CLAIMS

1. A process for producing rotundone from α-guaiene, ~~in particular~~ by oxidation of the C(3) position, wherein the α-guaiene is produced from a precursor by a sesquiterpene synthase, wherein the sesquiterpene synthase is produced in a microorganism~~.~~, and wherein the sesquiterpene synthase has a sequence identity with SEQ ID NO.: 2 or SEQ ID NO.: 4 of at least 90%.

2. The process according to claim 1, wherein the microorganism is cultured under conditions suitable to produce α-guaiene.

3. The process according to claim 1, wherein the sesquiterpene synthase is isolated from the microorganism prior to production of α-guaiene.

4. The process according to one of claims 1 to 3, wherein the microorganism is a recombinant microorganism.

5. The process according to one of claims 1 to 4, wherein the precursor is an acyclic precursor, in particular farnesyl pyrophosphate.

~~6. The process according to one of claims 1 to 5, wherein the sesquiterpene synthase has a sequence identity with SEQ ID NO.: 2, SEQ ID NO.: 4 of at least 70%, preferably at least 80%, more preferably at least 90%, even more preferably at least 95%.~~

~~7.~~6. The process according to one of claims 1 to ~~6~~5, wherein rotundone is produced from α-guaiene by an oxidation selected from the group consisting of transition metal catalysis, organocatalysis, chromium oxidation, selenium oxidation, manganese oxidation, aerial oxidation, enzymatic oxidation, electrochemical oxidation and combinations thereof.

7. The process according to claim ~~7~~6, wherein rotundone is produced from α-guaiene by transition metal catalysis and the transition metal is in particular selected from the group consisting of iron, copper, vanadium, manganese, molybdenum, cobalt, ruthenium, palladium, iridium, rhodium, titanium, chromium, gold, osmium and combinations thereof.

8. The process according to one of claims 1 to 7, wherein rotundone is produced from α-guaiene by an oxidation selected from transition metal catalysis or organocatalysis.

9. The process according to claim 8, wherein rotundone is produced from α-guaiene by iron porphyrin catalysis comprising the steps of:

   - Forming a mixture containing α-guaiene and an iron (III)-X porphyrin complex catalyst in a solvent;
   - Introducing molecular oxygen into the mixture;
   - Effecting production of rotundone oxidation of the C(3) position of α-guaiene.

10. The process according to claim 7, wherein rotundone is produced from α-guaiene by organocatalysis, in particular comprising the steps of:

   - Forming a mixture containing α-guaiene, an organocatalyst, preferably selected from the group consisting of *N*-hydroxyphthalimide and tetrachloro-*N*-hydroxyphthalimide, and an oxidant in a solvent;
   - Effecting oxidation of the C(3) position of α-guaiene.

11. Use of α-guaiene for producing rotundone, in particular by oxidation of the C(3) position, wherein the α-guaiene is produced from a precursor, in particular an acyclic precursor, by a

sesquiterpene synthase, wherein the sesquiterpene synthase is produced in a microorganism, and wherein the sesquiterpene synthase has a sequence identity with SEQ ID NO.: 2 or SEQ ID NO.: 4 of at least 90%.

~~12. A fragrance or flavor ingredient obtainable by the process according to one of claims 1 to 11.~~

~~13. A fragrance or flavor ingredient, in particular an ingredient according to claim 12, wherein the portion of rotundone is in a range of 10 to 95 wt.-%, preferably 20 to 70 wt.-%, even more preferably 25 to 50 wt.-%.~~

~~14. Use of a fragrance or flavor ingredient according to one of claims 12 or 13.~~