SECTION C — CHEMISTRY; METALLURGY

C12 BIOCHEMISTRY; BEER; SPIRITS; WINE; VINEGAR; MICROBIOLOGY; ENZYMOLOGY; MUTATION OR GENETIC ENGINEERING

C12P FERMENTATION OR ENZYME-USING PROCESSES TO SYNTHESISE A DESIRED CHEMICAL COMPOUND OR COMPOSITION OR TO SEPARATE OPTICAL ISOMERS FROM A RACEMIC MIXTURE [3]

Note(s) [3, 4, 6]

1. This subclass covers both major and minor chemical modifications.
2. Group C12P 1/00 covers processes for producing organic compounds not sufficiently identified to be classified in groups C12P 3/00-C12P 37/00. Compounds identified only by their empirical formulae are not considered to be sufficiently identified.
3. Attention is drawn to Notes (1) to (3) following the title of class C12.
4. If a particular reaction is considered of interest, it is also classified in the relevant chemical compound class, e.g. C07, C08.
5. In this subclass:
   - metal or ammonium salts of a compound are classified as that compound.
   - compositions are classified in the relevant compound groups.
6. In this subclass, it is desirable to add the indexing codes of subclass C12R.

Subclass index

BIOSYNTHESIS OF CHEMICAL SUBSTANCES
- Inorganic compounds....3/00
- Acyclic or carbocyclic organic compounds....5/00-15/00
- peptides or proteins....21/00
- Carotenes....23/00
- Tetracyclines....29/00
- Prostaglandins....31/00
- Steroids....33/00
- Heterocyclic organic compounds....17/00
- containing saccharide radicals....19/00
- Riboflavin....25/00
- Giberellin....27/00
- Cephalosporin; penicillin....35/00, 37/00

SEPARATION OF OPTICAL ISOMERS....41/00
OTHER PROCESSES FOR BIOSYNTHESIS PREPARATIONS....1/00, 39/00

1/00 Preparation of compounds or compositions, not provided for in groups C12P 3/00-C12P 39/00, by using micro-organisms or enzymes; General processes for the preparation of compounds or compositions by using micro-organisms or enzymes [3, 2006.01]

1/02 • by using fungi **[3, 2006.01]**

1/04 • by using bacteria **[3, 2006.01]**

1/06 • by using actinomycetales **[3, 2006.01]**

3/00 Preparation of elements or inorganic compounds except carbon dioxide [3, 2006.01]

5/00 Preparation of hydrocarbons [3, 2006.01]

5/02 • acyclic **[3, 2006.01]**

7/00 Preparation of oxygen-containing organic compounds [3, 2006.01]

7/02 • containing a hydroxy group **[3, 2006.01]**

7/04 • • acyclic **[3, 2006.01]**

7/06 • • • Ethanol, i.e. non-beverage **[3, 2006.01]**

7/08 • • • • produced as by-product or from waste or cellulosic material substrate **[3, 2006.01]**

7/10 • • • • • substrate containing cellulosic material **[3, 2006.01]**

7/12 • • • • • substrate containing sulfite waste liquor or citrus waste **[3, 2006.01]**

7/14 • • • • Multiple stages of fermentation; Multiple types of micro-organisms or reuse for micro-organisms **[3, 2006.01]**

7/16 • • • Butanols **[3, 2006.01]**

7/18 • • • polyhydric **[3, 2006.01]**

7/20 • • • • Glycerol **[3, 2006.01]**

7/22 • • aromatic **[3, 2006.01]**

7/24 • containing a carbonyl group **[3, 2006.01]**

7/26 • • Ketones **[3, 2006.01]**

7/28 • • • Acetone-containing products **[3, 2006.01]**

7/30 • • • • produced from substrate containing inorganic compounds other than water **[3, 2006.01]**

7/32 • • • • produced from substrate containing inorganic nitrogen source **[3, 2006.01]**
7/34 • • • • produced from substrate containing protein as nitrogen source **[3, 2006.01]**
7/36 • • • • produced from substrate containing grain or cereal material **[3, 2006.01]**
7/38 • • • Cyclopentanone- or cyclopentadione-containing products **[3, 2006.01]**
7/40 • containing a carboxyl group **[3, 2006.01]**
7/42 • • Hydroxy carboxylic acids **[3, 2006.01]**
7/44 • • Polycarboxylic acids **[3, 2006.01]**
7/46 • • • Dicarboxylic acids having four or less carbon atoms, e.g. fumaric acid, maleic acid **[3, 2006.01]**
7/48 • • • Tricarboxylic acids, e.g. citric acid **[3, 2006.01]**
7/50 • • • having keto groups, e.g. 2-ketoglutaric acid **[3, 2006.01]**
7/52 • • Propionic acid; Butyric acids **[3, 2006.01]**
7/54 • • Acetic acid **[3, 2006.01]**
7/56 • • Lactic acid **[3, 2006.01]**
7/58 • • Aldonic, ketoaldonic or saccharic acids (uronic acids C12P 19/00) **[3, 2006.01]**
7/60 • • • 2-Ketogulonic acid **[3, 2006.01]**
7/62 • Carboxylic acid esters **[3, 2006.01]**
7/64 • Fats; Fatty oils; Ester-type waxes; Higher fatty acids, i.e. having at least seven carbon atoms in an unbroken chain bound to a carboxyl group; Oxidised oils or fats **[3, 2006.01]**
7/66 • containing the quinoid structure **[3, 2006.01]**

9/00 Preparation of organic compounds containing a metal or atom other than H, N, C, O, S, or halogen [3, 2006.01]

11/00 Preparation of sulfur-containing organic compounds [3, 2006.01]

13/00 Preparation of nitrogen-containing organic compounds [3, 2006.01]
13/02 • Amides, e.g. chloramphenicol **[3, 2006.01]**
13/04 • Alpha- or beta-amino acids **[3, 2006.01]**
13/06 • • Alanine; Leucine; Isoleucine; Serine; Homoserine **[3, 2006.01]**
13/08 • • Lysine; Diaminopimelic acid; Threonine; Valine **[3, 2006.01]**
13/10 • • Citrulline; Arginine; Ornithine **[3, 2006.01]**
13/12 • • Methionine; Cysteine; Cystine **[3, 2006.01]**
13/14 • • Glutamic acid; Glutamine **[3, 2006.01]**
13/16 • • • using surfactants, fatty acids or fatty acid esters, i.e. having at least seven carbon atoms in an unbroken chain bound to a carboxyl group or a carboxyl ester group **[3, 2006.01]**
13/18 • • • using biotin or its derivatives **[3, 2006.01]**
13/20 • • Aspartic acid; Asparagine **[3, 2006.01]**
13/22 • • Tryptophan; Tyrosine; Phenylalanine; 3,4-Dihydroxyphenylalanine **[3, 2006.01]**
13/24 • • Proline; Hydroxyproline; Histidine **[3, 2006.01]**

15/00 Preparation of compounds containing at least three condensed carbocyclic rings [3, 2006.01]

17/00 Preparation of heterocyclic carbon compounds with only O, N, S, Se, or Te as ring hetero atoms (C12P 13/04-C12P 13/24 take precedence) **[3, 2006.01]**
17/02 • Oxygen as only ring hetero atoms **[3, 2006.01]**
17/04 • • containing a five-membered hetero ring, e.g. griseofulvin **[3, 2006.01]**
17/06 • • containing a six-membered hetero ring, e.g. fluorescein **[3, 2006.01]**
17/08 • • containing a hetero ring of at least seven ring members, e.g. zearalenone, macrolide aglycons **[3, 2006.01]**
17/10 • Nitrogen as only ring hetero atom **[3, 2006.01]**
17/12 • • containing a six-membered hetero ring **[3, 2006.01]**
17/14 • Nitrogen or oxygen as hetero atom and at least one other diverse hetero ring atom in the same ring **[3, 2006.01]**
17/16 • containing two or more hetero rings **[3, 2006.01]**
17/18 • containing at least two hetero rings condensed among themselves or condensed with a common carbocyclic ring system, e.g. rifamycin **[3, 2006.01]**

19/00 Preparation of compounds containing saccharide radicals (ketoaldonic acids C12P 7/58) **[3, 2006.01]**

Note(s) [3]

Attention is drawn to Note (3) following the title of subclass C07H, which defines the expression "saccharide radical".

19/02 • Monosaccharides **[3, 2006.01]**
19/04 • Polysaccharides, i.e. compounds containing more than five saccharide radicals attached to each other by glycosidic bonds **[3, 2006.01]**
19/06 • • Xanthan, i.e. Xanthomonas-type heteropolysaccharides **[3, 2006.01]**
19/08 • • Dextran **[3, 2006.01]**
19/10 • • Pullulan **[3, 2006.01]**
19/12 • Disaccharides **[3, 2006.01]**
19/14 • produced by the action of a carbohydrase, e.g. by alpha-amylase **[3, 2006.01]**
19/16 • produced by the action of an alpha-1, 6-glucosidase, e.g. amylose, debranched amylopectin **[3, 2006.01]**
19/18 • produced by the action of a glycosyl transferase, e.g. alpha-, beta- or gamma-cyclodextrins **[3, 2006.01]**
19/20 • produced by the action of an exo-1, 4 alpha-glucosidase, e.g. dextrose **[3, 2006.01]**
19/22 • produced by the action of a beta-amylase, e.g. maltose **[3, 2006.01]**
19/24 • produced by the action of an isomerase, e.g. fructose **[3, 2006.01]**
19/26 • Preparation of nitrogen-containing carbohydrates **[3, 2006.01]**
19/28 • • N-glycosides **[3, 2006.01]**
19/30 • • • Nucleotides **[3, 2006.01]**
19/32 • • • • having a condensed ring system containing a six-membered ring having two nitrogen atoms in the same-ring, e.g. purine nucleotides, nicotineamide-adenine dinucleotide **[3, 2006.01]**
19/34 • • • • Polynucleotides, e.g. nucleic acids, oligoribonucleotides **[3, 2006.01]**
19/36 • • • • Dinucleotides, e.g. nicotineamide-adenine dinucleotide phosphate **[3, 2006.01]**
19/38 • • • Nucleosides **[3, 2006.01]**
19/40 • • • • having a condensed ring system containing a six-membered ring having two nitrogen atoms in the same ring, e.g. purine nucleosides **[3, 2006.01]**
19/42 • • • Cobalamins, i.e. vitamin B_{12}, LLD factor **[3, 2006.01]**
19/44 • Preparation of O-glycosides, e.g. glucosides **[3, 2006.01]**

19/46 • • having an oxygen atom of the saccharide radical bound to a cyclohexyl radical, e.g. kasugamycin **[3, 2006.01]**

19/48 • • • the cyclohexyl radical being substituted by two or more nitrogen atoms, e.g. destomycin, neamin **[3, 2006.01]**

19/50 • • • • having two saccharide radicals bound through only oxygen to adjacent ring carbon atoms of the cyclohexyl radical, e.g. ambutyrosin, ribostamycin **[3, 2006.01]**

19/52 • • • • • containing three or more saccharide radicals, e.g. neomycin, lividomycin **[3, 2006.01]**

19/54 • • • the cyclohexyl radical being bound directly to a nitrogen atom of two or more radicals, e.g. streptomycin **[3, 2006.01]**

19/56 • • having an oxygen atom of the saccharide radical directly bound to a condensed ring system having three or more carbocyclic rings, e.g. daunomycin, adriamycin **[3, 2006.01]**

19/58 • • having an oxygen atom of the saccharide radical directly bound through only acyclic carbon atoms to a non-saccharide heterocyclic ring, e.g. bleomycin, phleomycin **[3, 2006.01]**

19/60 • • having an oxygen of the saccharide radical directly bound to a non-saccharide heterocyclic ring or a condensed ring system containing a non-saccharide heterocyclic ring, e.g. coumermycin, novobiocin **[3, 2006.01]**

19/62 • • • the hetero ring having eight or more ring members and only oxygen as ring hetero atoms, e.g. erythromycin, spiramycin, nystatin **[3, 2006.01]**

19/64 • Preparation of S-glycosides, e.g. lincomycin **[3, 2006.01]**

21/00 Preparation of peptides or proteins (single-cell protein C12N 1/00) **[3, 2006.01]**

21/02 • having a known sequence of two or more amino acids, e.g. glutathione **[3, 2006.01]**

21/04 • • Cyclic or bridged peptides or polypeptides, e.g. bacitracin (cyclised by —S—S— bonds only C12P 21/02) **[3, 2006.01]**

21/06 • produced by the hydrolysis of a peptide bond, e.g. hydrolysate products **[3, 2006.01]**

21/08 • Monoclonal antibodies **[5, 2006.01]**

23/00 Preparation of compounds containing a cyclohexene ring having an unsaturated side chain containing at least ten carbon atoms bound by conjugated double bonds, e.g. carotenes (containing hetero-rings C12P 17/00) **[3, 2006.01]**

25/00 Preparation of compounds containing alloxazine or isoalloxazine nucleus, e.g. riboflavin [3, 2006.01]

27/00 Preparation of compounds containing a gibbane ring system, e.g. gibberellin [3, 2006.01]

29/00 Preparation of compounds containing a naphthacene ring system, e.g. tetracycline (C12P 19/00 takes precedence) **[3, 2006.01]**

31/00 Preparation of compounds containing a five-membered ring having two side-chains in ortho position to each other, and having at least one oxygen atom directly bound to the ring in ortho position to one of the side-chains, one side-chain containing, not directly bound to the ring, a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, and the other side-chain having at least one oxygen atom bound in gamma-position to the ring, e.g. prostaglandins [3, 2006.01]

33/00 Preparation of steroids [3, 2006.01]

Note(s) [3]

Attention is drawn to Note (1) following the title of subclass C07J, which explains what is covered by the term "steroids".

Note(s) [3]

In groups C12P 33/02-C12P 33/20, the following terms are used with the meaning indicated:

- "acting", "forming", "hydroxylating", "dehydroxylating" or "dehydrogenating" means the action of a micro-organism or enzyme rather than other chemical action.

33/02 • Dehydrogenating; Dehydroxylating **[3, 2006.01]**

33/04 • • Forming an aryl ring from A ring **[3, 2006.01]**

33/06 • Hydroxylating **[3, 2006.01]**

33/08 • • at 11 position **[3, 2006.01]**

33/10 • • • at 11alpha-position **[3, 2006.01]**

33/12 • Acting on D ring **[3, 2006.01]**

33/14 • • Hydroxylating at 16 position **[3, 2006.01]**

33/16 • • Acting at 17 position **[3, 2006.01]**

33/18 • • • Hydroxylating at 17 position **[3, 2006.01]**

33/20 • containing heterocyclic rings **[3, 2006.01]**

35/00 Preparation of compounds having a 5-thia-1-azabicyclo [4.2.0] octane ring system, e.g. cephalosporin [3, 2006.01]

35/02 • by desacylation of the substituent in the 7 position **[3, 2006.01]**

35/04 • by acylation of the substituent in the 7 position **[3, 2006.01]**

35/06 • Cephalosporin C; Derivatives thereof **[3, 2006.01]**

35/08 • disubstituted in the 7 position **[3, 2006.01]**

37/00 Preparation of compounds having a 4-thia-1-azabicyclo [3.2.0] heptane ring system, e.g. penicillin [3, 2006.01]

37/02 • in presence of phenylacetic acid or phenylacetamide or their derivatives **[3, 2006.01]**

37/04 • by acylation of the substituent in the 6 position **[3, 2006.01]**

37/06 • by desacylation of the substituent in the 6 position **[3, 2006.01]**

39/00 Processes involving micro-organisms of different genera in the same process, simultaneously [3, 2006.01]

41/00 Processes using enzymes or micro-organisms to separate optical isomers from a racemic mixture [4, 2006.01]