C12P

FERMENTATION OR ENZYME-USING PROCESSES TO SYNTHESISE A DESIRED CHEMICAL COMPOUND OR COMPOSITION OR TO SEPARATE OPTICAL ISOMERS FROM A RACEMIC MIXTURE {(brewing of beer C12C; producing vinegar C12J; producing specific peptides or proteins C07K; producing enzymes C12N 9/00; DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification C12N 15/00; measuring or testing processes involving enzymes or micro-organisms C12Q; measuring or testing processes involving nucleic acid amplification reactions C12Q 1/6844; fermentation processes to form a food composition, A21 or A23; compounds in general, see the relevant compound class, e.g. C01, C07)}

Definition statement

This place covers:

- Processes wherein the product (compound or composition) is synthesised by a biochemical transformation of matter performed by using enzymes or micro-organisms.
- Processes of separating (=resolving) optical isomers (=enantiomers) from a racemic mixture by using enzymes or micro-organisms.

Relationships with other classification places

Between the subclasses C12P and C12Q , in the absence of an indication to the contrary, classification is made in the last appropriate subclass. For example, a fermentation or enzyme-using process involving condition-responsive control is classified in subclass C12Q, but not in C12P.

Documents relating to chemical compounds per se, in particular patent documents having claims/ examples directed to such compounds per se, are classified in the relevant class, e.g. C07 or C08, which encompasses also the chemical method of preparation thereof. For instance, compositions comprising macromolecular compounds are classified in C08L.

If a particular reaction for the production of known compounds is considered of special interest, e.g. if it seems to be a relevant contribution to the prior art in organic synthesis, it may also be classified in the relevant chemical compound class, e.g. C01, C07, C08, C11 or C13.

Microorganisms or products thereof added to foodstuff, medicinal, or cosmetic preparations are covered by A21, A23 and A61. Methods for biological treatment of waste are also covered by other classes, e.g. C02F (see below list).

Micro-organisms (compositions containing them, processes of propagating, maintaining, preserving them, culture media therefore) are classified in C12N 1/00-C12N 7/00 and subgroups. Sub-cellular parts of micro-organisms, unless specifically provided for elsewhere, are classified with the whole cell, i.e. in groups C12N 1/00-C12N 7/00 and subgroups.

Processes for producing specific peptides or proteins by recombinant microorganisms are normally not classified in C12P. Instead, such processes are classified together with the respective products in C07K, or, in case of enzymes, C12N 9/00 and subgroups. Expression vectors or methods using them are classified in C12N 15/63 and below. A classification in C12P 21/00 and below is only given for methods of general applicability not restricted to a specific protein (except expression vectors) or for methods indicating precise fermentation conditions (e.g. specific growth conditions) (C12P 21/00 and C12P 21/02), for glycosylation methods (C12P 21/005), or for methods wherein a protein is obtained by hydrolysis (C12P 21/06). Contrarily to the IPC scheme, groups **C12P21/04** (cyclic peptides) and **C12P21/08** (antibodies) do not exist in the CPC scheme (**C12P21/04** is covered by C07K 7/50; **C12P21/08** is covered by C07K 16/00).

Measuring or testing processes involving enzymes or micro-organisms, C12Q. Assays and products for analysing or detecting nucleic acids are covered in C12Q 1/68. C12Q 1/70 similarly relates to nucleic acid assays and products for analysing or detecting viruses or bacteriophages. Measuring or testing processes involving nucleic acid amplification reactions such as PCR are covered in C12Q 1/6844.

DNA or RNA concerning genetic engineering, vectors (plasmids), or their isolation, preparation or purification are classified in C12N 15/00 and subgroups.

Documents disclosing new isolates of micro-organisms or mutant microorganisms where the mutated genes are unknown should additionally be classified in C12R, and, if appropriate, in a subgroup of C12N 1/00. If mutant microorganisms are described for which the mutated or introduced gene is specified, the C12N 9/00 subgroup corresponding to that gene should be given.

Documents relating to methods of pretreatment of cellulosic or lignocellulosic material are classified in C08B 1/00, C08H 8/00, D21B 1/00, D21C 1/00 or D21C 3/00. If such methods are intended to enhance the enzymatic digestibility (hydrolysis), e.g. for obtaining fermentable sugars and follow-up fermentation products, then the corresponding C12P group is given, e.g. C12P 7/10 (ethanol from cellulosic substrate) or C12P 19/02 (glucose) and C12P 19/14 (using a cellulase), and in addition the C12P Indexing Code C12P 2201/00 is given.

Documents relating to the preparation of fatty acids by hydrolysis of fats or oils using enzymes or microorganisms are classified in C12P 7/6418, but also in C11C 1/045. If the method of preparation involves the use of enzymes or microorganisms as a main feature then the document should always be classified in C12P 7/6418. However, if the choice of particular enzymes or microorganisms, or the specific conditions for conducting the enzymatic or fermentative step do not seem to be the inventive feature of the process, then the document should rather only be classified in C11C 1/045.

Contrarily to the IPC practice, the **C12S** scheme is not used for classification in CPC.

References

Limiting references

This place does not cover:

Biocides of microbiological origin	A01N 63/00
Treating dough with micro-organisms or enzymes	A21D 8/04
Processes for treating foods or foodstuffs	A23
Preserving food	A23B
Dairy products, e.g. milk, butter, cheese etc.	A23C
Edible oils	A23D
Fermentation of tea	A23F 3/10
Fermentation of cocoa	A23G 1/02
Protein compositions for foodstuffs	A23J
Animal feeding stuffs	A23K
Animal feeding supplemented with hormones or enzymes	A23K 20/184, A23K 20/189
Preservation of feed with MOs/enzymes (ensilage)	A23K 30/18
Clarifying non-alcoholic beverages using MOs or enzymes	A23L 2/84
Food preservation by addition of MOs or enzymes	A23L 3/3571
Fermentation of cereal; addition of enzymes, MOs	A23L 7/104
Malt products	A23L 7/20

Fermentation of cereal malt or of cereal by malting	A23L 7/25
Fermented pulses or legumes, e.g. miso, tempeh	A23L 11/09
Treatment of pulse (fruit, legumes) with enzymes	A23L 11/33
Treatment of pulse (fruit, legumes) with MOs	A23L 11/37
Meat products containing additives: MOs	A23L 13/45
Meat products containing additives: enzymes	A23L 13/48
Tenderized or flavoured meat obtained using additives (MOs, enzymes)	A23L 13/72
Sea products treated or added with MOs or enzymes	A23L 17/65
Nuts or seeds treated with MOs or enzymes	A23L 25/40
Food + enzymes	A23L 29/06
Food + MOs	A23L 29/065
Food + microbial polysaccharides as thickening agents	A23L 29/269
Food containing carbohydrates	A23L 29/30
Modifying nutritive qualities of foods containing additives: Bacteria	A23L 33/135
Modifying nutritive qualities of foods containing additives: Yeast	A23L 33/14
Modifying nutritive qualities of foods containing additives: Amino acids, peptides or proteins	A23L 33/17
Cosmetic preparations containing algae extracts	A61K 8/975
Cosmetic preparations containing MOs	A61K 8/99
Medicinal preparations containing undetermined materials from MOs	A61K 35/66
Medicinal preparations containing undetermined materials from algae	A61K 36/02
Elimination of harmful chemicals by enzymes or MOs	A62D 3/02
Distillation or rectification of fermented solutions	B01D 3/001
Biological purification of waste gases	B01D 53/84
Catalysts comprising enzymes	B01J 31/003
Bioremediation of contaminated soil	B09C 1/10
Biological treatment of water, waste water or sewage	C02F 3/00
Biological treatment of sludge	C02F 11/02
Production of methane by anaerobic treatment of sludge	C02F 11/04
Preparation of fertilisers characterized by a composting step	C05F 17/00
Peptides, proteins and antibodies	C07K
Recovery of waste polymers by chemically breaking down the polymer chain by treatment with enzymes	C08J 11/105
Refining of hydrocarbon oils by MOs	C10G 32/00
Pretreatment of raw materials for production of fats or fatty oils, using enzymes or MOs	C11B 1/025
Refining of fats or oils by enzymes or MOs	C11B 3/003
Production of fatty acids by hydrolysis of fats or oils using enzymes or MOs (see above limitation)	C11C 1/045
Detergent compositions containing enzymes	C11D 3/386
Fermentation processes for beer production	C12C 11/00

Recovery of CO2 as by-product	C12F 3/02
Fermentation processes for wine making	C12G 1/00
Fermentation processes for preparing alcoholic beverages other than wine and beer	C12G 3/00
Pasteurisation, sterilisation, preservation, purification, clarification, ageing of alcoholic beverages involving enzymes	C12H 1/00
Preparing vinegar by fermentation of starting materials	C12J
Apparatus for enzymology, microbiology or cell culture	C12M
MOs (compositions containing them, processes of propagating, maintaining, preserving them, culture media)	C12N 1/00
Enzymes	C12N 9/00
Mutation and genetic engineering isolation, preparation or purification of DNA, RNA	C12N 15/00
Methods involving directed evolution of proteins, DNA or RNA	C12N 15/1058
Measuring and testing involving enzymes or MOs	C12Q 1/00
Measuring or testing processes involving nucleic acid amplification reactions (PCR)	C12Q 1/6844
Purification of sugar juices using MOs or enzymes	C13B 20/002
Extraction of metal compounds from ores or concentrates using MOs or enzymes	C22B 3/18
Bleaching fibres etc. using enzymes	D06L 3/11
Biochemical treatment of fibres, threads, yarns, fabrics or fibrous goods made from such materials, e.g. enzymatic	D06M 16/00
Treatment of cellulose-containing material with MOs or enzymes	D21C 5/005
Biochemical fuel cell (production of electricity)	H01M 8/16

Informative references

Attention is drawn to the following places, which may be of interest for search:

Medicinal preparations containing peptides	A61K 38/00
Medicinal preparations containing antigens	A61K 39/00
Separating processes involving the treatment of liquids with solid sorbents	B01D 15/00
Destroying solid waste or transforming solid waste	B09B 3/00
Methods of preparing compounds without using enzymes or micro-organisms	C01, C07, C08
Separation/ purification of alcohols (except phenols) e.g. ethanol	C07C 29/74
Separation/ purification of ketones	C07C 45/78
Separation/ purification of carboxylic acids	C07C 51/42
Separation/ purification of carboxylic acid esters	C07C 67/48
Preparatory treatment of cellulose for making derivatives thereof	C08B 1/00
Preparation of starch, degraded or non-chemically modified starch, amylose, or amylopectin	C08B 30/00

Preparation of polysaccharides other than starch and cellulose or their derivatives	C08B 37/00
Polyesters and preparation thereof	C08G 63/00
Macromolecular compounds derived from lignocellulosic materials	C08H 8/00
Compositions comprising polyesters	C08L 67/00
Recovery of hydrocarbons, using a composition comprising bacteria	C09K 8/582
Lubricating compositions	C10M
Production of fats or fatty oils from raw materials	C11B 1/00
Fats, oils, fatty acids by esterification	C11C 3/003, C11C 3/02, C11C 3/04
Removal of alcohol from alcoholic beverages	**C12H3/00** (IPC only)
Novel microorganisms	C12R
Processes using enzymes or micro-organisms to liberate, separate or purify a pre-existing compound or composition	**C12S** (IPC only)
Recovery/purification of carbohydrates	**C12S3/02** (IPC only)
Recovery/purification of cellulose	**C12S3/04** (IPC only)
Production of sugar (saccharose) juice	C13B 10/00
Glucose, maltose, lactose, fructose, invert sugar etc.	C13K
Pretreatment of the finely-divided cellulose-containing materials before digesting	D21C 1/00
Pulping cellulose-containing materials	D21C 3/00
Methods for enhanced recovery of hydrocarbons using bacteria	**E21B43/22**
Assays involving biological materials from specific organisms or of a specific nature	G01N 2333/00
Immunoassays and enzyme assays	G01N 2400/00 - G01N 2430/00
Bioinformatics	G06F 19/10
Biofuels	Y02E 50/10
Bio-diesel	Y02E 50/13
Cellulosic bio-ethanol	Y02E 50/16
Grain bio-ethanol	Y02E 50/17
Methane (biogas) by fermentation of organic byproducts	Y02E 50/343

Special rules of classification

In the absence of an indication to the contrary, classification is made in the last appropriate place.

Documents are primarily classified according to the compounds produced. In addition, if appropriate, classification according to the method or biocatalyst used to produce the compound is made.

This subclass covers both major and minor chemical modifications.

In this subclass:

- metal or ammonium salts of a compound are classified as that compound.
- compositions are classified in the relevant compound groups.

The following groups should only be given together with the corresponding product group: C12P 19/14-C12P 19/24, C12P 39/00, C12P 41/00-C12P 41/009.

Group C12P 1/00 covers processes using micro-organisms or enzymes for producing compositions and compounds not sufficiently identified to be classified in groups C12P 3/00 - C12P 37/00 (further definition of C12P 1/00, see FCR of C12P 1/00).

In the case that a document relates to the production of "fermentation products" in general, or to the production of multiple fermentation products, then the document is classified only for the products experimentally exemplified (this may be more than 5 C12P groups), or, in case that no examples are given or not all claimed products are exemplified, for those products for which there exists a reasonable support (this should be no more than 5 different C12P groups, but it may also only be a single product in some cases), or for the first products listed in case of no preference at all (maximum 5 different C12P groups). However, documents relating to the production of fermentation products without indication of any preferable product should if possible not be classified in C12P 1/00-C12P 1/06.

The following illustrates the case of a document relating to the production of a general family of products: A document relating to the production of "an alcohol" without further specification is classified in C12P 7/02. However, if certain alcohols are further specified, then the document is also classified in the specific subgroup, e.g. C12P 7/16 for butanol. Opposed to this, if the chemical structure of the product is largely unknown, and it is only known that the product comprises an alcohol group, then the document should rather be classified in the appropriate C12P 1/00 subgroup. In case of Markush formulae, the same approach as for "fermentation products" (see above) should be used.

The following Indexing Codes should, where applicable, be given as additional information (compulsory):

Pretreatment of cellulosic or lignocellulosic material for subsequent enzymatic treatment or hydrolysis	C12P 2201/00
Fermentation products obtained from optionally pretreated and/ or hydrolyzed cellulosic or lignocellulosic material as the carbon source (ethanol C12P 7/10)	C12P 2203/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Micro-organism (MO)	Comprises single-celled organisms such as bacteria, actinomycetales or single-celled fungi, e.g. yeasts; for the purposes of classification, this term also includes viruses, undifferentiated human, animal or plant cells, protozoa, tissues and unicellular algae.
Saccharide	polyhydroxy-aldehyde or -ketone, or derivative thereof; the exact definition is given under C12P 19/00

C12P 1/00

Preparation of compounds or compositions, not provided for in groups C12P 3/00 - C12P 39/00, by using micro-organisms or enzymes

Definition statement

This place covers:

- General processes using micro-organisms or enzymes for preparing compounds or compositions

- Processes using micro-organisms or enzymes for producing compositions and compounds "not sufficiently identified" to be classified in groups C12P 3/00 - C12P 37/00.

Compounds "not sufficiently identified" are compounds not identified with a chemical structure, or complex mixtures of compounds with no principal chemical compound identified. Examples are compounds identified only by their empirical formulae, their activity, their method of preparation, and/or their physical or chemical properties. Examples of "complex mixtures" are compositions obtained by fermentation without further specification of the (principal) chemical product(s) contained therein. In all other cases, a composition is classified with the relevant compound groups (one or more of C12P 5/00-C12P 37/00).

Notable exceptions, which should NOT get a C12P 1/00 classification, are (see also below table):

- Fermented food compositions and microorganisms or products thereof added to foodstuff, medicinal, or cosmetic preparations, which are covered by A21, A23 and A61.
- Methods for biological treatment of waste, covered by other classes, e.g. C02F.
- Micro-organisms per se or sub-cellular parts thereof, compositions containing them, processes of propagating, maintaining, preserving them, culture media therefore, which are covered by C12N 1/00-C12N 7/00.
- Recombinant microorganisms, which are covered by C12N, e.g. a microorganism recombinantly expressing an enzyme is classified along with the enzyme in C12N 9/00.
- Documents relating to the production of a family of compounds, e.g. alcohols or hydrocarbons should not be classified in C12P 1/00, but rather in the corresponding general product group, e.g. C12P 7/02 for alcohols and C12P 5/00 for hydrocarbons.

An positive example of a document to be classified in C12P 1/00:

E.g., a document relating to an antibiotic produced by a certain bacterium, where the antibiotic is only defined by its activity and/or its preparation method. Such a document would have to be classified in C12P 1/04. "not sufficiently characterized" may e.g. mean that, although it is specified in the description that the antibiotic compound bears an alcohol group, it is not clear if it also bears other functional groups (e.g. amine) or a heterocycle, i.e. it could fall under C12P 7/02, C12P 13/00 or C12P 17/00. Note that in this case the document should also be classified in C07G 11/00.

Generally, C12P 1/00 should not simply be used if the product or composition obtained by fermentation or enzymatic reaction is not found in C12P 3/00-C12P 37/00. Reference is made to the list of fields not covered in C12P 1/00 (see below table).

Relationships with other classification places

Bacteria or bacterial products added to foodstuff, medicinal, or cosmetic preparations are covered by A23 and A61.

Methods for biological treatment of waste are also covered by other classes, e.g. C02F (see below list).

A composition comprising a microorganism is classified in C12N 1/00. Recombinant cells, viruses or microorganisms are classified in C12N 5/00, C12N 7/00, C12N 9/00, and/or C12N 15/00.

New micro-organism strains or their use are classified in C12R.

In addition, documents which are classified in C12P 1/00 should preferably also be classified in C12R. E.g. a document relating to a method to produce a not further structurally defined antiobiotic using a Penicillium bacterium will be classified in C12P 1/00 and in C12R 1/80. even if the particular Penicillium strain is a known strain (or if there are no claims to the strain per se in a patent document).

References

Limiting references

This place does not cover:

Baking; treatment of flour or dough	A21D
Foods or foodstuffs; their treatment	A23
Cosmetic preparations containing MOs	A61K 8/99
Medicinal preparations containing undetermined materials from MOs	A61K 35/66
Elimination of harmful chemicals by enzymes or MOs	A62D 3/02
Biological purification of waste gases	B01D 53/84
Bioremediation of contaminated soil	B09C 1/10
Biological treatment of water, waste water or sewage	C02F 3/00
Biological treatment of sludge	C02F 11/02
Preparation of fertilisers characterized by a composting step	C05F 17/00
Antibiotics of unknown structure	C07G 11/00
Recovery of CO2 as by-product	C12F 3/02
MOs (compositions containing them, processes of propagating, maintaining, preserving them, culture media)	C12N 1/00
Microorganism recombinantly expressing an enzyme	C12N 9/00
Microorganism recombinantly expressing an enzyme cluster/ an enzymatic pathway	C12N 15/52
Biochemical fuel cell (product= electricity)	H01M 8/16

Informative references

Attention is drawn to the following places, which may be of interest for search:

Novel microorganisms	C12R

Special rules of classification

Documents which have been classified in this group should also be classified in C12R, even if such compounds are produced by known strains. Note that this rule applies only to C12P 1/00 - C12P 1/06, and NOT to groups C12P 3/00 - C12P 41/00.

C12P 3/00

Preparation of elements or inorganic compounds except carbon dioxide {(Recovery of carbon dioxides as by-products C12F 3/02)}

Definition statement

This place covers:

Production of inorganic compounds, i.e. all chemical compounds except organic compounds. Comprised within this group are inorganic gases (except carbon dioxide), fluids or solids including inorganic salts or inorganic polymers, minerals and metals.

Salts of organic compounds are not classified in C12P 3/00, but are instead classified as that organic compound (C12P 5/00-C12P 37/00).

References

Limiting references

This place does not cover:

Extraction of metal compounds from ores or concentrates using MOs or enzymes	C22B 3/18

Informative references

Attention is drawn to the following places, which may be of interest for search:

Recovery of CO2 as by-product	C12F 3/02

C12P 5/00

Preparation of hydrocarbons {or halogenated hydrocarbons}

Definition statement

This place covers:

The preparation of hydrocarbons or halogenated hydrocarbons

Special rules of classification

Terpenes are classified in C12P 5/007 no matter if they are acyclic or cyclic (i.e. the last place rule does not apply in this case).

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Attention is drawn to the fact that, depending on the definition given in an application, a "diesel", "biodiesel" (or a "fuel" or "biofuel" in general) may be meant to designate a hydrocarbon (C12P 5/00), in contrast to a fatty acid ester (C12P 7/649) or other "biofuels" such as bioethanol (C12P 7/06). Similarly, the term "biogas" may designate a methane containing gas (C12P 5/023) or a hydrogen-containing gas (C12P 3/00) or mixtures thereof (in this case, both classes would be given).

C12P 5/007

{containing one or more isoprene units, i.e. terpenes (carotenes C12P 23/00)}

Definition statement

This place covers:

The preparation of terpenes, i.e. compounds containing and/or built from isoprene units .

Special rules of classification

Terpenes are classified in C12P 5/007 no matter if they are acyclic or cyclic.

Note that terpenoids (isoprenoids), i.e. compounds derived from terpenes (methyl groups removed and/or oxygen atoms added) are classified elsewhere in C12P, e.g. in C12P 5/00, C12P 7/00, C12P 15/00, C12P 17/00, C12P 19/00, C12P 23/00 or C12P 33/00.

C12P 5/023

{Methane}

Relationships with other classification places

Methods to produce methane are classified, alternatively or in addition to C12P 5/023, in C02F 3/00 or C02F 11/00.

References

Limiting references

This place does not cover:

Bioreactors for gas production, e.g. biogas	C12M 21/04

Informative references

Attention is drawn to the following places, which may be of interest for search:

Biological treatment of water, waste water, or sewage	C02F 3/00
Anaerobic digestion processes	C02F 3/28
Treatment of sludge	C02F 11/00
Anaerobic treatment; Production of methane by such processes	C02F 11/04

Special rules of classification

In the case of methods of producing methane in biological waste treatment systems, classification in C12P 5/023 is done if technical details of the fermentation step for forming methane are considered to be important features (in contrast to other features of the purification system or to apparatus features). Otherwise, classification in C02F 3/00, C02F 11/00 and/or C12M is sufficient.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Biogas	methane containing gas produced by fermentation; in some instances, the term is also used to designate other gases produced by fermentation, such as hydrogen

C12P 7/00

Preparation of oxygen-containing organic compounds

References

Limiting references

This place does not cover:

Animal feeding stuffs from distillers' or brewers' waste	A23K 10/38
Distillation or rectification of fermented solutions	B01D 3/001
Refining of hydrocarbon oils by MOs	C10G 32/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Separation/ purification of alcohols (except phenols) e.g. ethanol	C07C 29/74
Separation/ purification of ketones	C07C 45/78
Separation/ purification of carboxylic acids	C07C 51/42
Separation/ purification of carboxylic acid esters	C07C 67/48
Production of fats or fatty oils from raw materials	C11B 1/00
Refining of fats or oils by enzymes or MOs	C11B 3/003
Production of fatty acids by hydrolysis of fats or oils using enzymes or MOs (see limitations indicated under C12P 7/64)	C11C 1/045
Fats, oils, fatty acids by esterification	C11C 3/003, C11C 3/02, C11C 3/04

C12P 7/22

aromatic

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Aromatic	refers to compounds containing an aromatic group, wherein the hydroxy group need not be directly attached to the aromatic group, i.e. compounds such as phenylethanol are also comprised in this group.

C12P 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

Definition statement

This place covers:

Production of:

- Fatty acids, including saturated, unsaturated, hydroxylated or polycarboxylic fatty acids
- Fatty acid mono-, di- or triglycerides
- Phosphoglycerides containing at least one fatty acid moiety
- Fatty acid esters, including amides

Nitrogen- or saccharide-containing lipids and any lipids containing a residue falling under product classes C12P 11/00-C12P 33/00 should be classified both in C12P 7/64 and in the appropriate place in C12P 11/00-C12P 33/00.

Examples are (the appropriate classification is indicated in parentheses):

- Phosphatidylcholine and phosphatidylethanolamine, see below Figure (C12P 7/6481 and C12P 13/001)
- Sphingolipids, e.g. ceramides, see below Figure (C12P 7/6436 and C12P 13/02)
- Phosphatidylserine (C12P 7/6481 and C12P 13/06)

- Glycolipids, e.g. phosphatidylinositol (C12P 7/6481 and C12P 19/44)
- Lipopeptides and lipoproteins (C12P 7/6436 and C12P 17/00, C12P 19/00, C12P 21/00 or C07K)
- Carotenoids or steroids (C12P 7/6436 and C12P 23/00 or C12P 33/00)

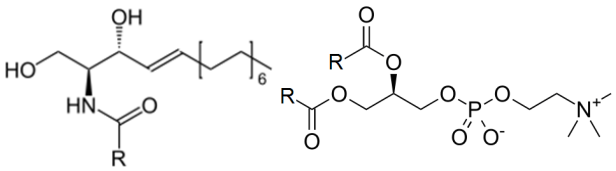


Figure: (left) a ceramide, (right) phosphatidylcholine (R= fatty acid acyl)

Special rules of classification

Processes specially aimed at the production of biodiesel are classified in C12P 7/649. If other features independent of the biodiesel production are considered to be a contribution over the prior art, the document is additionally classified in other subgroups of C12P 7/64.

Documents relating to the preparation of fatty acids by hydrolysis of fats or oils using enzymes or microorganisms are classified in C12P 7/6418 and in C11C 1/045. If the method of preparation involves the use of enzymes or microorganisms as a main feature then the document should always be classified in C12P 7/6418. However, if the choice of particular enzymes or microorganisms, or the specific conditions for conducting the enzymatic or fermentative step do not seem to be the inventive feature of the process, then the document should rather only be classified in C11C 1/045.

A similar approach should be used for deciding whether to classify a document in C12P 7/6436 (or below) or only in any of the classes C11B 1/025 and C11B 3/003.

C12P 7/649

{Biodiesel, i.e. Fatty acid alkyl esters}

Definition statement

This place covers:

Production of biodiesel, wherein "biodiesel" has the following definition:

- Fatty acid alkyl esters which are designated as "biodiesel" or "(bio)fuel" or the like in the claims or the description of the document,
- Fatty acid alkyl esters that are known to be used as biodiesel, i.e. these are generally C1-C3 alkyl (methyl, ethyl or propyl) esters of fatty acids, although there is no exact definition and in some cases also C4 and C5 alkyl esters are comprised in the definition.

Special rules of classification

Processes specially aimed at the production of biodiesel are classified in C12P 7/649. If other features independent of the biodiesel production are considered to be a contribution over the prior art, the document is additionally classified in one or more other subgroup(s) of C12P 7/64.

C12P 9/00

Preparation of organic compounds containing a metal or atom other than H, N, C, O, S or halogen {(phosphoglycerides, C12P 7/6481)}

Definition statement

This place covers:

Production of:

- phosphor-containing compounds except phosphoglycerides and except compounds falling under the definition of product classes below C12P 9/00 (C12P 11/00-C12P 33/00),
- organic compounds containing heteroatoms other than H, N, O, S or halogen

Frequent examples are organic compounds (except lipids) containing a phosphate group (-PO4), organometallic compounds, or compounds containing a hetero atom like Se, Si, As.

Not included are salts of organic compounds, which are classified with the organic compound.

References

Limiting references

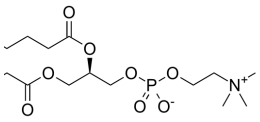
This place does not cover:

Phosphoglycerides having less than 7 carbon atoms	C12P 7/62
Phosphoglycerides having fatty acids with at least 7 carbon atoms	C12P 7/6481

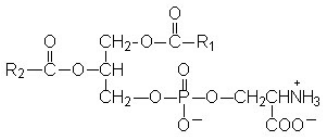
Special rules of classification

Phosphor-containing compounds are classified in C12P 9/00 (except phosphoglycerides, C12P 7/62 or C12P 7/6481).

Note that in other cases, the last place rule always applies, e.g.: phosphatidylcholine



should be classified in C12P 13/001,

phosphatidylserine  should be classified in C12P 13/06,

and nucleotides should be classified in C12P 19/30 and below.

C12P 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)

References

Limiting references

This place does not cover:

Peptides, proteins and antibodies	C07K

C12P 19/00

Preparation of compounds containing saccharide radicals (keto-aldonic acids C12P 7/58)

Definition statement

This place covers:

Sugars (saccharides) prepared by enzymatic and/or fermentative methods.

For the definition of the term "saccharide radical" the same criteria as in C07H apply, i.e.:

A "saccharide radical" is derived from acyclic polyhydroxy-aldehydes or acyclic polyhydroxy-ketones, or from their cyclic tautomers,

- by removing hydrogen atoms or
- by replacing hetero bonds to oxygen by the same number of hetero bonds to halogen, nitrogen, sulfur, selenium, or tellurium.

in accordance with either of the following definitions it:

a) consists of an uninterrupted carbon skeleton and oxygen atoms directly attached thereto, and;

b) is considered to be terminated by every bond to a carbon atom of a cyclic structure and by every bond to a carbon atom having three bonds to hetero atoms, e.g. ester or nitrile radicals, and;

c) contains within the carbon skeleton an unbranched sequence of at the most six carbon atoms in which at least three carbon atoms have one single bond to an oxygen atom as the only hetero bond (at least two in the case of a skeleton having only four carbon atoms, but at least three for compounds in which one or more carbon to oxygen bonds involved in a) or b) has been replaced by a carbon bond to a hetero atom other than oxygen), and

i) in a cyclic or acyclic sequence, at least one other carbon atom (that is not doubly bound to a carbon atom, e.g. glycals) has two single bonds to oxygen atoms as the only hetero bonds, or

ii) in an acyclic sequence, at least one other carbon atom (that is not doubly bound to a carbon atom) has one double bond to an oxygen atom as the only hetero bond;

d) has in the gamma or delta position in respect to the carbon atom bearing those two single bonds or this double bond to oxygen a carbon atom bearing one single bond to oxygen

e) is also a radical derived from a radical as defined in a) above by replacing at the most four of the specified hetero bonds to oxygen by the same number of hetero bonds to halogen, nitrogen, sulfur, selenium, or tellurium.

The terms "heterocyclic radical" or "hetero ring" are considered to exclude saccharide radicals as defined above.

Note: sorbitol and xylitol are NOT saccharide radicals, but they are polyhydric alcohols (classified in C12P 7/18)

Relationships with other classification places

Edible sugars obtained from natural sources or by chemical hydrolysis of naturally occurring di-, oligo- or polysaccharides are classified in C13, e.g. glucose obtained by saccharification of cellulosic materials, C13K 1/02. If the hydrolysis is done enzymatically (or using a microorganism), then the document should be classified in C13 and in C12P 19/00, e.g. a document relating to the production of glucose by hydrolysis of starch using amylase is classified in C12P 19/02 and C12P 19/14, and in C13K 1/06.

Novel sugars are classified in C07H. Polysaccharides, e.g. starch, derivatives thereof are classified in C08B. Production of malt is classified in C12C.

Documents relating to methods of pretreatment of cellulosic or lignocellulosic material are classified in C08B 1/00, D21B 1/00, D21C 1/00 or D21C 3/00. If such methods are intended to enhance the enzymatic digestibility (hydrolysis), e.g. for obtaining fermentable sugars and follow-up fermentation products, then the corresponding C12P group is given, e.g. C12P 7/10 (ethanol from cellulosic substrate) or C12P 19/02 (glucose) and C12P 19/14 (using a cellulase), and in addition the C12P Indexing Code C12P 2201/00 is given.

Methods for DNA/RNA amplification (e.g. PCR) are always classified in C12Q 1/68 and subgroups regardless of whether they are involved in measuring or testing processes. However, processes wherein a technical contribution to the prior art lies in the enzymatic amplification reaction itself are additionally classified in C12P 19/34. In other words, nucleic acid amplification reactions are additionally classified in C12P 19/34 if the invention lies in the enzymatic reaction itself (and not only in other aspects of the method, such as preparing the DNA/oligo's, annealing conditions, screening/ detection methods etc).

References

Limiting references

This place does not cover:

Keto-aldonic acids	C12P 7/58
Measuring or testing processes involving enzymes or microorganisms: nucleic acid amplification reactions	C12Q 1/6844
Purification of sugar juices using MOs or enzymes	C13B 20/002
Biochemical treatment of fibres, threads, yarns, fabrics or fibrous goods made from such materials, e.g. enzymatic	D06M 16/00
Process for obtaining cellulose by treatment of cellulose-containing material with MOs or enzymes	D21C 5/005

Informative references

Attention is drawn to the following places, which may be of interest for search:

Tapping of tree-juices, e.g. caoutchouc, gum	A01G 23/10
Sugars, derivatives thereof	C07H
Polysaccharides, derivatives thereof	C08B
Preparatory treatment of cellulose for making derivatives thereof	C08B 1/00
Macromolecular compounds derived from lignocellulosic materials	C08H 8/00
Compositions of macromolecular compounds	C08L
Compositions of cellulose	C08L 1/00
Compositions of starch	C08L 3/00
Compositions of polysaccharides other than starch and cellulose	C08L 5/00
Compositions of natural rubber	C08L 7/00
Edible sugars obtained or derived from natural sources	C13
Glucose obtained by saccharification of cellulosic material	C13K 1/02
Glucose obtained by saccharification of starch	C13K 1/06

Pretreatment of the finely-divided cellulose-containing materials before digesting	D21C 1/00
Pulping cellulose-containing materials	D21C 3/00

Special rules of classification

Groups C12P 19/14-C12P 19/24 should not be given alone, but these groups should be given together with a corresponding product group (C12P 19/02-C12P 19/12, C12P 19/26-C12P 19/64). Hence, in such cases documents are classified in both groups, which is an exception to the last place rule.

Methods for nucleic acid amplification, e.g. PCR methods are classified in C12P 19/34 if the amplification method per se (and not the diagnostic and/or analytical methodology) constitutes a contribution over the prior art, as far as this can be assessed without substantial examination.

C12P 21/00

Preparation of peptides or proteins (single cell protein C12N 1/00)

Definition statement

This place covers:

General enzymatic and/or fermentative methods to produce peptides or proteins. This comprises methods of general applicability not restricted to a specific protein (except expression vectors), such as in vitro translation systems, or methods indicating precise fermentation conditions (e.g. specific growth conditions) for the production of a peptide or protein (C12P 21/00 and C12P 21/02), for glycosylation methods (C12P 21/005), or methods wherein a protein is obtained by hydrolysis (C12P 21/06).

Relationships with other classification places

Documents disclosing the preparation of specific peptides or proteins by culturing recombinant microorganisms which have been transformed with the corresponding genes encoding these peptides/ proteins, i.e. straight forward gene expression, are not classified in C12P. Instead such documents are classified in the appropriate place in C07K (antibodies: C07K 16/00 and subgroups; a bacterial protein: C07K 14/195), or, if the produced protein is an enzyme, in the appropriate subgroup of C12N 9/00.

E.g. production of a protein or peptide which is not an enzyme, such as a surface antigen, wherein the protein orginates from Brucella, is classified in C07K 14/23. Unless details on the production method

However, if the special (inventive) feature of a method is an aspect of the fermentation process, e.g. special conditions of how to conduct the fermentation, then the document is classified in the corresponding C12P 21/00 subgroup along with the C07K or C12N 9/00 subgroup.

Methods involving the introduction of foreign genetic material using vectors (e.g. expression vectors) are classified in C12N 15/63 and subgroups.

General chemical methods to produce or derivatize proteins/peptides (i.e. non-enzymatic/fermentative methods) are classified in C07K 1/00-C07K 1/13. Protein purification methods are classified in C07K 1/14-C07K 1/36.

Methods to produce single cell protein, i.e. mixed protein extracted from pure or mixed cultures of algae, yeasts, fungi or bacteria are classified in C12N 1/00.

References

Limiting references

This place does not cover:

Macromolecular products derived from proteins	C08H 1/00
Micro-organisms (compositions containing them, processes of propagating, maintaining, preserving them, culture media), and especially single cell protein prepared thereof	C12N 1/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Protein compositions for foodstuffs	A23J
Animal feeding stuffs	A23K
Animal feeding supplemented with enzymes	A23K 20/189
Preservation of feed with MOs/enzymes (ensilage)	A23K 30/18
Peptides or proteins as additives in food	A23L 33/17, , A23L 29/00
Medicinal preparations containing peptides or proteins	A61K 38/00
Medicinal preparations containing antigens	A61K 39/00
Peptides or proteins (except enzymes) and recombinant expression thereof	C07K
Proteins (peptides having >20 amino acids) and recombinant expression thereof	C07K 14/00
Antibodies and recombinant expression thereof	C07K 16/00
Enzymes and recombinant expression thereof	C12N 9/00
Introduction of foreign genetic material using vectors	C12N 15/63

Special rules of classification

IPC groups **C12P21/04** (cyclic peptides) and **C12P21/08** (antibodies) are not used in CPC; documents classified in these groups under the IPC are instead classified in C07K 7/50 and C07K 16/00, respectively.

C12P 21/005

{Glycopeptides, glycoproteins}

Definition statement

This place covers:

Methods to produce glycosylated peptides/proteins. "Glycosylated" means covalent attachment of one or more sugar molecules to the protein or peptide, wherein a "sugar" is defined as above (C12P 19/00). This includes methods to specifically glycosylate proteins, to modify the glycosylation pattern, and/or to deglycosylate glycoproteins (wherein the produced protein still contains at least one glycosyl group).

Special rules of classification

This subgroup takes precedence to C12P 21/02 (i.e. the rule to classify in the last appropriate place does not apply in this case).

C12P 21/02

having a known sequence of two or more amino acids, e.g. glutathione

Definition statement

This place covers:

Methods which produce peptides or proteins having a known sequence, wherein details of the fermentation conditions are indicated. This comprises methods indicating specific growth conditions such as medium ingredients, pH, temperature, aeration, time intervals etc.) for the production of a peptide or protein of known sequence (this may be a native peptide or protein or a recombinantly expressed peptide or protein).

Also comprised are methods of general applicability not restricted to a specific peptide or protein, such as in vitro translation methods which methods intrinsically produce proteins having a known sequence. Excepted from this are methods defined only by the use of expression vectors (these are classified in C12N 15/63).

Recombinant gene expression methods without the indication of further details about the fermentation conditions are not classified in C12P, but instead in C07K and/or C12N (see above under C12P 21/00).

C12P 21/06

produced by the hydrolysis of a peptide bond, e.g. hydrolysate products (preparing foodstuffs by protein hydrolysis A23J 3/00)

Definition statement

This place covers:

Methods to produce hydrolysed proteins, i.e. wherein a peptide bond of a peptide or protein has been cleaved. Examples are methods to produce a protein hydrolysate using a peptidase or a protease, or methods to produce a specific protein involving the hydrolysis of a precursor protein.

C12P 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 heterorings C12P 17/00)

References

Limiting references

This place does not cover:

Compounds containing heterocyclic rings	C12P 17/00

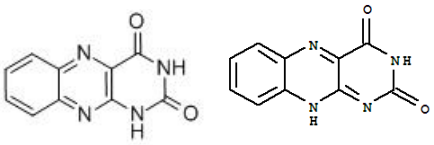
C12P 25/00

Preparation of compounds containing alloxazine or isoalloxazine nucleus, e.g. riboflavin

Definition statement

This place covers:

The preparation of compounds containing the



alloxazine or isoalloxazine nucleus

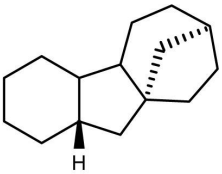
C12P 27/00

Preparation of compounds containing a gibbane ring system, e.g. gibberellin

Definition statement

This place covers:

The preparation of compounds containing the gibbane ring system:



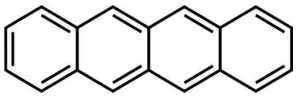
C12P 29/00

Preparation of compounds containing a naphthacene ring system, e.g. tetracycline (C12P 19/00 takes precedence)

Definition statement

This place covers:

The preparation of compounds containing the naphthacene ring system:



References

Limiting references

This place does not cover:

Saccharide-containing compounds	C12P 19/00

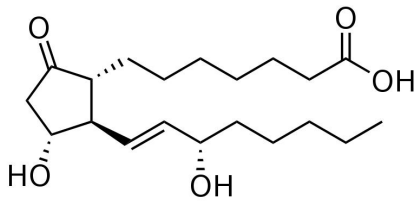
C12P 31/00

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

Definition statement

This place covers:

The preparation of prostaglandin-related compounds as defined in the title, for example



(prostaglandin E1).

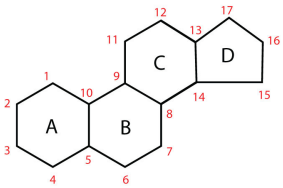
C12P 33/00

Preparation of steroids

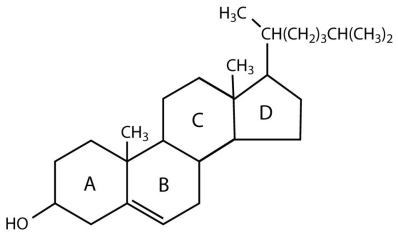
Definition statement

This place covers:

Preparation of compounds having the steroid skeleton, e.g. cholesterol:



(a) Steroid skeleton



(b) Cholesterol

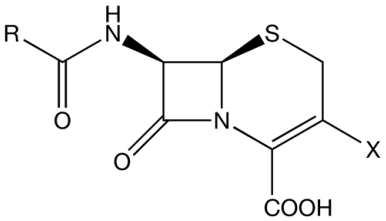
C12P 35/00

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

Definition statement

This place covers:

Preparation of compounds containing the 5-thia-1-azabicyclo [4.2.0] octane ring system, e.g. cephalosporin:



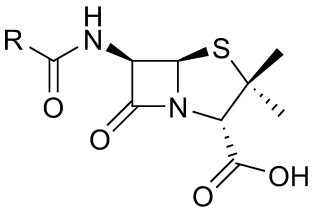
C12P 37/00

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

Definition statement

This place covers:

Preparation of compounds having a 4-thia-1-azabicyclo [3.2.0] heptane ring system, e.g. penicillin:



C12P 39/00

Processes involving micro-organisms of different genera in the same process, simultaneously

Definition statement

This place covers:

Processes wherein two or more species of microorganisms of different genera are used together to produce a product.

The microorganisms may be in direct contact with each other like in a consortium. Alternatively, the microorganisms may also be separated by a physical barrier (e.g. a permeable membrane), but still are indirectly in contact via a medium (e.g. aqueous buffer).

Such processes may involve the co-transformation of a substrate, or a stepwise transformation wherein a first microorganism produces an intermediate that is transformed by a second microorganism. Alternatively, the microorganisms are not each involved in product formation but act together as a consortium, e.g. as symbionts, wherein one type of microorganism supports growth of another.

Special rules of classification

This group should be given as supplementary information i.e. like an Indexing Code. The appropriate product group(s) should always be given in addition. Since the production of methane (biogas) by bacterial consortia is long known, it is deemed unnecessary to generally classify biogas processes in C12P 39/00, unless if the use of a specific consortium or the addition of certain species of microorganisms is indicated in the method.

C12P 41/00

Processes using enzymes or micro-organisms to separate optical isomers from a racemic mixture

Definition statement

This place covers:

Methods to obtain an optical isomer (=enantiomer) of a compound from the racemic mixture of that compound or of a precursor substrate that is not optically active, using an enzyme or a microorganism.

Such methods may comprise:

- Enantioselective derivatisation of one of the two enantiomers of a racemic substrate, the product(s) of interest being either the unreacted enantiomer of the substrate or the newly formed enantiomeric product, or both. The reaction may take place at the stereogenic centre or at a group different therefrom.
- Stereoselective derivatisation of a prochiral compound, e.g. enantioselective reduction of a prochiral ketone
- Metabolization of one of the enantiomers of a racemic compound

Special rules of classification

This group should be given as supplementary information i.e. like an Indexing Code. The appropriate product group(s) should always be given in addition.

C12P 2201/00

Pretreatment of cellulosic or lignocellulosic material for subsequent enzymatic treatment or hydrolysis

Definition statement

This place covers:

Methods for the pretreatment of the cellulosic or lignocellulosic material to facilitate enzymatic decomposition or to enhance digestibility e.g. by cellulases, wherein the pretreatment method is an essential part of the method and constitutes the technical contribution to the field.

Relationships with other classification places

This Indexing Code provides an additional information for documents relating to enzyme-using or fermentation processes. It should not replace the classification in the relevant place foreseen for documents relating to the (pre)treatment of (ligno)cellulosic materials (irrespective of their after-use), such as C08B 1/00, C08H 8/00, D21B 1/00, D21C 1/00, D21C 3/00 (see below Table).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Preparatory treatment of cellulose for making derivatives thereof	C08B 1/00

Macromolecular compounds derived from lignocellulosic materials	C08H 8/00
Fibrous raw materials or their mechanical treatment	D21B 1/00
Pretreatment of the finely-divided cellulose-containing materials before digesting	D21C 1/00
Pulping cellulose-containing materials	D21C 3/00

Special rules of classification

Classification in this group is compulsory when it is esteemed that the pretreatment method is an important feature which may have significant impact on the enzymatic step following the pretreatment.

C12P 2203/00

Fermentation products obtained from optionally pretreated or hydrolyzed cellulosic or lignocellulosic material as the carbon source (ethanol C12P 7/10)

Definition statement

This place covers:

Methods for producing fermentation products other than ethanol from (ligno)cellulosic material, wherein the carbon source for growth of the microorganism or the substrate to be converted by the microorganism or by the enzyme comprises (ligno)cellulosic material or material immediately derived therefrom.

Examples are methods wherein in a first step, sugars are obtained by hydrolysis of lignocellulose, which are then fermented to produce a product of interest.

Methods that only pertain to the production of sugars from (ligno)cellulose using hydrolases, with no follow-up fermentation product specified, are sufficiently described by the symbol C12P 19/14 and should therefore normally not be additionally classified in C12P 2203/00. Exceptions may be methods wherein a specific sugar or sugar derivative is produced.

References

Limiting references

This place does not cover:

Production of ethanol from a cellulosic substrate	C12P 7/10
Production of sugars, e.g. by hydrolysis of (ligno)cellulosic materials	C12P 19/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Glucose obtained by saccharification of cellulosic materials	C13K 1/02

Special rules of classification

This Indexing Code provides an additional information for documents classified in C12P according to the product produced. E.g. a method for producing propionic acid by fermentation of a lignocellulosic hydrolysate is classified in C12P 7/52 and in C12P 2203/00. It is compulsory to give this classification symbol where appropriate.