SECTION C — CHEMISTRY; METALLURGY

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

Note(s) [3, 5]

1. Between subclasses C12M-C12Q, and within each of these subclasses, the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place. For example, a fermentation or enzyme-using process involving condition-responsive control is classified in subclass C12Q.
2. In this class, viruses, undifferentiated human, animal or plant cells, protozoa, tissues and unicellular algae are considered as microorganisms.
3. In this class, unless specifically provided for, undifferentiated human, animal or plant cells, protozoa, tissues and unicellular algae are classified together with microorganisms. Sub-cellular parts, unless specifically provided for, are classified with the whole cell.
4. The codes of subclass C12R are only for use as indexing codes associated with subclasses C12C-C12Q, so as to provide information concerning the microorganisms used in the processes classified in these subclasses.

C12C BEER; PREPARATION OF BEER BY FERMENTATION (ageing or ripening by storing C12H 1/22; methods for reducing the alcohol content after fermentation C12H 3/00; methods for increasing the alcohol content after fermentation C12H 6/00; venting devices for casks, barrels or the like C12L 9/00)**; PREPARATION OF MALT FOR MAKING BEER; PREPARATION OF HOPS FOR MAKING BEER**

Note(s) [6]

In this subclass, it is desirable to add the indexing codes of subclass C12R.

Subclass index

1/00 Preparation of malt [1, 2006.01]
1/02 • Pretreatment of grains, e.g. washing, steeping **[1, 2006.01]**
1/027 • Germinating **[6, 2006.01]**
1/033 • • in boxes or drums **[6, 2006.01]**
1/047 • • Influencing the germination by chemical or physical means **[6, 2006.01]**
1/053 • • • by irradiation or electric treatment **[6, 2006.01]**
1/067 • Drying **[6, 2006.01]**
1/073 • • Processes or apparatus specially adapted to save or recover energy **[6, 2006.01]**
1/10 • • Drying on fixed supports **[1, 2006.01]**
1/12 • • Drying on moving supports **[1, 2006.01]**
1/125 • Continuous or semi-continuous processes for steeping, germinating or drying **[6, 2006.01]**
1/13 • • with vertical transport of the grains **[6, 2006.01]**
1/135 • • with horizontal transport of the grains **[6, 2006.01]**
1/15 • Grain or malt turning, charging or discharging apparatus **[6, 2006.01]**
1/16 • After-treatment of malt, e.g. malt cleaning, detachment of the germ **[1, 2006.01]**
1/18 • Preparation of malt extract or of special kinds of malt, e.g. caramel, black malt (malt products for use as foodstuffs A23L) **[1, 2006.01]**

3/00 Treatment of hops [1, 2006.01]
3/02 • Drying **[1, 2006.01]**
3/04 • Conserving; Storing; Packing **[1, 2006.01]**
3/06 • • Powder or pellets from hops **[6, 2006.01]**
3/08 • • Solvent extracts from hops **[6, 2006.01]**
3/10 • • • using carbon dioxide **[6, 2006.01]**
3/12 • • Isomerised products from hops **[6, 2006.01]**

5/00 Other raw materials for the preparation of beer [1, 2006.01]
5/02 • Additives for beer **[1, 2006.01]**
5/04 • • Colouring additives **[1, 2006.01]**

7/00 Preparation of wort (malt extract C12C 1/18) **[1, 2006.01]**
7/01 • Pretreatment of malt, e.g. malt grinding **[6, 2006.01]**
7/04 • Preparation or treatment of the mash **[1, 2006.01]**
7/047 • • part of the mash being unmalted cereal mash **[6, 2006.01]**
7/053 • • part of the mash being non-cereal material **[6, 2006.01]**
7/06 • • Mashing apparatus **[1, 2006.01]**
7/14 • Lautering, i.e. clarifying wort **[1, 2006.01]**
7/16 • • by straining **[1, 2006.01]**
7/165 • • • in mash filters **[6, 2006.01]**

7/17 • • • in lautertuns **[6, 2006.01]**
7/175 • • by centrifuging **[6, 2006.01]**
7/20 • • Boiling the beerwort (brew kettles C12C 13/02) **[6, 2006.01]**
7/22 • • • Processes or apparatus specially adapted to save or recover energy **[6, 2006.01]**
7/24 • Clarifying beerwort between hop boiling and cooling **[6, 2006.01]**
7/26 • Cooling beerwort; Clarifying beerwort during or after the cooling **[6, 2006.01]**
7/28 • After-treatment **[6, 2006.01]**

11/00 Fermentation processes for beer [1, 2006.01]
11/02 • Pitching yeast **[1, 2006.01]**
11/06 • Acidifying the wort **[1, 2006.01]**
11/07 • Continuous fermentation **[6, 2006.01]**
11/09 • Fermentation with immobilised yeast **[6, 2006.01]**
11/11 • Post fermentation treatments, e.g. carbonation or concentration (methods for reducing the alcohol content after fermentation C12H 3/00; methods for increasing the alcohol content after fermentation C12H 6/00) **[6, 2006.01, 2019.01]**

12/00 Processes specially adapted for making special kinds of beer [6, 2006.01]
12/02 • Beer with low calorie content (C12C 12/04 takes precedence) **[6, 2006.01]**
12/04 • Beer with low alcohol content (methods for reducing the alcohol content after fermentation C12H 3/00) **[6, 2006.01]**

13/00 Brewing devices, not covered by a single group of C12C 1/00-C12C 12/04 [3, 6, 2006.01]
13/02 • Brew kettles **[3, 2006.01]**
13/06 • • heated with fire **[3, 2006.01]**
13/08 • • with internal heating elements **[6, 2006.01]**
13/10 • Home brew equipment **[6, 2006.01]**

C12F RECOVERY OF BY-PRODUCTS OF FERMENTED SOLUTIONS (removal of yeast from wine or sparkling wine C12G 1/08)**; DENATURED ALCOHOL; PREPARATION THEREOF [6]**

Note(s) [6]

In this subclass, it is desirable to add the indexing codes of subclass C12R.

3/00 Recovery of by-products [1, 2006.01]
3/02 • of carbon dioxide **[1, 2006.01]**
3/04 • • Recovery of volatile fermentation products from carbon dioxide **[1, 2006.01]**
3/06 • from beer or wine (C12F 3/02 takes precedence; removal of yeast of wine C12G 1/08) **[1, 2006.01]**
3/08 • • Recovery of alcohol from press residues or other waste material (from carbon dioxide C12F 3/04) **[1, 2006.01]**
3/10 • from distillery slops **[1, 2006.01]**

5/00 Preparation of denatured alcohol [1, 2006.01]

C12G WINE; PREPARATION THEREOF; ALCOHOLIC BEVERAGES (beer C12C)**; PREPARATION OF ALCOHOLIC BEVERAGES NOT PROVIDED FOR IN SUBCLASSES C12C OR C12H**

Note(s) [6]

In this subclass, it is desirable to add the indexing codes of subclass C12R.

1/00 Preparation of wine or sparkling wine [1, 2006.01, 2019.01]
1/02 • Preparation of must from grapes; Must treatment or fermentation **[1, 2006.01]**
1/022 • • Fermentation; Microbiological or enzymatic treatment **[6, 2006.01]**
1/024 • • • in a horizontally mounted cylindrical vessel (C12G 1/026 takes precedence) **[6, 2006.01]**
1/026 • • • in vessels with movable equipment for mixing the content **[6, 2006.01]**
1/028 • • • with thermal treatment of the grapes or the must **[6, 2006.01]**
1/032 • • • with recirculation of the must for pompage extraction **[6, 2006.01]**
1/036 • • • by use of a home wine making vessel **[6, 2006.01]**
1/04 • • Sulfiting the must; Desulfiting **[1, 2006.01]**
1/06 • Preparation of sparkling wine; Impregnation of wine with carbon dioxide (methods for reducing the alcohol content after fermentation C12H 3/00; methods for increasing the alcohol content after fermentation C12H 6/00) **[1, 2006.01, 2019.01]**
1/067 • • Continuous processes **[6, 2006.01]**
1/073 • • Fermentation with immobilised yeast **[6, 2006.01]**
1/08 • Removal of yeast ["degorgeage"] **[1, 2006.01]**
1/09 • • Agitation, centrifugation or vibration of bottles **[6, 2006.01]**
1/10 • Deacidification of wine **[6, 2006.01]**
1/12 • Processes for preventing winestone precipitation **[6, 2006.01]**
1/14 • Preparation of wine or sparkling wine with low alcohol content (methods for reducing the alcohol content after fermentation C12H 3/00) **[2019.01]**

3/00 Preparation of other alcoholic beverages [1, 2006.01, 2019.01]
3/005 • Solid or pasty alcoholic beverage-forming compositions **[2019.01]**
3/02 • by fermentation **[1, 2006.01, 2019.01]**
3/021 • • of botanical family Poaceae, e.g. wheat, millet, sorghum, barley, rye or corn **[2019.01]**
3/022 • • • of botanical genus Oryza, e.g. rice **[2019.01]**
3/023 • • of botanical family Solanaceae, e.g. potato **[2019.01]**

3/024 • • of fruits other than botanical genus Vitis **[2019.01]**
3/025 • • Low-alcohol beverages (methods for reducing the alcohol content after fermentation C12H 3/00) **[2019.01]**
3/026 • • with health-improving ingredients, e.g. flavonoids, flavones, polyphenols or polysaccharides, added before or during the fermentation stage; with flavouring ingredients added before or during the fermentation stage **[2019.01]**
3/04 • by mixing, e.g. for preparation of liqueurs **[1, 2006.01, 2019.01]**
3/05 • • with health-improving ingredients, e.g. flavonoids, flavones, polyphenols or polysaccharides **[2019.01]**
3/055 • • • extracted from plants **[2019.01]**
3/06 • • with flavouring ingredients **[1, 2006.01]**
3/07 • • • Flavouring with wood extracts, e.g. generated by contact with wood; Wood pretreatment therefor **[6, 2006.01]**
3/08 • by methods for altering the composition of fermented solutions or alcoholic beverages not provided for in groups C12G 3/02-C12G 3/07 (methods for reducing the alcohol content of fermented solutions or alcoholic beverages C12H 3/00; methods for increasing the alcohol content of fermented solutions or alcoholic beverages C12H 6/00) **[1, 2006.01]**

C12H PASTEURISATION, STERILISATION, PRESERVATION, PURIFICATION, CLARIFICATION OR AGEING OF ALCOHOLIC BEVERAGES; METHODS FOR ALTERING THE ALCOHOL CONTENT OF FERMENTED SOLUTIONS OR ALCOHOLIC BEVERAGES (deacidification of wine C12G 1/10; preventing winestone precipitation C12G 1/12; simulation ageing by flavouring C12G 3/06) **[6]**

Note(s) [1, 6, 2006.01]

1. When classifying in this subclass, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned.
2. In this subclass, it is desirable to add the indexing codes of subclass C12R.

1/00 Pasteurisation, sterilisation, preservation, purification, clarification, or ageing of alcoholic beverages [1, 2006.01]
1/02 • combined with removal of precipitate or added materials, e.g. adsorption material **[1, 2006.01]**
1/04 • • with the aid of ion-exchange material or inert clarification material, e.g. adsorption material **[1, 2006.01]**
1/044 • • • with the aid of inorganic material **[6, 2006.01]**
1/048 • • • • with silicon containing material **[6, 2006.01]**
1/052 • • • with the aid of organic material **[6, 2006.01]**
1/056 • • • • with the aid of polymers **[6, 2006.01]**
1/06 • • Precipitation by physical means, e.g. by irradiation, vibrations **[1, 2006.01]**
1/065 • • • Separation by centrifugation **[6, 2006.01]**
1/07 • • • Separation by filtration **[6, 2006.01]**
1/075 • • • • by cross-flow filtration **[6, 2006.01]**
1/08 • • • by heating **[1, 2006.01]**
1/10 • • Precipitation by chemical means **[1, 2006.01]**
1/12 • without precipitation **[1, 2006.01]**
1/14 • • with non-precipitating compounds, e.g. sulfiting; Sequestration, e.g. with chelate-producing compounds **[1, 2006.01]**
1/15 • • • with enzymes **[6, 2006.01]**
1/16 • • by physical means, e.g. irradiation **[1, 2006.01]**
1/18 • • • by heating **[1, 2006.01]**
1/20 • • • • in containers allowing for expansion of the contents **[1, 2006.01]**
1/22 • Ageing or ripening by storing, e.g. lagering of beer **[1, 2006.01]**

3/00 Methods for reducing the alcohol content of fermented solutions or alcoholic beverages to obtain low-alcohol or non-alcoholic beverages [6, 2006.01, 2019.01]
3/02 • by evaporating **[6, 2006.01, 2019.01]**
3/04 • using semi-permeable membranes **[6, 2006.01, 2019.01]**

6/00 Methods for increasing the alcohol content of fermented solutions or alcoholic beverages [2019.01]
6/02 • by distillation **[2019.01]**
6/04 • by freezing **[2019.01]**

C12J VINEGAR; PREPARATION OR PURIFICATION THEREOF

Note(s) [6]

In this subclass, it is desirable to add the indexing codes of subclass C12R.

1/00 Vinegar; Preparation or purification thereof [1, 2006.01]
1/02 • from wine **[1, 2006.01]**
1/04 • from alcohol **[1, 2006.01]**
1/06 • from milk **[1, 2006.01]**
1/08 • Addition of flavouring ingredients **[1, 2006.01]**
1/10 • Apparatus **[1, 2006.01]**

C12J

C12L PITCHING OR DEPITCHING MACHINES; CELLAR TOOLS

Note(s) [6]

In this subclass, it is desirable to add the indexing codes of subclass C12R.

3/00 Pitching or depitching machines [1, 2006.01]

9/00 Venting devices for casks, barrels, or the like [1, 2006.01]

11/00 Cellar tools [1, 2006.01]

C12M APPARATUS FOR ENZYMOLOGY OR MICROBIOLOGY (installations for fermenting manure A01C 3/02; preservation of living parts of humans or animals A01N 1/02; brewing apparatus C12C; fermentation apparatus for wine C12G; apparatus for preparing vinegar C12J 1/10) **[3]**

Note(s) [4, 6]

1. Attention is drawn to Notes (1) to (3) following the title of class C12.
2. In this subclass, it is desirable to add the indexing codes of subclass C12R.

1/00 Apparatus for enzymology or microbiology [3, 2006.01]

Note(s) [3]

This group covers:
- apparatus where microorganisms or enzymes are produced or isolated;
- apparatus where the characteristics of microorganisms or enzymes are investigated, e.g. which growth factors are necessary;
- apparatus specially adapted to employ microorganisms or enzymes as "reactants" or biocatalysts;
- apparatus of both the laboratory and industrial scale.

1/02 • with agitation means; with heat exchange means **[3, 2006.01]**
1/04 • with gas introduction means **[3, 2006.01]**
1/06 • • with agitator, e.g. impeller **[3, 2006.01]**
1/08 • • with draft tube **[3, 2006.01]**
1/09 • • Flotation apparatus **[5, 2006.01]**
1/10 • rotatably mounted **[3, 2006.01]**
1/107 • with means for collecting fermentation gases, e.g. methane (producing methane by anaerobic treatment of sludge C02F 11/04) **[5, 2006.01]**
1/113 • • with transport of the substrate during the fermentation **[5, 2006.01]**
1/12 • with sterilisation, filtration, or dialysis means **[3, 2006.01]**
1/14 • with means providing thin layers or with multi-level trays **[3, 2006.01]**
1/16 • containing, or adapted to contain, solid media **[3, 2006.01]**
1/18 • • Multiple fields or compartments **[3, 2006.01]**
1/20 • • • Horizontal planar fields **[3, 2006.01]**
1/21 • Froth suppressors **[5, 2006.01]**
1/22 • Petri dishes **[3, 2006.01]**
1/24 • tube or bottle type **[3, 2006.01]**
1/26 • Inoculator or sampler **[3, 2006.01]**
1/28 • • being part of container **[3, 2006.01]**
1/30 • • • Sampler being a swab **[3, 2006.01]**
1/32 • • multiple field or continuous type **[3, 2006.01]**
1/33 • Disintegrators **[5, 2006.01]**
1/34 • Measuring or testing with condition measuring or sensing means, e.g. colony counters **[3, 2006.01]**
1/36 • including condition or time responsive control, e.g. automatically controlled fermentors **[3, 2006.01]**
1/38 • • Temperature-responsive control **[3, 2006.01]**
1/40 • Apparatus specially designed for the use of free, immobilised, or carrier-bound enzymes, e.g. apparatus containing a fluidised bed of immobilised enzymes **[3, 2006.01]**
1/42 • Apparatus for the treatment of microorganisms or enzymes with electrical or wave energy, e.g. magnetism, sonic wave **[5, 2006.01]**

3/00 Tissue, human, animal or plant cell, or virus culture apparatus [3, 2006.01]

3/02 • with means providing suspensions **[3, 2006.01]**
3/04 • with means providing thin layers **[3, 2006.01]**
3/06 • with filtration, ultrafiltration, inverse osmosis or dialysis means **[5, 2006.01]**
3/08 • Apparatus for tissue disaggregation **[5, 2006.01]**
3/10 • for culture in eggs **[5, 2006.01]**

C12N MICROORGANISMS OR ENZYMES; COMPOSITIONS THEREOF; PROPAGATING, PRESERVING, OR MAINTAINING MICROORGANISMS; MUTATION OR GENETIC ENGINEERING; CULTURE MEDIA (microbiological testing media C12Q 1/00) **[3]**

Note(s) [3, 4, 6, 7, 2006.01]

1. Attention is drawn to Notes (1) to (3) following the title of class C12.

2. Biocidal, pest repellant, pest attractant or plant growth regulatory activity of compounds or preparations is further classified in subclass A01P.
3. Therapeutic activity of single-cell proteins or enzymes is further classified in subclass A61P.
4. When classifying in this subclass, classification is also made in group B01D 15/08 insofar as subject matter of general interest relating to chromatography is concerned.
5. In this subclass, it is desirable to add the indexing codes of subclass C12R.

Subclass index

1/00 **Microorganisms, e.g. protozoa; Compositions thereof** (medicinal preparations containing material from protozoa, bacteria or viruses A61K 35/66, from algae A61K 36/02, from fungi A61K 36/06; preparing medicinal bacterial antigen or antibody compositions, e.g. bacterial vaccines, A61K 39/00)**; Processes of propagating, maintaining or preserving microorganisms or compositions thereof; Processes of preparing or isolating a composition containing a microorganism; Culture media therefor [3, 2006.01]**

1/02 • Separating microorganisms from their culture media **[3, 2006.01]**

1/04 • Preserving or maintaining viable microorganisms (immobilised microorganisms C12N 11/00) **[3, 2006.01]**

1/06 • Lysis of microorganisms **[3, 2006.01]**

1/08 • Reducing the nucleic acid content **[3, 2006.01]**

1/10 • Protozoa; Culture media therefor **[3, 2006.01]**

1/11 • • modified by introduction of foreign genetic material **[5, 2006.01]**

1/12 • Unicellular algae; Culture media therefor (as new plants A01H 13/00) **[3, 2006.01]**

1/13 • • modified by introduction of foreign genetic material **[5, 2006.01]**

1/14 • Fungi (culture of mushrooms A01G 18/00; as new plants A01H 15/00); Culture media therefor **[3, 2006.01]**

1/15 • • modified by introduction of foreign genetic material **[5, 2006.01]**

1/16 • • Yeasts; Culture media therefor **[3, 2006.01]**

1/18 • • • Baker's yeast; Brewer's yeast **[3, 2006.01]**

1/19 • • • modified by introduction of foreign genetic material **[5, 2006.01]**

1/20 • Bacteria; Culture media therefor **[3, 2006.01]**

1/21 • • modified by introduction of foreign genetic material **[5, 2006.01]**

1/22 • Processes using, or culture media containing, cellulose or hydrolysates thereof **[3, 2006.01]**

1/24 • Processes using, or culture media containing, waste sulfite liquor **[3, 2006.01]**

1/26 • Processes using, or culture media containing, hydrocarbons (refining of hydrocarbon oils by using microorganisms C10G 32/00) **[3, 2006.01]**

1/28 • • aliphatic **[3, 2006.01]**

1/30 • • • having five or less carbon atoms **[3, 2006.01]**

1/32 • Processes using, or culture media containing, lower alkanols, i.e. C_1 to C_6 **[3, 2006.01]**

1/34 • Processes using foam culture **[3, 2006.01]**

1/36 • Adaptation or attenuation of cells **[3, 2006.01]**

1/38 • Chemical stimulation of growth or activity by addition of chemical compounds which are not essential growth factors; Stimulation of growth by removal of a chemical compound (C12N 1/34 takes precedence) **[3, 2006.01]**

3/00 **Spore-forming or isolating processes [3, 2006.01]**

5/00 **Undifferentiated human, animal or plant cells, e.g. cell lines; Tissues; Cultivation or maintenance thereof; Culture media therefor** (plant reproduction by tissue culture techniques A01H 4/00) **[3, 5, 2006.01]**

5/02 • Propagation of single cells or cells in suspension; Maintenance thereof; Culture media therefor **[3, 2006.01]**

5/04 • Plant cells or tissues **[5, 2006.01]**

5/07 • Animal cells or tissues **[2010.01]**

Note(s) [2010.01]

The last place priority rule does not apply between the subgroups of this group.

5/071 • • Vertebrate cells or tissues, e.g. human cells or tissues **[2010.01]**

5/073 • • • Embryonic cells or tissues; Foetal cells or tissues **[2010.01]**

5/0735 • • • • Embryonic stem cells; Embryonic germ cells **[2010.01]**

5/074 • • • Adult stem cells **[2010.01]**

5/075 • • • Oocytes; Oogonia **[2010.01]**

5/076 • • • Sperm cells; Spermatogonia **[2010.01]**

5/077 • • • Mesenchymal cells, e.g. bone cells, cartilage cells, marrow stromal cells, fat cells or muscle cells **[2010.01]**

5/0775 • • • • Mesenchymal stem cells; Adipose-tissue derived stem cells **[2010.01]**

5/078 • • • Cells from blood or from the immune system **[2010.01]**

5/0781 • • • • B cells; Progenitors thereof **[2010.01]**

5/0783 • • • • T cells; NK cells; Progenitors of T or NK cells **[2010.01]**

5/0784 • • • • Dendritic cells; Progenitors thereof **[2010.01]**

5/0786 • • • • Monocytes; Macrophages **[2010.01]**

5/0787 • • • • Granulocytes, e.g. basophils, eosinophils, neutrophils or mast cells **[2010.01]**

5/0789 • • • • Stem cells; Multipotent progenitor cells **[2010.01]**

5/079 • • • Neural cells **[2010.01]**

5/0793 • • • • Neurons **[2010.01]**

5/0797 • • • • Stem cells; Progenitor cells **[2010.01]**

5/09 • Tumour cells **[2010.01]**

5/095 • • Stem cells; Progenitor cells **[2010.01]**

5/10 • Cells modified by introduction of foreign genetic material, e.g. virus-transformed cells **[5, 2006.01]**
5/12 • • Fused cells, e.g. hybridomas **[5, 2006.01]**
5/14 • • • Plant cells **[5, 2006.01]**
5/16 • • • Animal cells **[5, 2006.01]**
5/18 • • • • Murine cells, e.g. mouse cells **[5, 2006.01]**
5/20 • • • • • one of the fusion partners being a B lymphocyte **[5, 2006.01]**
5/22 • • • Human cells **[5, 2006.01]**
5/24 • • • • one of the fusion partners being a B lymphocyte **[5, 2006.01]**
5/26 • • • Cells resulting from interspecies fusion **[5, 2006.01]**
5/28 • • • • one of the fusion partners being a human cell **[5, 2006.01]**

7/00 Viruses, e.g. bacteriophages; Compositions thereof; Preparation or purification thereof (medicinal preparations containing viruses A61K 35/76; preparing medicinal viral antigen or antibody compositions, e.g. virus vaccines, A61K 39/00) **[3, 2006.01]**

7/01 • Viruses, e.g. bacteriophages, modified by introduction of foreign genetic material (vectors C12N 15/00) **[5, 2006.01]**
7/02 • Recovery or purification **[3, 2006.01]**
7/04 • Inactivation or attenuation; Producing viral sub-units **[3, 2006.01]**
7/06 • • by chemical treatment **[3, 2006.01]**
7/08 • • by serial passage of virus **[3, 2006.01]**

9/00 Enzymes, e.g. ligases (6.); Proenzymes; Compositions thereof (preparations containing enzymes for cleaning teeth A61K 8/66, A61Q 11/00; medicinal preparations containing enzymes or proenzymes A61K 38/43; enzyme containing detergent compositions C11D**); Processes for preparing, activating, inhibiting, separating, or purifying enzymes [3, 2006.01]**

Note(s) [3, 5]

In this group:
- proenzymes are classified with the corresponding enzymes;
- enzymes are generally categorised according to the "Nomenclature and Classification of Enzymes" of the International Commission on Enzymes. Where appropriate, this designation appears in the subgroups below in parenthesis.

9/02 • Oxidoreductases (1.), e.g. luciferase **[3, 2006.01]**
9/04 • • acting on CHOH groups as donors, e.g. glucose oxidase, lactate dehydrogenase (1.1) **[3, 2006.01]**
9/06 • • acting on nitrogen containing compounds as donors (1.4, 1.5, 1.7) **[3, 2006.01]**
9/08 • • acting on hydrogen peroxide as acceptor (1.11) **[3, 2006.01]**
9/10 • Transferases (2.) (ribonucleases C12N 9/22) **[3, 2006.01]**
9/12 • • transferring phosphorus containing groups, e.g. kinases (2.7) **[3, 2006.01]**
9/14 • Hydrolases (3.) **[3, 2006.01]**
9/16 • • acting on ester bonds (3.1) **[3, 2006.01]**
9/18 • • • Carboxylic ester hydrolases **[3, 2006.01]**
9/20 • • • • Triglyceride splitting, e.g. by means of lipase **[3, 2006.01]**
9/22 • • • Ribonucleases **[3, 2006.01]**
9/24 • • acting on glycosyl compounds (3.2) **[3, 2006.01]**
9/26 • • • acting on alpha-1, 4-glucosidic bonds, e.g. hyaluronidase, invertase, amylase **[3, 2006.01]**
9/28 • • • • Alpha-amylase from microbial source, e.g. bacterial amylase **[3, 2006.01]**
9/30 • • • • • Fungal source **[3, 2006.01]**
9/32 • • • • Alpha-amylase from plant source **[3, 2006.01]**
9/34 • • • • Glucoamylase **[3, 2006.01]**
9/36 • • • acting on beta-1, 4 bonds between N-acetylmuramic acid and 2-acetylamino 2-deoxy-D-glucose, e.g. lysozyme **[3, 2006.01]**
9/38 • • • acting on beta-galactose-glycoside bonds, e.g. beta-galactosidase **[3, 2006.01]**
9/40 • • • acting on alpha-galactose-glycoside bonds, e.g. alpha-galactosidase **[3, 2006.01]**
9/42 • • • acting on beta-1, 4-glucosidic bonds, e.g. cellulase **[3, 2006.01]**
9/44 • • • acting on alpha-1, 6-glucosidic bonds, e.g. isoamylase, pullulanase **[3, 2006.01]**
9/46 • • • • Dextranase **[3, 2006.01]**
9/48 • • acting on peptide bonds, e.g. thromboplastin, leucine aminopeptidase (3.4) **[3, 2006.01]**
9/50 • • • Proteinases **[3, 2006.01]**
9/52 • • • • derived from bacteria **[3, 2006.01]**
9/54 • • • • • bacteria being Bacillus **[3, 2006.01]**
9/56 • • • • • • Bacillus subtilis or Bacillus licheniformis **[3, 2006.01]**
9/58 • • • • derived from fungi **[3, 2006.01]**
9/60 • • • • • from yeast **[3, 2006.01]**
9/62 • • • • • from Aspergillus **[3, 2006.01]**
9/64 • • • • derived from animal tissue, e.g. rennin **[3, 2006.01]**
9/66 • • • Elastase **[3, 2006.01]**
9/68 • • • Plasmin, i.e. fibrinolysin **[3, 2006.01]**
9/70 • • • Streptokinase **[3, 2006.01]**
9/72 • • • Urokinase **[3, 2006.01]**
9/74 • • • Thrombin **[3, 2006.01]**
9/76 • • • Trypsin; Chymotrypsin **[3, 2006.01]**
9/78 • • acting on carbon to nitrogen bonds other than peptide bonds (3.5) **[3, 2006.01]**
9/80 • • • acting on amide bonds in linear amides **[3, 2006.01]**
9/82 • • • • Asparaginase **[3, 2006.01]**
9/84 • • • • Penicillin amidase **[3, 2006.01]**
9/86 • • • acting on amide bonds in cyclic amides, e.g. penicillinase **[3, 2006.01]**
9/88 • Lyases (4.) **[3, 2006.01]**
9/90 • Isomerases (5.) **[3, 2006.01]**
9/92 • • Glucose isomerase **[3, 2006.01]**
9/94 • Pancreatin **[3, 2006.01]**
9/96 • Stabilising an enzyme by forming an adduct or a composition; Forming enzyme conjugates **[3, 2006.01]**
9/98 • Preparation of granular or free-flowing enzyme compositions (C12N 9/96 takes precedence) **[3, 2006.01]**
9/99 • Enzyme inactivation by chemical treatment **[3, 2006.01]**

11/00 Carrier-bound or immobilised enzymes; Carrier-bound or immobilised microbial cells; Preparation thereof [3, 2006.01]

11/02 • Enzymes or microbial cells immobilised on or in an organic carrier **[3, 2006.01]**
11/04 • • entrapped within the carrier, e.g. gel or hollow fibres **[3, 2006.01]**

11/06 • • attached to the carrier via a bridging agent **[3, 2006.01]**
11/08 • • the carrier being a synthetic polymer **[3, 2006.01, 2020.01]**
11/082 • • • obtained by reactions only involving carbon-to-carbon unsaturated bonds **[2020.01]**
11/084 • • • • Polymers containing vinyl alcohol units **[2020.01]**
11/087 • • • • Acrylic polymers **[2020.01]**
11/089 • • • obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds **[2020.01]**
11/091 • • • • Phenol resins; Amino resins **[2020.01]**
11/093 • • • • Polyurethanes **[2020.01]**
11/096 • • • • Polyesters; Polyamides **[2020.01]**
11/098 • • • formed in the presence of the enzymes or microbial cells **[2020.01]**
11/10 • • the carrier being a carbohydrate **[3, 2006.01]**
11/12 • • • Cellulose or derivatives thereof **[3, 2006.01]**
11/14 • Enzymes or microbial cells immobilised on or in an inorganic carrier **[3, 2006.01]**
11/16 • Enzymes or microbial cells immobilised on or in a biological cell **[3, 2006.01]**
11/18 • Multi-enzyme systems **[3, 2006.01]**

13/00 Treatment of microorganisms or enzymes with electrical or wave energy, e.g. magnetism, sonic waves [3, 2006.01]

15/00 Mutation or genetic engineering; DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification; Use of hosts therefor (mutants or genetically engineered microorganisms C12N 1/00, C12N 5/00, C12N 7/00; new plants A01H; plant reproduction by tissue culture techniques A01H 4/00; new animals A01K 67/00; use of medicinal preparations containing genetic material which is inserted into cells of the living body to treat genetic diseases, gene therapy A61K 48/00; peptides in general C07K) **[3, 5, 6, 2006.01]**

Note(s) [3]

This group covers processes wherein there is a modification of the genetic material which would not normally occur in nature without intervention of man which produce a change in the gene structure which is passed on to succeeding generations.

15/01 • Preparation of mutants without inserting foreign genetic material therein; Screening processes therefor **[5, 2006.01]**
15/02 • Preparation of hybrid cells by fusion of two or more cells, e.g. protoplast fusion **[5, 2006.01]**
15/03 • • Bacteria **[5, 2006.01]**
15/04 • • Fungi **[5, 2006.01]**
15/05 • • Plant cells **[5, 2006.01]**
15/06 • • Animal cells **[5, 2006.01]**
15/07 • • Human cells **[5, 2006.01]**
15/08 • • Cells resulting from interspecies fusion **[5, 2006.01]**
15/09 • Recombinant DNA-technology **[5, 2006.01]**
15/10 • • Processes for the isolation, preparation or purification of DNA or RNA (chemical preparation of DNA or RNA C07H 21/00; preparation of non-structural polynucleotides from microorganisms or with enzymes C12P 19/34) **[5, 2006.01]**
15/11 • • DNA or RNA fragments; Modified forms thereof (DNA or RNA not used in recombinant technology C07H 21/00) **[5, 2006.01]**
15/113 • • • Non-coding nucleic acids modulating the expression of genes, e.g. antisense oligonucleotides **[2010.01]**
15/115 • • • Aptamers, i.e. nucleic acids binding a target molecule specifically and with high affinity without hybridising therewith **[2010.01]**
15/117 • • • Nucleic acids having immunomodulatory properties, e.g. containing CpG-motifs **[2010.01]**
15/12 • • • Genes encoding animal proteins **[5, 2006.01]**
15/13 • • • • Immunoglobulins **[5, 2006.01]**
15/14 • • • • Human serum albumins **[5, 2006.01]**
15/15 • • • • Protease inhibitors, e.g. antithrombin, antitrypsin, hirudin **[5, 2006.01]**
15/16 • • • • Hormones **[5, 2006.01]**
15/17 • • • • • Insulins **[5, 2006.01]**
15/18 • • • • • Growth hormones **[5, 2006.01]**
15/19 • • • • Interferons; Lymphokines; Cytokines **[5, 2006.01]**
15/20 • • • • • Interferons **[5, 2006.01]**
15/21 • • • • • • Alpha-interferons **[5, 2006.01]**
15/22 • • • • • • Beta-interferons **[5, 2006.01]**
15/23 • • • • • • Gamma-interferons **[5, 2006.01]**
15/24 • • • • • Interleukins **[5, 2006.01]**
15/25 • • • • • • Interleukin-1 **[5, 2006.01]**
15/26 • • • • • • Interleukin-2 **[5, 2006.01]**
15/27 • • • • • Colony stimulating factors **[5, 2006.01]**
15/28 • • • • • Tumor necrosis factors **[5, 2006.01]**
15/29 • • • Genes encoding plant proteins, e.g. thaumatin **[5, 2006.01]**
15/30 • • • Genes encoding protozoal proteins, e.g. from Plasmodium, Trypanosoma, Eimeria **[5, 2006.01]**
15/31 • • • Genes encoding microbial proteins, e.g. enterotoxins **[5, 2006.01]**
15/32 • • • • Bacillus crystal proteins **[5, 2006.01]**
15/33 • • • • Genes encoding viral proteins **[5, 2006.01]**
15/34 • • • • • Proteins from DNA viruses **[5, 2006.01]**
15/35 • • • • • • Parvoviridae, e.g. feline panleukopenia virus, human parvovirus **[5, 2006.01]**
15/36 • • • • • • Hepadnaviridae **[5, 2006.01]**
15/37 • • • • • • Papovaviridae, e.g. papillomaviruses, polyomavirus, SV40 **[5, 2006.01]**
15/38 • • • • • • Herpetoviridae, e.g. herpes simplex virus, varicella-zoster virus, Epstein-Barr virus, cytomegalovirus, pseudorabies virus **[5, 2006.01]**
15/39 • • • • • • Poxviridae, e.g. vaccinia virus, variola virus **[5, 2006.01]**
15/40 • • • • • Proteins from RNA viruses, e.g. flaviviruses **[5, 2006.01]**
15/41 • • • • • • Picornaviridae, e.g. rhinovirus, coxsackie viruses, echoviruses, enteroviruses **[5, 2006.01]**
15/42 • • • • • • • Foot-and-mouth disease virus **[5, 2006.01]**
15/43 • • • • • • • Poliovirus **[5, 2006.01]**
15/44 • • • • • • Orthomyxoviridae, e.g. influenza virus **[5, 2006.01]**

15/45 • • • • • • Paramyxoviridae, e.g. measles virus, mumps virus, Newcastle disease virus, canine distemper virus, rinderpest virus, respiratory syncytial viruses **[5, 2006.01]**

15/46 • • • • • • Reoviridae, e.g. rotavirus, bluetongue virus, Colorado tick fever virus **[5, 2006.01]**

15/47 • • • • • • Rhabdoviridae, e.g. rabies viruses, vesicular stomatitis virus **[5, 2006.01]**

15/48 • • • • • • Retroviridae, e.g. bovine leukaemia virus, feline leukaemia virus **[5, 2006.01]**

15/49 • • • • • • • Lentiviridae, e.g. immunodeficiency viruses such as HIV, visna-maedi virus, equine infectious anaemia virus **[5, 2006.01]**

15/50 • • • • • • Coronaviridae, e.g. infectious bronchitis virus, transmissible gastroenteritis virus **[5, 2006.01]**

15/51 • • • • • Hepatitis viruses **[5, 2006.01]**

15/52 • • • Genes encoding for enzymes or proenzymes **[5, 2006.01]**

Note(s) [5]

In this group:

- genes encoding for proenzymes are classified with the corresponding genes encoding enzymes;
- enzymes are generally categorised according to the "Nomenclature and Classification of Enzymes" of the International Commission on Enzymes. Where appropriate, this designation appears in the groups below in parenthesis.

15/53 • • • • Oxidoreductases (1) **[5, 2006.01]**

15/54 • • • • Transferases (2) **[5, 2006.01]**

15/55 • • • • Hydrolases (3) **[5, 2006.01]**

15/56 • • • • • acting on glycosyl compounds (3.2), e.g. amylase, galactosidase, lysozyme **[5, 2006.01]**

15/57 • • • • • acting on peptide bonds (3.4) **[5, 2006.01]**

15/58 • • • • • • Plasminogen activators, e.g. urokinase, TPA **[5, 2006.01]**

15/59 • • • • • • Chymosin **[5, 2006.01]**

15/60 • • • • Lyases (4) **[5, 2006.01]**

15/61 • • • • Isomerases (5) **[5, 2006.01]**

15/62 • • • DNA sequences coding for fusion proteins **[5, 2006.01]**

Note(s) [5]

In this group, the following term is used with the meaning indicated:

- "fusion" means the fusion of two different proteins.

15/63 • • Introduction of foreign genetic material using vectors; Vectors; Use of hosts therefor; Regulation of expression **[5, 2006.01]**

15/64 • • • General methods for preparing the vector, for introducing it into the cell or for selecting the vector-containing host **[5, 2006.01]**

15/65 • • • using markers (enzymes used as markers C12N 15/52) **[5, 2006.01]**

15/66 • • • General methods for inserting a gene into a vector to form a recombinant vector using cleavage and ligation; Use of non-functional linkers or adaptors, e.g. linkers containing the sequence for a restriction endonuclease **[5, 2006.01]**

Note(s) [5]

In this group, the following expression is used with the meaning indicated:

- "non-functional linkers" means DNA sequences which are used to link DNA sequences and which have no known function of structural gene or regulating function.

15/67 • • • General methods for enhancing the expression **[5, 2006.01]**

15/68 • • • • Stabilisation of the vector **[5, 2006.01]**

15/69 • • • • Increasing the copy number of the vector **[5, 2006.01]**

15/70 • • • Vectors or expression systems specially adapted for E. coli **[5, 2006.01]**

Note(s) [5]

1. This group covers the use of E. coli as host.
2. Shuttle vectors also replicating in E. coli are classified according to the other host.

15/71 • • • • Expression systems using regulatory sequences derived from the trp-operon **[5, 2006.01]**

15/72 • • • • Expression systems using regulatory sequences derived from the lac-operon **[5, 2006.01]**

15/73 • • • • Expression systems using phage lambda regulatory sequences **[5, 2006.01]**

15/74 • • • Vectors or expression systems specially adapted for prokaryotic hosts other than E. coli, e.g. Lactobacillus, Micromonospora **[5, 2006.01]**

Note(s) [5]

This group covers the use of prokaryotes as hosts.

15/75 • • • • for Bacillus **[5, 2006.01]**

15/76 • • • • for Actinomyces; for Streptomyces **[5, 2006.01]**

15/77 • • • • for Corynebacterium; for Brevibacterium **[5, 2006.01]**

15/78 • • • • for Pseudomonas **[5, 2006.01]**

15/79 • • • Vectors or expression systems specially adapted for eukaryotic hosts **[5, 2006.01]**

Note(s) [5]

This group covers the use of eukaryotes as hosts.

15/80 • • • • for fungi **[5, 2006.01]**

15/81 • • • • • for yeasts **[5, 2006.01]**

15/82 • • • • for plant cells **[5, 2006.01]**

15/83 • • • • • Viral vectors, e.g. cauliflower mosaic virus **[5, 2006.01]**

15/84 • • • • • Ti-plasmids **[5, 2006.01]**

15/85 • • • • for animal cells **[5, 2006.01]**

15/86 • • • • • Viral vectors **[5, 2006.01]**

15/861 • • • • • • Adenoviral vectors **[7, 2006.01]**

15/863 • • • • • • Poxviral vectors, e.g. vaccinia virus **[7, 2006.01]**

15/864 • • • • • • Parvoviral vectors **[7, 2006.01]**

15/866 • • • • • • Baculoviral vectors **[7, 2006.01]**

15/867 • • • • • • Retroviral vectors **[7, 2006.01]**

15/869 • • • • • • Herpesviral vectors **[7, 2006.01]**

15/87 • • Introduction of foreign genetic material using processes not otherwise provided for, e.g. co-transformation **[5, 2006.01]**

15/873 • • • Techniques for producing new embryos, e.g. nuclear transfer, manipulation of totipotent cells or production of chimeric embryos **[2010.01]**

15/877 • • • • Techniques for producing new mammalian cloned embryos **[2010.01]**

15/88 • • • using microencapsulation, e.g. using liposome vesicle **[5, 2006.01]**

15/89 • • • using microinjection **[5, 2006.01]**

15/90 • • • Stable introduction of foreign DNA into chromosome **[5, 2006.01]**

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

1/00 Preparation of compounds or compositions, not provided for in groups C12P 3/00-C12P 39/00, by using microorganisms or enzymes; General processes for the preparation of compounds or compositions by using microorganisms 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 microorganisms or reuse for microorganisms **[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, 2022.01]**
7/625 • • Polyesters of hydroxy carboxylic acids **[2022.01]**
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, 2022.01]**
7/6409 • • Fatty acids **[2022.01]**
7/6418 • • • by hydrolysis of fatty acid esters **[2022.01]**
7/6427 • • • Polyunsaturated fatty acids [PUFA], i.e. having two or more double bonds in their backbone **[2022.01]**
7/6431 • • • • Linoleic acids [18:2[n-6]] **[2022.01]**
7/6432 • • • • Eicosapentaenoic acids [EPA] **[2022.01]**
7/6434 • • • • Docosahexenoic acids [DHA] **[2022.01]**
7/6436 • • Fatty acid esters **[2022.01]**
7/6445 • • • Glycerides **[2022.01]**
7/6454 • • • • by esterification **[2022.01]**
7/6458 • • • • by transesterification, e.g. interesterification, ester interchange, alcoholysis or acidolysis **[2022.01]**
7/6463 • • • • obtained from glyceride producing microorganisms, e.g. single cell oil **[2022.01]**
7/6472 • • • • containing polyunsaturated fatty acid [PUFA] residues, i.e. having two or more double bonds in their backbone **[2022.01]**
7/6481 • • • • Phosphoglycerides (phosphoglycerides having carboxylic acids with less than seven carbon atoms C12P 7/62) **[2022.01]**
7/649 • • • Biodiesel, i.e. fatty acid alkyl esters **[2022.01]**
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]**

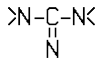
19/44 • Preparation of O-glycosides, e.g. glucosides **[3, 2006.01]**

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 **[3, 2006.01]**

Note(s) [2020.01]

Cyclic or bridged peptides or polypeptides cyclised only by —S—S— bonds are classified in group C12P 21/02 only.

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 microorganism 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 microorganisms of different genera in the same process, simultaneously [3, 2006.01]

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

C12Q MEASURING OR TESTING PROCESSES INVOLVING ENZYMES, NUCLEIC ACIDS OR MICROORGANISMS (immunoassay G01N 33/53); COMPOSITIONS OR TEST PAPERS THEREFOR; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMOLOGICAL PROCESSES [3]

Note(s) [3, 4, 6]

1. This subclass does not cover the observation of the progress or of the result of processes specified in this subclass by any of the methods specified in groups G01N 3/00-G01N 29/00, which is covered by subclass G01N.
2. In this subclass, the following expression is used with the meaning indicated:
   - "involving", when used in relation to a substance, includes the testing for the substance as well as employing the substance as a determinant or reactant in a test for a different substance.
3. Attention is drawn to Notes (1) to (3) following the title of class C12.
4. In this subclass, test media are classified in the appropriate group for the relevant test process.
5. In this subclass, it is desirable to add the indexing codes of subclass C12R.

1/00 Measuring or testing processes involving enzymes, nucleic acids or microorganisms (measuring or testing apparatus with condition measuring or sensing means, e.g. colony counters, C12M 1/34)**; Compositions therefor; Processes of preparing such compositions [3, 2006.01]**

1/02 • involving viable microorganisms **[3, 2006.01]**

1/04 • • Determining presence or kind of microorganism; Use of selective media for testing antibiotics or bacteriocides; Compositions containing a chemical indicator therefor **[3, 2006.01]**

1/06 • • • Quantitative determination **[3, 2006.01]**

1/08 • • • • using multifield media **[3, 2006.01]**

1/10 • • • Enterobacteria **[3, 2006.01]**

1/12 • • • Nitrate to nitrite reducing bacteria **[3, 2006.01]**

1/14 • • • Streptococcus; Staphylococcus **[3, 2006.01]**

1/16 • • • using radioactive material **[3, 2006.01]**

1/18 • • Testing for antimicrobial activity of a material **[3, 2006.01]**

1/20 • • • using multifield media **[3, 2006.01]**

1/22 • • Testing for sterility conditions **[3, 2006.01]**

1/24 • • Methods of sampling, or inoculating or spreading a sample; Methods of physically isolating an intact microorganism **[3, 2006.01]**

1/25 • involving enzymes not classifiable in groups C12Q 1/26-C12Q 1/70 **[5, 2006.01]**

1/26 • involving oxidoreductase **[3, 2006.01]**

1/28 • • involving peroxidase **[3, 2006.01]**

1/30 • • involving catalase **[3, 2006.01]**

1/32 • • involving dehydrogenase **[3, 2006.01]**

1/34 • involving hydrolase **[3, 2006.01]**

1/37 • • involving peptidase or proteinase **[5, 2006.01]**

1/40 • • involving amylase **[3, 2006.01]**

1/42 • • involving phosphatase **[3, 2006.01]**

1/44 • • involving esterase **[3, 2006.01]**

1/46 • • • involving cholinesterase **[3, 2006.01]**

1/48 • involving transferase **[3, 2006.01]**

1/50 • • involving creatine phosphokinase **[3, 2006.01]**

1/52 • • involving transaminase **[3, 2006.01]**

1/527 • involving lyase **[5, 2006.01]**

1/533 • involving isomerase **[5, 2006.01]**

1/54 • involving glucose or galactose **[3, 2006.01]**

1/56 • involving blood clotting factors, e.g. involving thrombin, thromboplastin, fibrinogen **[3, 2006.01]**

1/58 • involving urea or urease **[3, 2006.01]**

1/60 • involving cholesterol **[3, 2006.01]**

1/61 • involving triglycerides **[5, 2006.01]**

1/62 • involving uric acid **[3, 2006.01]**

1/64 • Geomicrobiological testing, e.g. for petroleum **[3, 2006.01]**

1/66 • involving luciferase **[3, 2006.01]**

1/68 • involving nucleic acids **[3, 2006.01, 2018.01]**

Note(s) [2018.01]

In this group, classification is made according to the most relevant feature irrespective of the last place priority rule.

1/6804 • • Nucleic acid analysis using immunogens (immunoassay G01N 33/53) **[2018.01]**

1/6806 • • Preparing nucleic acids for analysis, e.g. for polymerase chain reaction [PCR] assay (C12Q 1/6804 takes precedence) **[2018.01]**

1/6809 • • Methods for determination or identification of nucleic acids involving differential detection **[2018.01]**

1/6811 • • Selection methods for production or design of target specific oligonucleotides or binding molecules **[2018.01]**

1/6813 • • Hybridisation assays **[2018.01]**

1/6816 • • • characterised by the detection means (C12Q 1/6804 takes precedence) **[2018.01]**

1/6818 • • • • involving interaction of two or more labels, e.g. resonant energy transfer **[2018.01]**

1/682 • • • • Signal amplification **[2018.01]**

1/6823 • • • • Release of bound markers **[2018.01]**

1/6825 • • • • Nucleic acid detection involving sensors **[2018.01]**

1/6827 • • • for detection of mutation or polymorphism **[2018.01]**

1/683 • • • • involving restriction enzymes, e.g. restriction fragment length polymorphism [RFLP] **[2018.01]**

1/6832 • • • Enhancement of hybridisation reaction **[2018.01]**
1/6834 • • • Enzymatic or biochemical coupling of nucleic acids to a solid phase **[2018.01]**
1/6837 • • • • using probe arrays or probe chips (C12Q 1/6874 takes precedence) **[2018.01]**
1/6839 • • • Triple helix formation or other higher order conformations in hybridisation assays **[2018.01]**
1/6841 • • • In situ hybridisation **[2018.01]**
1/6844 • • Nucleic acid amplification reactions **[2018.01]**
1/6848 • • • characterised by the means for preventing contamination or increasing the specificity or sensitivity of an amplification reaction **[2018.01]**
1/6851 • • • Quantitative amplification **[2018.01]**
1/6853 • • • using modified primers or templates **[2018.01]**
1/6855 • • • • Ligating adaptors **[2018.01]**
1/6858 • • • Allele-specific amplification **[2018.01]**
1/686 • • • Polymerase chain reaction [PCR] **[2018.01]**
1/6862 • • • Ligase chain reaction [LCR] **[2018.01]**
1/6865 • • • Promoter-based amplification, e.g. nucleic acid sequence-based amplification [NASBA], self-sustained sequence replication [3SR] or transcription-based amplification system [TAS] **[2018.01]**
1/6867 • • • Replicase-based amplification, e.g. using Q-beta replicase **[2018.01]**
1/6869 • • Methods for sequencing **[2018.01]**
1/6872 • • • involving mass spectrometry **[2018.01]**
1/6874 • • • involving nucleic acid arrays, e.g. sequencing by hybridisation [SBH] **[2018.01]**
1/6876 • • Nucleic acid products used in the analysis of nucleic acids, e.g. primers or probes **[2018.01]**
1/6879 • • • for sex determination **[2018.01]**
1/6881 • • • for tissue or cell typing, e.g. human leukocyte antigen [HLA] probes **[2018.01]**
1/6883 • • • for diseases caused by alterations of genetic material **[2018.01]**
1/6886 • • • • for cancer (immunoassay for cancer G01N 33/574) **[2018.01]**
1/6888 • • • for detection or identification of organisms **[2018.01]**
1/689 • • • • for bacteria **[2018.01]**
1/6893 • • • • for protozoa **[2018.01]**
1/6895 • • • • for plants, fungi or algae **[2018.01]**
1/6897 • • involving reporter genes operably linked to promoters **[2018.01]**
1/70 • involving virus or bacteriophage **[3, 2006.01]**

3/00 Condition-responsive control processes (apparatus therefor C12M 1/36) **[3, 2006.01]**

C12R INDEXING SCHEME ASSOCIATED WITH SUBCLASSES C12C-C12Q, RELATING TO MICROORGANISMS [3]

Note(s) [3]

1. This subclass constitutes an indexing scheme associated with the other subclasses of class C12, relating to microorganisms used in the processes classified in subclasses C12C-C12Q.
2. The bacteria terminology is based on "Bergey's Manual of Determinative Bacteriology", Eighth Edition, 1975.

1/00 Microorganisms [3, 2006.01]
1/01 • Bacteria or actinomycetales **[3, 2006.01]**
1/02 • • Acetobacter **[3, 2006.01]**
1/025 • • Achromobacter **[3, 2006.01]**
1/03 • • Actinomadura **[3, 2006.01]**
1/04 • • Actinomyces **[3, 2006.01]**
1/045 • • Actinoplanes **[3, 2006.01]**
1/05 • • Alcaligenes **[3, 2006.01]**
1/06 • • Arthrobacter **[3, 2006.01]**
1/065 • • Azotobacter **[3, 2006.01]**
1/07 • • Bacillus **[3, 2006.01]**
1/08 • • • Bacillus brevis **[3, 2006.01]**
1/085 • • • Bacillus cereus **[3, 2006.01]**
1/09 • • • Bacillus circulans **[3, 2006.01]**
1/10 • • • Bacillus licheniformis **[3, 2006.01]**
1/11 • • • Bacillus megaterium **[3, 2006.01]**
1/12 • • • Bacillus polymyxa **[3, 2006.01]**
1/125 • • • Bacillus subtilis **[3, 2006.01]**
1/13 • • Brevibacterium **[3, 2006.01]**
1/14 • • Chainia **[3, 2006.01]**
1/145 • • Clostridium **[3, 2006.01]**
1/15 • • Corynebacterium **[3, 2006.01]**
1/16 • • • Corynebacterium diphtheriae **[3, 2006.01]**
1/165 • • • Corynebacterium poinsettiae **[3, 2006.01]**
1/17 • • • Corynebacterium pyogenes **[3, 2006.01]**
1/18 • • Erwinia **[3, 2006.01]**
1/185 • • Escherichia **[3, 2006.01]**
1/19 • • • Escherichia coli **[3, 2006.01]**
1/20 • • Flavobacterium **[3, 2006.01]**
1/21 • • Haemophilus **[3, 2006.01]**
1/22 • • Klebsiella **[3, 2006.01]**
1/225 • • Lactobacillus **[3, 2006.01]**
1/23 • • • Lactobacillus acidophilus **[3, 2006.01]**
1/24 • • • Lactobacillus brevis **[3, 2006.01]**
1/245 • • • Lactobacillus casei **[3, 2006.01]**
1/25 • • • Lactobacillus plantarum **[3, 2006.01]**
1/26 • • Methylomonas **[3, 2006.01]**
1/265 • • Micrococcus **[3, 2006.01]**
1/27 • • • Micrococcus flavus **[3, 2006.01]**
1/28 • • • Micrococcus glutamicus **[3, 2006.01]**
1/285 • • • Micrococcus lysodeikticus **[3, 2006.01]**
1/29 • • Micromonospora **[3, 2006.01]**
1/30 • • • Micromonospora chalcea **[3, 2006.01]**
1/31 • • • Micromonospora purpurea **[3, 2006.01]**
1/32 • • Mycobacterium **[3, 2006.01]**
1/325 • • • Mycobacterium avium **[3, 2006.01]**
1/33 • • • Mycobacterium fortuitum **[3, 2006.01]**
1/34 • • • Mycobacterium smegmatis **[3, 2006.01]**
1/35 • • Mycoplasma **[3, 2006.01]**
1/36 • • Neisseria **[3, 2006.01]**
1/365 • • Nocardia **[3, 2006.01]**
1/37 • • Proteus **[3, 2006.01]**
1/38 • • Pseudomonas **[3, 2006.01]**
1/385 • • • Pseudomonas aeruginosa **[3, 2006.01]**
1/39 • • • Pseudomonas fluorescens **[3, 2006.01]**
1/40 • • • Pseudomonas putida **[3, 2006.01]**

1/41 • • Rhizobium **[3, 2006.01]**
1/42 • • Salmonella **[3, 2006.01]**
1/425 • • Serratia **[3, 2006.01]**
1/43 • • • Serratia marcescens **[3, 2006.01]**
1/44 • • Staphylococcus **[3, 2006.01]**
1/445 • • • Staphylococcus aureus **[3, 2006.01]**
1/45 • • • Staphylococcus epidermidis **[3, 2006.01]**
1/46 • • Streptococcus **[3, 2006.01]**
1/465 • • Streptomyces **[3, 2006.01]**
1/47 • • • Streptomyces albus **[3, 2006.01]**
1/48 • • • Streptomyces antibioticus **[3, 2006.01]**
1/485 • • • Streptomyces aureofaciens **[3, 2006.01]**
1/49 • • • Streptomyces aureus **[3, 2006.01]**
1/50 • • • Streptomyces bikiniensis **[3, 2006.01]**
1/51 • • • Streptomyces candidus **[3, 2006.01]**
1/52 • • • Streptomyces chartreusis **[3, 2006.01]**
1/525 • • • Streptomyces diastatochromogenes **[3, 2006.01]**
1/53 • • • Streptomyces filipinensis **[3, 2006.01]**
1/54 • • • Streptomyces fradiae **[3, 2006.01]**
1/545 • • • Streptomyces griseus **[3, 2006.01]**
1/55 • • • Streptomyces hygroscopicus **[3, 2006.01]**
1/56 • • • Streptomyces lavendulae **[3, 2006.01]**
1/565 • • • Streptomyces lincolnensis **[3, 2006.01]**
1/57 • • • Streptomyces noursei **[3, 2006.01]**
1/58 • • • Streptomyces olivaceus **[3, 2006.01]**
1/585 • • • Streptomyces platensis **[3, 2006.01]**
1/59 • • • Streptomyces rimosus **[3, 2006.01]**
1/60 • • • Streptomyces sparsogenes **[3, 2006.01]**
1/61 • • • Streptomyces venezuelae **[3, 2006.01]**
1/62 • • Streptosporangium **[3, 2006.01]**
1/625 • • Streptoverticillium **[3, 2006.01]**
1/63 • • Vibrio **[3, 2006.01]**
1/64 • • Xanthomonas **[3, 2006.01]**
1/645 • Fungi **[3, 2006.01]**
1/65 • • Absidia **[3, 2006.01]**
1/66 • • Aspergillus **[3, 2006.01]**
1/665 • • • Aspergillus awamori **[3, 2006.01]**
1/67 • • • Aspergillus flavus **[3, 2006.01]**
1/68 • • • Aspergillus fumigatus **[3, 2006.01]**
1/685 • • • Aspergillus niger **[3, 2006.01]**
1/69 • • • Aspergillus oryzae **[3, 2006.01]**
1/70 • • • Aspergillus ustus **[3, 2006.01]**
1/71 • • • Aspergillus wentii **[3, 2006.01]**
1/72 • • Candida **[3, 2006.01]**
1/725 • • • Candida albicans **[3, 2006.01]**
1/73 • • • Candida lipolytica **[3, 2006.01]**
1/74 • • • Candida tropicalis **[3, 2006.01]**
1/745 • • Cephalosporium **[3, 2006.01]**
1/75 • • • Cephalosporium acremonium **[3, 2006.01]**
1/76 • • • Cephalosporium coerulescens **[3, 2006.01]**
1/765 • • • Cephalosporium crotocinigenum **[3, 2006.01]**
1/77 • • Fusarium **[3, 2006.01]**
1/78 • • Hansenula **[3, 2006.01]**
1/785 • • Mucor **[3, 2006.01]**
1/79 • • Paecilomyces **[3, 2006.01]**
1/80 • • Penicillium **[3, 2006.01]**
1/81 • • • Penicillium brevi **[3, 2006.01]**
1/82 • • • Penicillium chrysogenum **[3, 2006.01]**
1/825 • • • Penicillium notatum **[3, 2006.01]**
1/83 • • • Penicillium patulum **[3, 2006.01]**
1/84 • • Pichia **[3, 2006.01]**
1/845 • • Rhizopus **[3, 2006.01]**
1/85 • • Saccharomyces **[3, 2006.01]**
1/86 • • • Saccharomyces carlsbergensis **[3, 2006.01]**
1/865 • • • Saccharomyces cerevisiae **[3, 2006.01]**
1/87 • • • Saccharomyces lactis **[3, 2006.01]**
1/88 • • Torulopsis **[3, 2006.01]**
1/885 • • Trichoderma **[3, 2006.01]**
1/89 • Algae **[3, 2006.01]**
1/90 • Protozoa **[3, 2006.01]**
1/91 • Cell lines **[3, 7, 2006.01]**
1/92 • Viruses **[5, 7, 2006.01]**
1/93 • • Animal viruses **[7, 2006.01]**
1/94 • • Plant viruses **[7, 2006.01]**