE, soil urease; S-CAT, soil catalase; MOFG, Mongolian oak forest ginseng; BFG, birch forest ginseng; MWFG, miscellaneous wood forest ginseng; PFG, poplar forest ginseng; FIG, farmland ginseng; DfG, deforestation ginseng. FIG, farmland ginseng; DfG, deforestation ginseng. Values are means of five replicates ± SE. Treatment means with different letters are significantly different ($p < 0.05$).