Composition of various lavender species and biosynthesis of their constituents.

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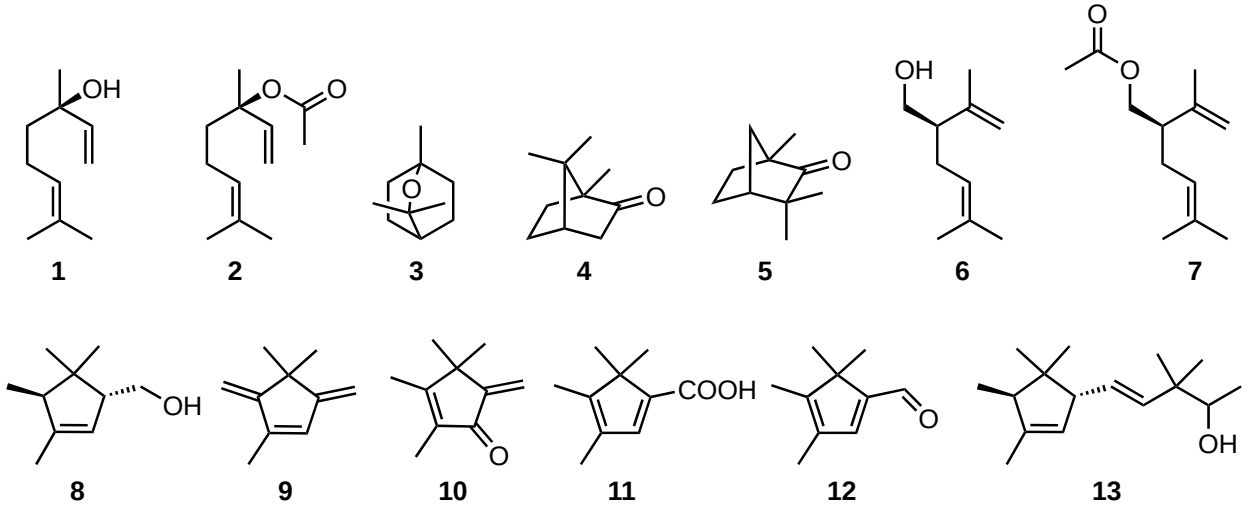
Lavandula species (Labiatae) are important sources of essential oils, used extensively in the fragrance industry and for perfume compositions. The most commonly used species are lavender (*Lavandula angustifolia* Mill.), spike lavender (*Lavandula latifolia* Medik., syn. *Lavandula spica*), and a natural hybrid of these two species: lavandin (*Lavandula intermedia* Emeric ex Loisel). The chemical composition of lavender and lavandin essential oils are dominated by (-)-linalool **1** and its acetate **2**, while those of spike lavender contains mostly **1**, 1,8-cineole **3** and camphor **4**. Another worth to mention species is *Lavandula stoechas*, which main oil constituents are **4** and fenchone **5**. The biosynthesis of these very common regular monoterpenoids **1**-**5** is well known, and involves classical reactions of geranyl pyrophosphate. At first sight, lavender volatiles are then rather simple and common metabolites, widespread in many aromatic plants. However, a closer look to the published analytical data shows that the situation is more complex, as we can also observe the presence of sesquiterpenoids and nor-sesquiterpenoids, as well as uncommon Diels-Alder adducts among lavender components. Moreover, as often, minor constituents play an important role in the characteristic odor of lavender, and several studies showed that it contains various odorants already described in jasmine, sandalwood, violet flower... [1-3]. Lavender and lavandin oils also contains few percents of (-)-lavandulol and its acetate (**6**-**7**), two irregular monoterpenoids which biosynthesis is different from that of **1**-**5**. To conclude this survey on lavender volatiles, we will present a puzzling case of irregular monoterpenoids **8**-**12** present in the essential oil of *Lavandula luisieri*, a species morphologically related to *Lavandula stoechas*. The characterization of **9**-**12** required the use of 1D and 2D NMR analysis, as well as hemisynthesis [4]. Furthermore, using **8** as starting material, we synthesized a new sandalwood odorant **13** related to the common perfumery material polysantol®.



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