

**Table S1.** Information of 60 EOs

| No. | Name of EOs      | Scientific name                  | Extracted part  | Family               | Origin    |
|-----|------------------|----------------------------------|-----------------|----------------------|-----------|
| 1   | Cinnamon         | <i>Cinnamomum zeylanicum</i>     | bark            | <i>Lauraceae</i>     | Sri Lanka |
| 2   | May Chang        | <i>Litsea cubeba</i>             | fruit           | <i>Lauraceae</i>     | Malaysia  |
| 3   | Black pepper     | <i>Piper nigrum</i>              | fruit           | <i>Piperaceae</i>    | Malaysia  |
| 4   | Grapefruit       | <i>Citrus paradisi</i>           | peel            | <i>Rutaceae</i>      | Brazil    |
| 5   | Bergamot         | <i>Citrus bergamia</i>           | peel            | <i>Rutaceae</i>      | Italy     |
| 6   | Petitgrain       | <i>Citrus aurantium</i>          | leaf            | <i>Rutaceae</i>      | Italy     |
| 7   | Neroli           | <i>Citrus aurantium bigarade</i> | flower          | <i>Rutaceae</i>      | Italy     |
| 8   | Lime             | <i>Citrus medica</i>             | peel            | <i>Rutaceae</i>      | Italy     |
| 9   | Orange sweet     | <i>Citrus vulgaris</i>           | peel            | <i>Rutaceae</i>      | Brazil    |
| 10  | Tangerine        | <i>Citrus tangerina</i>          | peel            | <i>Rutaceae</i>      | Malaysia  |
| 11  | Mandarin         | <i>Citrus reticulata</i>         | peel            | <i>Rutaceae</i>      | Brazil    |
| 12  | Lemon            | <i>Citrus limonum</i>            | peel            | <i>Rutaceae</i>      | Argentina |
| 13  | Cajeput          | <i>Melaleuca quinquenervia</i>   | leaf            | <i>Myrtaceae</i>     | England   |
| 14  | Eucalyptus       | <i>Eucalyptus radiata</i>        | branch and leaf | <i>Myrtaceae</i>     | Australia |
| 15  | Lemon eucalyptus | <i>Eucalyptus citriodora</i>     | leaf            | <i>Myrtaceae</i>     | China     |
| 16  | Rosewood         | <i>Aniba Rosaedora</i>           | heart wood      | <i>Lauraceae</i>     | Brazil    |
| 17  | Sandalwood       | <i>Santalum album</i>            | heart wood      | <i>Santalaceae</i>   | India     |
| 18  | Cedarwood        | <i>Cedrus atlantica</i>          | bark and trunk  | <i>Pinaceae</i>      | Morocco   |
| 19  | Pine fir         | <i>Pinus sylvestris</i>          | needle and cone | <i>Pinaceae</i>      | Australia |
| 20  | Violet           | <i>Viola odorata</i>             | flower          | <i>Violaceae</i>     | France    |
| 21  | Green tea        | <i>Camellia sinensis</i>         | leaf            | <i>Theaceae</i>      | Portugal  |
| 22  | Carrot seed      | <i>Daucus carota</i>             | seed            | <i>Apiaceae</i>      | Hungary   |
| 23  | Parsley          | <i>Petroselinum sativum</i>      | leaf            | <i>Apiaceae</i>      | China     |
| 24  | Angelica         | <i>Angelica archangelica</i>     | seed and root   | <i>Apiaceae</i>      | China     |
| 25  | Fennel           | <i>Foeniculum vulgare</i>        | seed            | <i>Apiaceae</i>      | Vietnam   |
| 26  | Cumin            | <i>Cuminum cyminum</i>           | seed            | <i>Apiaceae</i>      | India     |
| 27  | Verbena          | <i>Lippia citriodora</i>         | stem leaf       | <i>Verbenaceae</i>   | Germany   |
| 28  | Nutmeg           | <i>Myristica fragrans</i>        | fruit           | <i>Myristicaceae</i> | Indonesia |
| 29  | Geranium         | <i>Pelargonium graveolens</i>    | flower and leaf | <i>Geraniaceae</i>   | France    |
| 30  | Benzoin          | <i>Styrax benzoin</i>            | stem            | <i>Styracaceae</i>   | Vietnam   |
| 31  | Capsicum         | <i>Capsicum frutescens</i>       | fruit           | <i>Solanaceae</i>    | China     |
| 32  | Ginger           | <i>Zingiber officinale</i>       | rhizome         | <i>Zingiberaceae</i> | China     |
| 33  | Ylang ylang      | <i>Cananga odorata</i>           | flower          | <i>Annonaceae</i>    | Indonesia |
| 34  | Chinese ilex     | <i>Ilex purpurea hassk</i>       | seed            | <i>Aquifoliaceae</i> | China     |

|    |                      |                               |                 |                     |            |
|----|----------------------|-------------------------------|-----------------|---------------------|------------|
| 35 | Palmarosa            | <i>Cymbopogon martini</i>     | flower and leaf | <i>Poaceae</i>      | Spain      |
| 36 | Rose                 | <i>Rosa rugosa</i>            | flower          | <i>Rosaceae</i>     | England    |
| 37 | Bay                  | <i>Laurus nobilis</i>         | leaf            | <i>Lauraceae</i>    | Morocco    |
| 38 | Osmanthus            | <i>Osmanthus fragrans</i>     | flower          | <i>Oleaceae</i>     | East India |
| 39 | Jasmine              | <i>Jasminum sambac</i>        | flower          | <i>Oleaceae</i>     | Morocco    |
| 40 | Clove                | <i>Eugenia caryophyllata</i>  | flower          | <i>Myrtaceae</i>    | Sri Lanka  |
| 41 | Michelia alba leaf   | <i>Michelia alba DC.</i>      | leaf            | <i>Magnoliaceae</i> | China      |
| 42 | Michelia alba flower | <i>Michelia alba DC.</i>      | flower          | <i>Magnoliaceae</i> | China      |
| 43 | Chamomile            | <i>Ormenis mixta</i>          | flower          | <i>Asteraceae</i>   | Morocco    |
| 44 | Ay tsao              | <i>Artemisia argyi</i>        | leaf            | <i>Asteraceae</i>   | China      |
| 45 | Lemongrass           | <i>Cymbopogon citratus</i>    | leaf            | <i>Poaceae</i>      | India      |
| 46 | Vetiver              | <i>Vetiveria zizanoides</i>   | root and leaf   | <i>Poaceae</i>      | Haiti      |
| 47 | Citronella ceylon    | <i>Cymbopogon nardus</i>      | seed            | <i>Poaceae</i>      | China      |
| 48 | Myrrh                | <i>Commiphora myrrha</i>      | branch          | <i>Commiphora</i>   | Bengal     |
| 49 | Frankincense         | <i>Boswellia thurifera</i>    | bark            | <i>Burseraceae</i>  | Turkey     |
| 50 | Marjoram             | <i>Origanum marjorana</i>     | flower and leaf | <i>Lamiaceae</i>    | Bulgaria   |
| 51 | Thyme                | <i>Thymus vulgaris</i>        | entire plants   | <i>Lamiaceae</i>    | Spain      |
| 52 | Clary sage           | <i>Salvia sclarea</i>         | flower and leaf | <i>Lamiaceae</i>    | France     |
| 53 | Peppermint2          | <i>Mentha haplocalyx Briq</i> | leaf            | <i>Lamiaceae</i>    | America    |
| 54 | Melissa              | <i>Melissa officinalis</i>    | flower and leaf | <i>Lamiaceae</i>    | France     |
| 55 | Peppermint1          | <i>Mentha piperita</i>        | leaf            | <i>Lamiaceae</i>    | America    |
| 56 | Basil                | <i>Ocimum basilicum</i>       | leaf            | <i>Lamiaceae</i>    | Egypt      |
| 57 | Patchouli            | <i>Pogostemon patchouli</i>   | entire plants   | <i>Lamiaceae</i>    | India      |
| 58 | Rosemary             | <i>Rosmarinus officinalis</i> | flower and leaf | <i>Lamiaceae</i>    | Spain      |
| 59 | Juniper              | <i>Juniperus communis</i>     | fruit           | <i>Cupressaceae</i> | Spain      |
| 60 | Cypress              | <i>Cupressus sempervirens</i> | leaf and cone   | <i>Cupressaceae</i> | England    |

**Table S2.** Repelling rate of 60 EOs at 10 µg/cm<sup>2</sup> exposed for 30 min

| EO                   | 1   | 2   | 3   | Average | SD  |
|----------------------|-----|-----|-----|---------|-----|
| Cinnamon             | 78% | 80% | 72% | 77%     | 4%  |
| Marjoram             | 59% | 55% | 56% | 57%     | 2%  |
| Lemongrass           | 50% | 56% | 56% | 54%     | 3%  |
| Bay                  | 50% | 52% | 50% | 51%     | 1%  |
| Chamomile            | 49% | 44% | 47% | 47%     | 3%  |
| Jasmine              | 47% | 40% | 45% | 44%     | 4%  |
| Peppermint2          | 30% | 50% | 45% | 42%     | 10% |
| Thyme                | 39% | 43% | 40% | 41%     | 2%  |
| Osmanthus            | 42% | 33% | 33% | 36%     | 5%  |
| Myrrh                | 32% | 34% | 34% | 33%     | 1%  |
| Melissa              | 37% | 28% | 33% | 33%     | 5%  |
| Grapefruit           | 33% | 28% | 32% | 31%     | 3%  |
| Sandalwood           | 34% | 33% | 27% | 31%     | 4%  |
| May Chang            | 28% | 31% | 32% | 30%     | 2%  |
| Citronella ceylon    | 33% | 27% | 28% | 29%     | 3%  |
| Nutmeg               | 32% | 26% | 28% | 29%     | 3%  |
| Vetiver              | 26% | 28% | 31% | 28%     | 3%  |
| Ay tsao              | 22% | 24% | 32% | 26%     | 5%  |
| Bergamot             | 33% | 18% | 25% | 25%     | 8%  |
| Clary sage           | 24% | 18% | 33% | 25%     | 8%  |
| Petitgrain           | 26% | 22% | 24% | 24%     | 2%  |
| Green tea            | 26% | 25% | 19% | 23%     | 4%  |
| Geranium             | 21% | 28% | 20% | 23%     | 4%  |
| Verbena              | 28% | 21% | 17% | 22%     | 6%  |
| Benzoin              | 23% | 19% | 20% | 21%     | 2%  |
| Peppermint1          | 17% | 21% | 22% | 20%     | 3%  |
| Clove                | 16% | 22% | 18% | 19%     | 3%  |
| Michelia alba flower | 15% | 20% | 23% | 19%     | 4%  |
| Basil                | 25% | 11% | 18% | 18%     | 7%  |
| Patchouli            | 15% | 20% | 15% | 17%     | 3%  |
| Neroli               | 21% | 11% | 18% | 17%     | 5%  |
| Cedarwood            | 26% | 8%  | 15% | 16%     | 9%  |
| Palmarosa            | 17% | 13% | 14% | 15%     | 2%  |
| Michelia alba leaf   | 21% | 11% | 13% | 15%     | 5%  |
| Lime                 | 11% | 16% | 15% | 14%     | 3%  |
| Rosemary             | 11% | 12% | 15% | 13%     | 2%  |
| Parsley              | 22% | 6%  | 12% | 13%     | 8%  |
| Juniper              | 17% | 13% | 6%  | 12%     | 6%  |
| Lemon eucalyptus     | 9%  | 10% | 13% | 11%     | 2%  |
| Capsicum             | 15% | 6%  | 8%  | 10%     | 5%  |
| Angelica             | 5%  | 13% | 10% | 9%      | 4%  |

|              |      |      |     |      |     |
|--------------|------|------|-----|------|-----|
| Cajeput      | 5%   | 11%  | 12% | 9%   | 4%  |
| Orange sweet | 11%  | 6%   | 8%  | 8%   | 3%  |
| Carrot seed  | 14%  | 4%   | 6%  | 8%   | 5%  |
| Eucalyptus   | 0%   | 11%  | 6%  | 6%   | 6%  |
| Tangerine    | 5%   | 5%   | 5%  | 5%   | 0%  |
| Violet       | 0%   | 6%   | 2%  | 3%   | 3%  |
| Fennel       | 0%   | 6%   | 3%  | 3%   | 3%  |
| Rose         | -7%  | 12%  | 4%  | 3%   | 10% |
| Ginger       | 7%   | 0%   | 0%  | 2%   | 4%  |
| Ylang ylang  | 0%   | 1%   | 3%  | 1%   | 2%  |
| Chinese ilex | -4%  | 0%   | 6%  | 1%   | 5%  |
| Cypress      | 0%   | 0%   | 1%  | 0%   | 1%  |
| Black pepper | 5%   | -12% | 5%  | -1%  | 10% |
| Cumin        | -5%  | 0%   | 0%  | -2%  | 3%  |
| Pine fir     | -11% | -5%  | 0%  | -5%  | 6%  |
| Mandarin     | -7%  | -6%  | -5% | -6%  | 1%  |
| Rosewood     | -7%  | -8%  | -5% | -7%  | 2%  |
| Frankincense | -20% | -10% | 0%  | -10% | 10% |
| Lemon        | -20% | -6%  | -9% | -12% | 7%  |
| DEET         | 55%  | 60%  | 61% | 59%  | 3%  |

**Table S3.** Repelling rate of the main constituents from 8 active EOs

| Compounds                                | 1    | 2    | 3   | Average | SD |
|--|------|------|-----|---------|----|
| cinnamaldehyde (CZ, LN)                  | 79%  | 84%  | 82% | 82%     | 3% |
| citral (CC)                              | 67%  | 60%  | 68% | 65%     | 4% |
| terpinen-4-ol (OMa)                      | 59%  | 64%  | 56% | 60%     | 4% |
| thymol (TV)                              | 60%  | 55%  | 44% | 53%     | 8% |
| benzyl acetate (JS)                      | 34%  | 38%  | 38% | 37%     | 2% |
| diethyl phthalate (OMi)                  | 30%  | 40%  | 41% | 37%     | 6% |
| eugenol (LN)                             | 35%  | 31%  | 36% | 34%     | 3% |
| diisobutyl phthalate (LN)                | 41%  | 31%  | 23% | 32%     | 9% |
| $\beta$ -caryophyllene (LN)              | 28%  | 29%  | 34% | 30%     | 3% |
| $\alpha$ -terpineol (OMa)                | 20%  | 24%  | 25% | 23%     | 3% |
| menthol (MHB)                            | 16%  | 23%  | 19% | 19%     | 4% |
| carvacrol (TV)                           | 18%  | 19%  | 14% | 17%     | 3% |
| linalool (JS, TV)                        | 20%  | 11%  | 13% | 15%     | 5% |
| limonene (OMa, CC, OMi, MHB, TV)         | 9%   | 16%  | 14% | 13%     | 4% |
| <i>p</i> -menthone (MHB)                 | 3%   | 4%   | 6%  | 4%      | 2% |
| ( <i>E</i> )-2-hexyl-cinnamaldehyde (JS) | 0%   | 3%   | 3%  | 2%      | 2% |
| 2,2,4,6,6-pentamethyl-heptane (MHB)      | -3%  | -3%  | 4%  | -1%     | 4% |
| $\gamma$ -terpinene (OMa)                | 0%   | -14% | -9% | -8%     | 7% |
| <i>p</i> -cymene (OMa, TV)               | -10% | -16% | -5% | -10%    | 6% |