

Supplemental Materials

Choice of reaction time and amounts of SULT1A3 or Caco-2 lysate used. The length of incubation was chosen so that the reaction time was at least 5 min but not longer than 30 min when using SULT1A3 or at least 5 min but not longer than 60 min when using Caco-2 cell lysate, except for genistein, where a reaction time of 480 min was used. The shorter reaction time (5 min) was for compounds that were rapidly metabolized to ensure that percentages metabolized would not exceed 35%, the linear range for amount formed vs. time curve. The longer reaction time was used to ensure that slowly metabolized compounds will have produced a reasonable peak area for measurement (above the lower concentration in the linear response range). Amounts of SULT1A3, which is proportional to the protein concentration, used was also varied to ensure proper quantification while maintaining substrate starting concentration for the duration of the reactions.

Table 1. The reaction conditions of sulfation activities of flavonoids at the substrate concentration of **2.5 μ M** by expressed human **SULT1A3**

Compounds	Compounds Concentration	Protein Concentration (expressed SULT1A3)	Reaction Time (Incubating Time)
Naringenin	2.5 μ M	0.0053 mg/ml	5 min
Phloretin	2.5 μ M	0.0053 mg/ml	30 min
Genistein	2.5 μ M	0.0053 mg/ml	30 min
Apigenin	2.5 μ M	0.0053 mg/ml	5 min
Kaempferol	2.5 μ M	0.0053 mg/ml	5 min
4'HF	2.5 μ M	0.0053 mg/ml	30 min
5HF	2.5 μ M	0.0053 mg/ml	30 min
7HF	2.5 μ M	0.0053 mg/ml	5 min
5,4'DHF	2.5 μ M	0.0053 mg/ml	5 min
5,7DHF	2.5 μ M	0.00267 mg/ml	5 min
7,4'DHF	2.5 μ M	0.0053 mg/ml	5 min
3HF	2.5 μ M	0.0053 mg/ml	30 min
3,4'DHF	2.5 μ M	0.0053 mg/ml	30 min
3,7DHF	2.5 μ M	0.00267 mg/ml	5 min
3,5,7THF	2.5 μ M	0.00267 mg/ml	5 min
3,7,4'THF	2.5 μ M	0.0053 mg/ml	5 min

Table 2. The reaction conditions of sulfation activities of flavonoids at the substrate concentration of **10 μ M** by expressed human **SULT1A3**

Compounds	Compounds Concentration	Protein Concentration (expressed SULT1A3)	Reaction Time (Incubating Time)
Naringenin	10 μ M	0.0053 mg/ml	10 min
Phloretin	10 μ M	0.0053 mg/ml	30 min
Genistein	10 μ M	0.0053 mg/ml	30 min

Apigenin	10 μ M	0.0053 mg/ml	10 min
Kaempferol	10 μ M	0.0053 mg/ml	10 min
4'HF	10 μ M	0.0053 mg/ml	30 min
5HF	10 μ M	0.0053 mg/ml	30 min
7HF	10 μ M	0.0053 mg/ml	10 min
5,4'DHF	10 μ M	0.0053 mg/ml	10 min
5,7DHF	10 μ M	0.00267 mg/ml	10 min
7,4'DHF	10 μ M	0.0053 mg/ml	10 min
3HF	10 μ M	0.0053 mg/ml	30 min
3,4'DHF	10 μ M	0.0053 mg/ml	30 min
3,7DHF	10 μ M	0.00267 mg/ml	10 min
3,5,7THF	10 μ M	0.00267 mg/ml	10 min
3,7,4'THF	10 μ M	0.0053 mg/ml	10 min

Table 3. The reaction conditions of sulfation activities of flavonoids at the substrate concentration of **2.5 μ M** by **Caco-2 cell lysates**

Compounds	Compounds Concentration	Protein Concentration (Caco-2 cell lysates)	Reaction Time (Incubating Time)
Naringenin	2.5 μ M	0.5 mg/ml	30 min
Phloretin	2.5 μ M	0.5 mg/ml	60 min
Genistein	2.5 μ M	2 mg/ml	480 min
Apigenin	2.5 μ M	0.5 mg/ml	10 min
Kaempferol	2.5 μ M	0.5 mg/ml	30 min
4'HF	2.5 μ M	0.5 mg/ml	30 min
5HF	2.5 μ M	2 mg/ml	60 min
7HF	2.5 μ M	0.5 mg/ml	10 min
5,4'DHF	2.5 μ M	2 mg/ml	60 min
5,7DHF	2.5 μ M	0.5 mg/ml	10 min
7,4'DHF	2.5 μ M	0.5 mg/ml	10 min
3HF	2.5 μ M	2 mg/ml	60 min
3,4'DHF	2.5 μ M	2 mg/ml	60 min
3,7DHF	2.5 μ M	0.5 mg/ml	5 min
3,5,7THF	2.5 μ M	0.5 mg/ml	10 min
3,7,4'THF	2.5 μ M	0.5 mg/ml	5 min

Table 4. The reaction conditions of sulfation activities of flavonoids at the substrate concentration of **10 μ M** by **Caco-2 cell lysates**

Compounds	Compounds Concentration	Protein Concentration (Caco-2 cell lysates)	Reaction Time (Incubating Time)
Naringenin	10 μ M	1 mg/ml	60 min
Phloretin	10 μ M	2 mg/ml	60 min
Genistein	10 μ M	2 mg/ml	480 min
Apigenin	10 μ M	1 mg/ml	20 min
Kaempferol	10 μ M	2 mg/ml	60 min
4'HF	10 μ M	2 mg/ml	60 min
5HF	10 μ M	2 mg/ml	60 min
7HF	10 μ M	1 mg/ml	15 min
5,4'DHF	10 μ M	2 mg/ml	60 min

5,7DHF	10 μ M	1 mg/ml	20 min
7,4'DHF	10 μ M	1 mg/ml	20 min
3HF	10 μ M	2 mg/ml	60 min
3,4'DHF	10 μ M	2 mg/ml	60 min
3,7DHF	10 μ M	1 mg/ml	10 min
3,5,7THF	10 μ M	1 mg/ml	20 min
3,7,4'THF	10 μ M	1 mg/ml	10 min