CLAIMS

1. A recombinant cell comprising a plasmid expressing a terpenoid synthase gene and one or more modification to the gene of the recombinant cell from a mixed acid fermentation pathway, a lyase family and/or a cell division factor,

wherein the one or more modification comprises one or more deletion of *ackA-pta, ldhA, pflB, poxB, adhE-ldhA, adhE-ldhA-pflB, tnaA* and/or *zapB*.

2. The recombinant cell according to claim 1, wherein the terpenoid synthase is a sesquiterpenoid synthase,

wherein the sesquiterpenoid synthase is a nerolidol synthase, and

wherein the nerolidol synthase is a strawberry nerolidol synthase.

3. The recombinant cell according to any one of the preceding claims, wherein the terpenoid synthase is selected from the group consisting of fungi, plants and / or bacteria,

wherein the terpenoid synthase is from any one selected from the group consisting of *Fragaria ananassa* (Fa) – strawberry, *Vitis vinifera* – grape, *Selaginella moellendorffii* (Sm)– Spikemoss, *Celastrus angulatus Maxim,* Maze *Zea mays, Abrus precatorius*, *Acer yangbiense*, *Actinidia chinensis, Aegilops tauschii, Ageratina Adenophora, Albizia julibrissin, Ananas comosus, Antirrhinum majus, Apostasia shenzhenica, Aquilegia coerulea, Arabidopsis thaliana, Arabis alpine, Arachis duranensis, Arachis hypogaea, Artemisia annua, Beta vulgaris, Cajanus cajan, Camellia sinensis, Cannabis sativa, Capsicum annuum, Capsicum baccatum, Capsicum chinense, Carpinus fangiana, Castanea mollissima, Chengiopanax sciadophylloides, Chenopodium quinoa, Cicer arietinum, Citrus clementina, Citrus sinensis, Citrus unshiu, Coffea arabica, Coffea canephora, Coleus amboinicus, Coptis chinensis, Cucumis sativus, Cucurbita maxima, Cucurbita moschata, Davidia involucrate, Dorcoceras hygrometricum, Ensete ventricosum, Erythranthe guttata, Eucalyptus grandis, Fagus sylvatica, Ficus carica, Folsomia candida, Fragaria vesca, Glycine max, Glycine soja, Gossypium australe, Helianthus annuus, Herrania umbratical, Hevea brasiliensis, Hibiscus syriacus, Jasminum sambac, Jatropha curcas, Juglans regia, Kalanchoe fedtschenkoi, Kingdonia uniflora, Lactuca saligna, Lavandula angustifolia, Lupinus albus, Lupinus angustifolius, Malus baccata, Malus domestica, Manihot esculenta, Medicago sativa, Medicago truncatula, Microthlaspi erraticum, Mikania micrantha, Momordica charantia, Morella rubra, Morus notabilis, Mucuna pruriens, Nelumbo nucifera,*

Nicotiana attenuate, Nicotiana tabacum, Nyssa sinensis, Ocimum basilicum, Olea europaea subsp. Europaea, Oryza brachyantha, Panicum miliaceum, Phaseolus angularis, Phaseolus vulgaris, Phyllostachys edulis, Populus alba, Populus nigra, Populus trichocarpa, Prunus armeniaca, Prunus avium, Prunus campanulate, Prunus dulcis, Prunus persica, Punica granatum, Pyrus ussuriensis x Pyrus communis, Quercus lobata, Rhamnella rubrinervis, Rosa chinensis, Salix brachista, Salix dunnii, Salix suchowensis, Scoparia dulcis, Selaginella moellendorffii, Senna tora, Solanum lycopersicum, Spinacia oleracea, Striga asiatica, Tanacetum cinerariifolium, Tetracentron sinense, Theobroma cacao, Trifolium medium, Trifolium pratense, Trifolium subterraneum, Tripterygium wilfordii, Triticum Urartu, Vigna angularis var. angularis, Vigna radiata var. radiata, Zingiber officinale, and *Ziziphus jujuba*.

4. The recombinant cell according to any one of the preceding claims, wherein the one or more modification to the gene of the recombinant cell comprises genes involved in the formation of by-products.

5. The recombinant cell according to any one of the preceding claims, wherein the modification to the gene of the recombinant cell is to one or more genes selected from the group consisting of lactose inhibitor (*lacI*), T7 RNA polymerase (*T7RP*), *aroA, aroB, aroC, aroAB, aroBC, aroAC, aroABC, ackA, adhE, adhE-pta, serC*, frdABCD, eutD, *adhE-ldhA-poxB, adhE-ldhA-ackA-pta, adhE-ldhA-poxB-pflB, poxB-pflB-ackA-pta, adhE-ldhA-poxB-pflB-ackA-pta,* and combinations thereof.

6. The recombinant cell according to any one of the preceding claims, wherein the one or more genes that are modified from the recombinant cell comprises the combination of *ackA-pta, ldhA, pflB, poxB*, and / or *tnaA.*

7. The recombinant cell according to any one of the preceding claims,

wherein the one or more modification to the gene of the recombinant cell comprises one or more insertion and/or one or more deletion of the recombinant cell,

wherein the one or more insertion comprises one or more insertion of lactose inhibitor and/or T7 RNA polymerase between the *ybhB* and *ybhC* gene, and/or

wherein the one or deletion comprises one or more deletion of *aroA, aroB, aroC, a*roAB, *aroBC, aroAC, aroABC, ackA, adhE, adhE-pta, adhE-ldhA-poxB, adhE-ldhA-ackA-pta, adhE-ldhA-poxB-pflB, poxB-pflB-ackA-pta,* and/or *adhE-ldhA-poxB-pflB-ackA-pta*.

8. The recombinant cell according to any one of the preceding claims, wherein the recombinant cell carries plasmids expressing genes of a biosynthetic pathway,

wherein the biosynthetic pathway comprises the nerolidol biosynthetic pathway and / or mevalonate pathway,

wherein the recombinant cell carries plasmid expressing genes of the nerolidol biosynthetic pathway and / or mevalonate pathway comprising *hmgS, atoB,* truncated HMG-CoA reductase (*thmgR*)*, mevk, pmk, pmd,* and/or *idi*.

9. The recombinant cell according to any one of the preceding claims, wherein the recombinant cell comprises one or more plasmids with a combination of strong or weak promoters

of T7, TM1, TM2 and/or TM3 promoters.

10. The recombinant cell according to any one of the preceding claims, wherein the recombinant cell comprises one or more modifications selected from the group consisting of

i) a deletion of ***ackA and pta,***

ii) carrying plasmids expressing one or more genes selected from the group consisting of HMG-CoA synthase (*hmgS*)*,* acetoacetyl-CoA thiolase (*atoB*)*,* HMG-CoA reductase (*hmgR*)*, aroC* with *T7, TM1, TM2* and/or *TM3* promoter; mevalonate kinase (*mevK*)*,* phosphomevalonate kinase (*pmk*)*,* mevalonate pyrophosphate decarboxylase *(pmd*)*,* IPP isomerase (*idi*)*, aroB* with *T7, TM1, TM2* and/or *TM3* promoter; and /or

iii) nerolidol synthase (*LNS*)*,* fpps (*ispA*)*, aroA* with *T7*, *TM1, TM2* and/or *TM3* promoter;

iv) a deletion of ***ldhA,***

v) carrying plasmids expressing *hmgS, atoB, hmgR, aroC* with *T7* ,*TM1, TM2* and/or *TM3* promoter; *mevK, pmk, pmd, idi, aroB* with *T7, TM1, TM2* and/or *TM3* promoter; and/or

vi*) LNS, ispA, aroA* with *T7*, *TM1, TM2*, and/or *TM3* promoter;

vii) a deletion of ***pflB,***

viii) carrying plasmids expressing *hmgS, atoB, hmgR, aroC* with *T7, TM1, TM2* and/or *TM3* promoter; *mevK, pmk, pmd, idi, aroB* with *T7, TM1, TM2* and/or *TM3* promoter; and/or

ix*) LNS, ispA, aroA* with *T7,TM1, TM2* and/or *TM3* promoter;

x) a deletion of ***poxB,***

xi) carrying plasmids expressing *hmgS, atoB, hmgR, aroC* with *T7*, *TM1, TM2* and/or *TM3* promoter; *mevK, pmk, pmd, idi, aroB* with *T7*,*TM1, TM2* and/or*TM3* promoter; and/or

xii*) LNS, ispA, aroA* with *T7, TM1, TM2* and/or *TM3* promoter;

xiii) a deletion of ***tnaA*****,**

xiv) carrying plasmids expressing *hmgS, atoB, hmgR, aroC* genes with *T7, TM1, TM2* and/or *TM3* promoter; *mevK, pmk, pmd, idi, aroB* genes with *T7, TM1, TM2* and/or *TM3* promoter; and/or

xv*) LNS, ispA, aroA* with T7, *TM1, TM2* and/or *TM3* promoter;

xvi*)* a deletion of ***adhE,***

xvii) carrying plasmids expressing *hmgS, atoB, hmgR, aroC* genes with *T7, TM1, TM2* and/or *TM3* promoter; *mevK, pmk, pmd, idi, aroB* genes with *T7, TM1, TM2* and/or *TM3* promoter; and/or

xviii) *LNS, ispA, aroA* with *T7, TM1, TM2* and/or *TM3* promoter;

xix*)* a deletion of ***zapB,***

xx) carrying plasmids expressing *hmgS, atoB, hmgR, aroC* genes with *T7, TM1, TM2* and/or *TM3* promoter; *mevK, pmk, pmd, idi, aroB* genes with *T7, TM1, TM2* and/or *TM3* promoter; and/or

xi) *LNS, ispA, aroA* with *T7, TM1, TM2* and/or *TM3* promoter.

11. A recombinant cell according to any one of the preceding claims for use in biosynthesis.

12. A method of producing isoprenoid, where in the method comprises culturing the recombinant cell according to any one of the preceding claims.

13. The method according to claim 12, wherein the method comprises culturing the recombinant cell in a medium comprising a carbon source with glucose, glycerol and / or lactose.

14. The method according to claims 12 or 13, wherein the method comprises culturing the recombinant cell in a medium with an extractant that comprises a plant oil,

wherein the extractant comprises a sunflower oil.

15. The method according to any one of claims 12 to 14, wherein the method comprises culturing the recombinant cell with a bioprocess comprising fed-batch fermentation with single-phase fermentation and / or two-phase fermentation.