

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

### Notes

- (1) Between subclasses C12M to C12Q, and within each of these subclasses, 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. [3]
- (2) In this class, viruses, undifferentiated human, animal or plant cells, protozoa, tissues and unicellular algae are considered as micro-organisms. [3,5]
- (3) In this class, unless specifically provided for, undifferentiated human, animal or plant cells, protozoa, tissues and unicellular algae are classified together with micro-organisms. Sub-cellular parts, unless specifically provided for, are classified with the whole cell. [5]

### Note

The codes of subclass C12R are only for use as indexing codes associated with subclasses C12C to C12Q or C12S, so as to provide information concerning the micro-organisms used in the processes classified in these subclasses. [3]

**C12C BREWING OF BEER** (cleaning of raw materials A23N; pitching or depitching machines, cellar tools C12L; propagating yeasts C12N 1/14; non-beverage ethanolic fermentation C12P 7/06)

### Note

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

### Subclass Index

|  |                     |                       |       |
|--|---------------------|-----------------------|-------|
| RAW MATERIALS FOR PREPARING BEER .....   | 1/00, 3/00,<br>5/00 | SPECIAL BEER .....    | 12/00 |
| PREPARATION AND TREATMENT OF<br>WORT; FERMENTATION PROCESSES FOR<br>BEER ..... | 7/00, 11/00         | BREWING DEVICES ..... | 13/00 |

|   |  |                                       |
|---|--|---------------------------------------|
| <b>1/00 Preparation of malt</b>   | <b>3/10</b>  | . . . using carbon dioxide [6]        |
| 1/02 . Pretreatment of grains, e.g. washing, steeping   | 3/12   | . . Isomerised products from hops [6] |
| 1/027 . Germinating [6]   | <b>5/00 Other raw materials for the preparation of beer</b>                          |                                       |
| 1/033 . . in boxes or drums [6]   | 5/02 . Additives for beer  |                                       |
| 1/047 . . Influencing the germination by chemical or<br>physical means [6]  | 5/04 . . Colouring additives   |                                       |
| 1/053 . . . by irradiation or electric treatment [6]  | <b>7/00 Preparation of wort</b> (malt extract C12C 1/18)                             |                                       |
| 1/067 . Drying [6]  | 7/01 . Pretreatment of malt, e.g. malt grinding [6]                                  |                                       |
| 1/073 . . Processes or apparatus specially adapted to save or<br>recover energy [6]   | 7/04 . Preparation or treatment of the mash  |                                       |
| 1/10 . . Drying on fixed supports   | 7/047 . . part of the mash being unmalted cereal mash [6]                            |                                       |
| 1/12 . . Drying on moving supports  | 7/053 . . part of the mash being non-cereal material [6]                             |                                       |
| 1/125 . Continuous or semi-continuous processes for<br>steeping, germinating or drying [6]  | 7/06 . Mashing apparatus   |                                       |
| 1/13 . . with vertical transport of the grains [6]  | 7/14 . Clarifying wort (Läuterung)   |                                       |
| 1/135 . . with horizontal transport of the grains [6]   | 7/16 . . by straining  |                                       |
| 1/15 . Grain or malt turning, charging or discharging<br>apparatus [6]  | 7/165 . . . in mash filters [6]  |                                       |
| 1/16 . After-treatment of malt, e.g. malt cleaning,<br>detachment of the germ   | 7/17 . . . in lautertuns [6]   |                                       |
| 1/18 . Preparation of malt extract or of special kinds of<br>malt, e.g. caramel, black malt (malt products for use<br>as foodstuffs A23L) | 7/175 . . by centrifuging [6]  |                                       |
|   | 7/20 . . Boiling the beerwort (brew kettles<br>C12C 13/02) [6]                       |                                       |
|   | 7/22 . . . Processes or apparatus specially adapted to<br>save or recover energy [6] |                                       |
|   | 7/24 . Clarifying beerwort between hop boiling and<br>cooling [6]                    |                                       |
| <b>3/00 Treatment of hops</b>   | 7/26 . Cooling beerwort; Clarifying beerwort during or after<br>the cooling [6]      |                                       |
| 3/02 . Drying   | 7/28 . After-treatment [6]   |                                       |
| 3/04 . Conserving; Storing; Packing   | <b>11/00 Fermentation processes for beer</b>   |                                       |
| 3/06 . . Powder or pellets from hops [6]  | 11/02 . Pitching yeast   |                                       |
| 3/08 . . Solvent extracts from hops [6]   | 11/06 . Acidifying the wort  |                                       |

**C12C – C12G**

|       |  |       |  |
|-------|--|-------|--|
| 11/07 | • Continuous fermentation [6]  | 13/00 | <b>Brewing devices, not covered by a single group of C12C 1/00 to C12C 12/04 [3,6]</b> |
| 11/09 | • Fermentation with immobilised yeast [6]  | 13/02 | • Brew kettles [3]   |
| 11/11 | • Post fermentation treatments, e.g. carbonation, concentration (C12H takes precedence; containers with means specially adapted for effervescing potable liquids B65D 85/73) [6] | 13/06 | • . . heated with fire [3]   |
|       |  | 13/08 | • . . with internal heating elements [6]   |
|       |  | 13/10 | • Home brew equipment [6]  |
| 12/00 | <b>Processes specially adapted for making special kinds of beer [6]</b>  |       |  |
| 12/02 | • Beer with low calorie content (C12C 12/04 takes precedence) [6]  |       |  |
| 12/04 | • Beer with low alcohol content (removal of alcohol C12H 3/00) [6]   |       |  |

**C12F RECOVERY OF BY-PRODUCTS OF FERMENTED SOLUTIONS; DENATURING OF, OR DENATURED, ALCOHOL [6]****Note**

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

|      |  |      |   |
|------|--|------|---|
| 3/00 | <b>Recovery of by-products</b>   | 3/08 | • . . Recovery of alcohol from press residues or other waste material (from carbon dioxide C12F 3/04) |
| 3/02 | • of carbon dioxide  | 3/10 | • from distillery slops   |
| 3/04 | • . . Recovery of volatile fermentation products from carbon dioxide         | 5/00 | <b>Preparation of denatured alcohol</b>   |
| 3/06 | • from beer or wine (C12F 3/02 takes precedence; removal of yeast C12G 1/08) |      |   |

**C12G WINE; OTHER ALCOHOLIC BEVERAGES; PREPARATION THEREOF (beer C12C)****Note**

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

|       |  |      |   |
|-------|--|------|---|
| 1/00  | <b>Preparation of wine or sparkling wine</b>   | 1/08 | • Removal of yeast (“degorgeage”)   |
| 1/02  | • Preparation of must from grapes; Must treatment or fermentation                      | 1/09 | • . . Agitation, centrifugation or vibration of bottles [6]   |
| 1/022 | • . . Fermentation; Microbiological or enzymatic treatment [6]                         | 1/10 | • Deacidifying of wine [6]  |
| 1/024 | • . . . in a horizontally mounted cylindrical vessel (C12G 1/026 takes precedence) [6] | 1/12 | • Processes for preventing winestone precipitation [6]  |
| 1/026 | • . . . in vessels with movable equipment for mixing the content [6]                   | 3/00 | <b>Preparation of other alcoholic beverages</b>   |
| 1/028 | • . . . with thermal treatment of the grapes or the must [6]                           | 3/02 | • by straight fermentation  |
| 1/032 | • . . . with recirculation of the must for pompage extraction [6]                      | 3/04 | • by mixing, e.g. liqueurs  |
| 1/036 | • . . . by use of a home wine making vessel [6]  | 3/06 | • . . with flavouring ingredients   |
| 1/04  | • . . Sulfiting the must; Desulfiting  | 3/07 | • . . . Flavouring with wood or wood extract; Pretreatment of the wood used therefor [6]  |
| 1/06  | • Preparation of sparkling wine, e.g. champagne; Impregnating wine with carbon dioxide | 3/08 | • by other methods for varying the composition of fermented solutions (removal of alcohol from alcoholic beverages to obtain alcohol-free or low-alcohol beverages C12H 3/00) |
| 1/067 | • . . Continuous processes [6]   | 3/10 | • . . Increasing the alcohol content  |
| 1/073 | • . . Fermentation with immobilised yeast [6]  | 3/12 | • . . . by distillation (distillation processes or apparatus, in general B01D 3/00)   |
|       |  | 3/14 | • . . . by freezing [6]   |

**C12H PASTEURISATION, STERILISATION, PRESERVATION, PURIFICATION, CLARIFICATION, AGEING OF ALCOHOLIC BEVERAGES OR REMOVAL OF ALCOHOL THEREFROM** (deacidifying wine C12G 1/10; preventing winestone precipitation C12G 1/12; simulation ageing by flavouring C12G 3/06) [6]

**Note**

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. [8]

**Note**

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

|             |   |             |   |
|-------------|---|-------------|---|
| <b>1/00</b> | <b>Pasteurisation, sterilisation, preservation, purification, clarification, or ageing of alcoholic beverages</b> | <b>1/14</b> | . . with non-precipitating compounds, e.g. sulfiting; Sequestration, e.g. with chelate-producing compounds  |
| 1/02        | . combined with removal of precipitate or added materials, e.g. adsorption material                               | 1/15        | . . . with enzymes [6]  |
| 1/04        | . . with the aid of ion-exchange material or inert clarification material, e.g. adsorption material               | 1/16        | . . by physical means, e.g. irradiation   |
| 1/044       | . . . with the aid of inorganic material [6]  | 1/18        | . . . by heating  |
| 1/048       | . . . with silicon containing material [6]  | 1/20        | . . . . in containers allowing for expansion of the contents  |
| 1/052       | . . . with the aid of organic material [6]  | 1/22        | . Ageing or ripening by storing, e.g. lagering of beer  |
| 1/056       | . . . with the aid of polymers [6]  | <b>3/00</b> | <b>Removal of alcohol from alcoholic beverages to obtain alcohol-free or low-alcohol beverages</b>  |
| 1/06        | . . Precipitation by physical means, e.g. by irradiation, vibrations  |             | (distillation or rectification of fermented solutions to obtain pure alcohol B01D 3/00; recovery of by-products of wine or beer other than low-alcohol beverages C12F 3/06; preparation of alcoholic beverages other than wine or beer by varying the composition of fermented solutions C12G 3/08) [6] |
| 1/065       | . . . Separation by centrifugation [6]  | 3/02        | . by evaporating [6]  |
| 1/07        | . . . Separation by filtration [6]  | 3/04        | . using semi-permeable membranes [6]  |
| 1/075       | . . . . by cross-flow filtration [6]  |             |   |
| 1/08        | . . . by heating  |             |   |
| 1/10        | . . Precipitation by chemical means   |             |   |
| 1/12        | . without precipitation   |             |   |

**C12J VINEGAR; ITS PREPARATION**

**Note**

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

|             |   |             |                                      |
|-------------|---|-------------|--------------------------------------|
| <b>1/00</b> | <b>Vinegar; Preparation; Purification</b> | <b>1/06</b> | . from milk                          |
| 1/02        | . from wine                               | 1/08        | . Addition of flavouring ingredients |
| 1/04        | . from alcohol                            | 1/10        | . Apparatus                          |

**C12L PITCHING OR DEPITCHING MACHINES; CELLAR TOOLS** (cleaning of casks B08B 9/00)

**Note**

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

- 3/00 Pitching or depitching machines**
- 9/00 Venting devices for casks, barrels, or the like**
- 11/00 Cellar tools**

**C12M APPARATUS FOR ENZYMOLOGY OR MICROBIOLOGY** (installations for fermenting manure A01C 3/02; preservation of living parts of humans or animals A01N 1/02; physical or chemical apparatus in general B01; brewing apparatus C12C; fermentation apparatus for wine C12G; apparatus for preparing vinegar C12J 1/10) [3]

### Note

Attention is drawn to Notes (1) to (3) following the title of class C12. [4]

### Note

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

|             |  |             |   |
|-------------|--|-------------|---|
| <b>1/00</b> | <b>Apparatus for enzymology or microbiology [3]</b>  | 1/21        | . Froth suppressors [5]   |
| <b>Note</b> |  | 1/22        | . Petri type dish [3]   |
|             | This group covers:   | 1/24        | . tube or bottle type [3]   |
|             | – apparatus where micro-organisms or enzymes are produced or isolated;   | 1/26        | . Inoculator or sampler [3]   |
|             | – apparatus where the characteristics of micro-organisms or enzymes are investigated, e.g. which growth factors are necessary;   | 1/28        | . . . being part of container [3]   |
|             | – apparatus specially adapted to employ micro-organisms or enzymes as “reactants” or biocatalysts;                               | 1/30        | . . . Sampler being a swab [3]  |
|             | – apparatus of both the laboratory and industrial scale. [3]   | 1/32        | . . . multiple field or continuous type [3]   |
|             |  | 1/33        | . Disintegrators [5]  |
|             |  | 1/34        | . Measuring or testing with condition measuring or sensing means, e.g. colony counters [3]  |
|             |  | 1/36        | . including condition or time responsive control, e.g. automatically controlled fermentors (controlling or regulating in general G05) [3]                       |
| 1/02        | . with agitation means; with heat exchange means [3]   | 1/38        | . . . Temperature-responsive control [3]  |
| 1/04        | . with gas introduction means [3]  | 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] |
| 1/06        | . . . with agitator, e.g. impeller [3]   |             |   |
| 1/08        | . . . with draft tube [3]  |             |   |
| 1/09        | . . . Flotation apparatus [5]  | 1/42        | . Apparatus for the treatment of micro-organisms or enzymes with electrical or wave energy, e.g. magnetism, sonic wave [5]                                      |
| 1/10        | . rotatably mounted [3]  |             |   |
| 1/107       | . with means for collecting fermentation gases, e.g. methane (producing methane by anaerobic treatment of sludge C02F 11/04) [5] | <b>3/00</b> | <b>Tissue, human, animal or plant cell, or virus culture apparatus [3]</b>  |
| 1/113       | . . . with transport of the substrate during the fermentation [5]  | 3/02        | . with means providing suspensions [3]  |
| 1/12        | . with sterilisation, filtration, or dialysis means [3]  | 3/04        | . with means providing thin layers [3]  |
| 1/14        | . with means providing thin layers or with multi-level trays [3]   | 3/06        | . with filtration, ultrafiltration, inverse osmosis or dialysis means [5]   |
| 1/16        | . containing, or adapted to contain, solid media [3]   | 3/08        | . Apparatus for tissue disaggregation [5]   |
| 1/18        | . . . Multiple fields or compartments [3]  | 3/10        | . for culture in eggs [5]   |
| 1/20        | . . . . Horizontal planar fields [3]   |             |   |

**C12N MICRO-ORGANISMS OR ENZYMES; COMPOSITIONS THEREOF** (biocides, pest repellants or attractants, or plant growth regulators containing micro-organisms, viruses, microbial fungi, enzymes, fermentates, or substances produced by, or extracted from, micro-organisms or animal material A01N 63/00; food compositions A21, A23; medicinal preparations A61K; chemical aspects of, or use of materials for, bandages, dressings, absorbent pads or surgical articles A61L; fertilisers C05); **PROPAGATING, PRESERVING, OR MAINTAINING MICRO-ORGANISMS** (preservation of living parts of humans or animals A01N 1/02); **MUTATION OR GENETIC ENGINEERING; CULTURE MEDIA** (microbiological testing media C12Q) [3]

### Notes

- (1) Attention is drawn to Notes (1) to (3) following the title of class C12. [3,4]
- (2) Biocidal, pest repellant, pest attractant or plant growth regulatory activity of compounds or preparations is further classified in subclass A01P. [8]
- (3) Therapeutic activity of single-cell proteins or enzymes is further classified in subclass A61P. [7]
- (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. [8]

**Note**

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

**Subclass Index**

MICRO-ORGANISMS; SPORES;  
UNDIFFERENTIATED CELLS; VIRUSES ..... 1/00; 3/00;  
5/00; 7/00; 11/00  
ENZYMES ..... 9/00, 11/00

TREATMENT WITH ELECTRICAL OR  
WAVE ENERGY ..... 13/00  
MUTATION OR GENETIC ENGINEERING ..... 15/00

- 
- |   |  |   |  |
|---|--|---|--|
| <p><b>1/00</b></p> <p>1/02</p> <p>1/04</p> <p>1/06</p> <p>1/08</p> <p>1/10</p> <p>1/11</p> <p>1/12</p> <p>1/13</p> <p>1/14</p> <p>1/15</p> <p>1/16</p> <p>1/18</p> <p>1/19</p> <p>1/20</p> <p>1/21</p> <p>1/22</p> <p>1/24</p> <p>1/26</p> <p>1/28</p> <p>1/30</p> <p>1/32</p> <p>1/34</p> <p>1/36</p> <p>1/38</p> <p><b>3/00</b></p> | <p><b>Micro-organisms, e.g. protozoa; Compositions thereof</b> (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); <b>Processes of propagating, maintaining or preserving micro-organisms or compositions thereof; Processes of preparing or isolating a composition containing a micro-organism; Culture media therefor</b> [3]</p> <p>. Separating micro-organisms from their culture media [3]</p> <p>. Preserving or maintaining viable micro-organisms (immobilised micro-organisms C12N 11/00) [3]</p> <p>. Lysis of micro-organisms [3]</p> <p>. Reducing the nucleic acid content [3]</p> <p>. Protozoa; Culture media therefor [3]</p> <p>. . modified by introduction of foreign genetic material [5]</p> <p>. Unicellular algae; Culture media therefor (culture of multi-cellular plants A01G; as new plants A01H 13/00) [3]</p> <p>. . modified by introduction of foreign genetic material [5]</p> <p>. Fungi (culture of mushrooms A01G 1/04; as new plants A01H 15/00); Culture media therefor [3]</p> <p>. . modified by introduction of foreign genetic material [5]</p> <p>. . Yeasts; Culture media therefor [3]</p> <p>. . . Baker's yeast; Brewer's yeast [3]</p> <p>. . . modified by introduction of foreign genetic material [5]</p> <p>. Bacteria; Culture media therefor [3]</p> <p>. . modified by introduction of foreign genetic material [5]</p> <p>. Processes using, or culture media containing, cellulose or hydrolysates thereof [3]</p> <p>. Processes using, or culture media containing, waste sulfite liquor [3]</p> <p>. Processes using, or culture media containing, hydrocarbons (refining of hydrocarbon oils by using micro-organisms C10G 32/00) [3]</p> <p>. . aliphatic [3]</p> <p>. . . having five or less carbon atoms [3]</p> <p>. Processes using, or culture media containing, lower alkanols, i.e. C<sub>1</sub> to C<sub>6</sub> [3]</p> <p>. Processes using foam culture [3]</p> <p>. Adaptation or attenuation of cells [3]</p> <p>. 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]</p> <p><b>Spore-forming or isolating processes</b> [3]</p> | <p><b>5/00</b></p> <p>5/02</p> <p>5/04</p> <p>5/06</p> <p>5/08</p> <p>5/10</p> <p>5/12</p> <p>5/14</p> <p>5/16</p> <p>5/18</p> <p>5/20</p> <p>5/22</p> <p>5/24</p> <p>5/26</p> <p>5/28</p> <p><b>7/00</b></p> <p>7/01</p> <p>7/02</p> <p>7/04</p> <p>7/06</p> <p>7/08</p> | <p><b>Undifferentiated human, animal or plant cells, e.g. cell lines; Tissues; Cultivation or maintenance thereof; Culture media therefor</b> (plant reproduction by tissue culture techniques A01H 4/00) [3,5]</p> <p>. Propagation of single cells or cells in suspension; Maintenance thereof; Culture media therefor [3]</p> <p>. Plant cells or tissues [5]</p> <p>. Animal cells or tissues [5]</p> <p>. Human cells or tissues [5]</p> <p>. Cells modified by introduction of foreign genetic material, e.g. virus-transformed cells [5]</p> <p>. . Fused cells, e.g. hybridomas [5]</p> <p>. . . Plant cells [5]</p> <p>. . . Animal cells [5]</p> <p>. . . . Murine cells, e.g. mouse cells [5]</p> <p>. . . . one of the fusion partners being a B lymphocyte [5]</p> <p>. . . Human cells [5]</p> <p>. . . . one of the fusion partners being a B lymphocyte [5]</p> <p>. . . Cells resulting from interspecies fusion [5]</p> <p>. . . . one of the fusion partners being a human cell [5]</p> <p><b>Viruses, e.g. bacteriophages; Compositions thereof; Preparation or purification thereof</b> (medicinal preparations containing viruses A61K 35/76; preparing medicinal viral antigen or antibody compositions, e.g. virus vaccines, A61K 39/00) [3]</p> <p>. Viruses, e.g. bacteriophages, modified by introduction of foreign genetic material (vectors C12N 15/00) [5]</p> <p>. Recovery or purification [3]</p> <p>. Inactivation or attenuation; Producing viral sub-units [3]</p> <p>. . by chemical treatment [3]</p> <p>. . by serial passage of virus [3]</p> |
|---|--|---|--|

- 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** (preparation of malt C12C 1/00) [3]

### Note

In this group:

- proenzymes are classified with the corresponding enzymes; [5]
- 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. [3]

- 9/02 . Oxidoreductases (1.), e.g. luciferase [3]  
 9/04 . . acting on CHO groups as donors, e.g. glucose oxidase, lactate dehydrogenase (1.1) [3]  
 9/06 . . acting on nitrogen containing compounds as donors (1.4, 1.5, 1.7) [3]  
 9/08 . . acting on hydrogen peroxide as acceptor (1.11) [3]  
 9/10 . Transferases (2.) (ribonucleases C12N 9/22) [3]  
 9/12 . . transferring phosphorus containing groups, e.g. kinases (2.7) [3]  
 9/14 . Hydrolases (3.) [3]  
 9/16 . . acting on ester bonds (3.1) [3]  
 9/18 . . . Carboxylic ester hydrolases [3]  
 9/20 . . . . Triglyceride splitting, e.g. by means of lipase [3]  
 9/22 . . . Ribonucleases [3]  
 9/24 . . acting on glycosyl compounds (3.2) [3]  
 9/26 . . . acting on alpha-1, 4-glucosidic bonds, e.g. hyaluronidase, invertase, amylase [3]  
 9/28 . . . . Alpha-amylase from microbial source, e.g. bacterial amylase [3]  
 9/30 . . . . Fungal source [3]  
 9/32 . . . . Alpha-amylase from plant source [3]  
 9/34 . . . . Glucoamylase [3]  
 9/36 . . . acting on beta-1, 4 bonds between N-acetylmuramic acid and 2-acetylaminogalactose-2-deoxy-D-glucose, e.g. lysozyme [3]  
 9/38 . . . acting on beta-galactose-glycoside bonds, e.g. beta-galactosidase [3]  
 9/40 . . . acting on alpha-galactose-glycoside bonds, e.g. alpha-galactosidase [3]  
 9/42 . . . acting on beta-1, 4-glucosidic bonds, e.g. cellulase [3]  
 9/44 . . . acting on alpha-1, 6-glucosidic bonds, e.g. isoamylase, pullulanase [3]  
 9/46 . . . . Dextranase [3]  
 9/48 . . acting on peptide bonds, e.g. thromboplastin, leucine aminopeptidase (3.4) [3]  
 9/50 . . . Proteinases [3]  
 9/52 . . . . derived from bacteria [3]  
 9/54 . . . . . bacteria being Bacillus [3]  
 9/56 . . . . . Bacillus subtilis or Bacillus licheniformis [3]  
 9/58 . . . . derived from fungi [3]  
 9/60 . . . . from yeast [3]  
 9/62 . . . . from Aspergillus [3]  
 9/64 . . . . derived from animal tissue, e.g. rennin [3]  
 9/66 . . . Elastase [3]

- 9/68 . . . Plasmin, i.e. fibrinolysin [3]  
 9/70 . . . Streptokinase [3]  
 9/72 . . . Urokinase [3]  
 9/74 . . . Thrombin [3]  
 9/76 . . . Trypsin; Chymotrypsin [3]  
 9/78 . . acting on carbon to nitrogen bonds other than peptide bonds (3.5) [3]  
 9/80 . . . acting on amide bonds in linear amides [3]  
 9/82 . . . . Asparaginase [3]  
 9/84 . . . . Penicillin amidase [3]  
 9/86 . . . acting on amide bonds in cyclic amides, e.g. penicillinase [3]  
 9/88 . Lyases (4.) [3]  
 9/90 . Isomerases (5.) [3]  
 9/92 . . Glucose isomerase [3]  
 9/94 . Pancreatin [3]  
 9/96 . Stabilising an enzyme by forming an adduct or a composition; Forming enzyme conjugates [3]  
 9/98 . Preparation of granular or free-flowing enzyme compositions (C12N 9/96 takes precedence) [3]  
 9/99 . Enzyme inactivation by chemical treatment [3]

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

- 11/02 . Enzymes or microbial cells being immobilised on or in an organic carrier [3]  
 11/04 . . entrapped within the carrier, e.g. gel, hollow fibre [3]  
 11/06 . . attached to the carrier via a bridging agent [3]  
 11/08 . . the carrier being a synthetic polymer [3]  
 11/10 . . the carrier being a carbohydrate [3]  
 11/12 . . . Cellulose or derivatives thereof [3]  
 11/14 . Enzymes or microbial cells being immobilised on or in an inorganic carrier [3]  
 11/16 . Enzymes or microbial cells being immobilised on or in a biological cell [3]  
 11/18 . Multi-enzyme systems [3]

### 13/00 Treatment of micro-organisms or enzymes with electrical or wave energy, e.g. magnetism, sonic waves [3]

### 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 micro-organisms 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]

### Note

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. [3]

- 15/01 . Preparation of mutants without inserting foreign genetic material therein; Screening processes therefor [5]  
 15/02 . Preparation of hybrid cells by fusion of two or more cells, e.g. protoplast fusion [5]

|       |   |   |  |
|-------|---|---|--|
| 15/03 | . . . Bacteria [5]  | 15/45   | . . . . . Paramyxoviridae, e.g. measles virus, mumps virus, Newcastle disease virus, canine distemper virus, rinderpest virus, respiratory syncytial viruses [5] |
| 15/04 | . . . Fungi [5]   | 15/46   | . . . . . Reoviridae, e.g. rotavirus, bluetongue virus, Colorado tick fever virus [5]  |
| 15/05 | . . . Plant cells [5]   | 15/47   | . . . . . Rhabdoviridae, e.g. rabies viruses, vesicular stomatitis virus [5]   |
| 15/06 | . . . Animal cells [5]  | 15/48   | . . . . . Retroviridae, e.g. bovine leukaemia virus, feline leukaemia virus [5]  |
| 15/07 | . . . Human cells [5]   | 15/49   | . . . . . Lentiviridae, e.g. immunodeficiency viruses such as HIV, visna-maedi virus, equine infectious anaemia virus [5]  |
| 15/08 | . . . Cells resulting from interspecies fusion [5]  | 15/50   | . . . . . Coronaviridae, e.g. infectious bronchitis virus, transmissible gastroenteritis virus [5]   |
| 15/09 | . . . Recombinant DNA-technology [5]  | 15/51   | . . . . . Hepatitis viruses [5]  |
| 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 micro-organisms or with enzymes C12P 19/34) [5] | 15/52   | . . . . . Genes encoding for enzymes or proenzymes [5]   |
| 15/11 | . . . DNA or RNA fragments; Modified forms thereof (DNA or RNA not used in recombinant technology C07H 21/00) [5]   | <b>Note</b>   |  |
| 15/12 | . . . . Genes encoding animal proteins [5]  | In this group:  |  |
| 15/13 | . . . . . Immunoglobulins [5]   | – genes encoding for proenzymes are classified with the corresponding genes encoding enzymes;   |  |
| 15/14 | . . . . . Human serum albumins [5]  | – 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. [5] |  |
| 15/15 | . . . . . Protease inhibitors, e.g. antithrombin, antitrypsin, hirudin [5]  | 15/53   | . . . . . Oxidoreductases (1) [5]  |
| 15/16 | . . . . . Hormones [5]  | 15/54   | . . . . . Transferases (2) [5]   |
| 15/17 | . . . . . Insulins [5]  | 15/55   | . . . . . Hydrolases (3) [5]   |
| 15/18 | . . . . . Growth hormones [5]   | 15/56   | . . . . . acting on glycosyl compounds (3.2), e.g. amylase, galactosidase, lysozyme [5]  |
| 15/19 | . . . . . Interferons; Lymphokines; Cytokines [5]   | 15/57   | . . . . . acting on peptide bonds (3.4) [5]  |
| 15/20 | . . . . . Interferons [5]   | 15/58   | . . . . . Plasminogen activators, e.g. urokinase, TPA [5]  |
| 15/21 | . . . . . Alpha-interferons [5]   | 15/59   | . . . . . Chymosin [5]   |
| 15/22 | . . . . . Beta-interferons [5]  | 15/60   | . . . . . Lyases (4) [5]   |
| 15/23 | . . . . . Gamma-interferons [5]   | 15/61   | . . . . . Isomerases (5) [5]   |
| 15/24 | . . . . . Interleukins [5]  | 15/62   | . . . . . DNA sequences coding for fusion proteins [5]   |
| 15/25 | . . . . . Interleukin-1 [5]   | <b>Note</b>   |  |
| 15/26 | . . . . . Interleukin-2 [5]   | In this group, the following term is used with the meaning indicated:   |  |
| 15/27 | . . . . . Colony stimulating factors [5]  | – “fusion” means the fusion of two different proteins. [5]  |  |
| 15/28 | . . . . . Tumor necrosis factors [5]  | 15/63   | . . . Introduction of foreign genetic material using vectors; Vectors; Use of hosts therefor; Regulation of expression [5]                                       |
| 15/29 | . . . . Genes encoding plant proteins, e.g. thaumatin [5]   | 15/64   | . . . General methods for preparing the vector, for introducing it into the cell or for selecting the vector-containing host [5]                                 |
| 15/30 | . . . . Genes encoding protozoal proteins, e.g. from Plasmodium, Trypanosoma, Eimeria [5]   | 15/65   | . . . using markers (enzymes used as markers C12N 15/52) [5]   |
| 15/31 | . . . . Genes encoding microbial proteins, e.g. enterotoxins [5]  |   |  |
| 15/32 | . . . . . Bacillus crystal proteins [5]   |   |  |
| 15/33 | . . . . . Genes encoding viral proteins [5]   |   |  |
| 15/34 | . . . . . Proteins from DNA viruses [5]   |   |  |
| 15/35 | . . . . . Parvoviridae, e.g. feline panleukopenia virus, human parvovirus [5]   |   |  |
| 15/36 | . . . . . Hepadnaviridae [5]  |   |  |
| 15/37 | . . . . . Papovaviridae, e.g. papillomaviruses, polyomavirus, SV40 [5]  |   |  |
| 15/38 | . . . . . Herpetoviridae, e.g. herpes simplex virus, varicella-zoster virus, Epstein-Barr virus, cytomegalovirus, pseudorabies virus [5]  |   |  |
| 15/39 | . . . . . Poxviridae, e.g. vaccinia virus, variola virus [5]  |   |  |
| 15/40 | . . . . . Proteins from RNA viruses, e.g. flaviviruses [5]  |   |  |
| 15/41 | . . . . . Picornaviridae, e.g. rhinovirus, coxsackie viruses, echoviruses, enteroviruses [5]  |   |  |
| 15/42 | . . . . . Foot-and-mouth disease virus [5]  |   |  |
| 15/43 | . . . . . Poliovirus [5]  |   |  |
| 15/44 | . . . . . Orthomyxoviridae, e.g. influenza virus [5]  |   |  |

- 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]

**Note**

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. [5]

- 15/67 . . . General methods for enhancing the expression [5]  
 15/68 . . . Stabilisation of the vector [5]  
 15/69 . . . Increasing the copy number of the vector [5]  
 15/70 . . . Vectors or expression systems specially adapted for E. coli [5]

**Notes**

- (1) This group covers the use of E. coli as host. [5]  
 (2) Shuttle vectors also replicating in E. coli are classified according to the other host. [5]
- 15/71 . . . Expression systems using regulatory sequences derived from the trp-operon [5]  
 15/72 . . . Expression systems using regulatory sequences derived from the lac-operon [5]  
 15/73 . . . Expression systems using phage lambda regulatory sequences [5]  
 15/74 . . . Vectors or expression systems specially adapted for prokaryotic hosts other than E. coli, e.g. Lactobacillus, Micromonospora [5]

**Note**

This group covers the use of prokaryotes as hosts. [5]

- 15/75 . . . for Bacillus [5]  
 15/76 . . . for Actinomycetes; for Streptomyces [5]  
 15/77 . . . for Corynebacterium; for Brevibacterium [5]  
 15/78 . . . for Pseudomonas [5]  
 15/79 . . . Vectors or expression systems specially adapted for eukaryotic hosts [5]

**Note**

This group covers the use of eukaryotes as hosts. [5]

- 15/80 . . . for fungi [5]  
 15/81 . . . for yeasts [5]  
 15/82 . . . for plant cells [5]  
 15/83 . . . Viral vectors, e.g. cauliflower mosaic virus [5]  
 15/84 . . . Ti-plasmids [5]  
 15/85 . . . for animal cells [5]  
 15/86 . . . Viral vectors [5]  
 15/861 . . . Adenoviral vectors [7]  
 15/863 . . . Poxviral vectors, e.g. vaccinia virus [7]  
 15/864 . . . Parvoviral vectors [7]  
 15/866 . . . Baculoviral vectors [7]  
 15/867 . . . Retroviral vectors [7]  
 15/869 . . . Herpesviral vectors [7]  
 15/87 . . . Introduction of foreign genetic material using processes not otherwise provided for, e.g. co-transformation [5]  
 15/88 . . . using micro-encapsulation, e.g. using liposome vesicle [5]  
 15/89 . . . using micro-injection [5]  
 15/90 . . . Stable introduction of foreign DNA into chromosome [5]

**C12P FERMENTATION OR ENZYME-USING PROCESSES TO SYNTHESISE A DESIRED CHEMICAL COMPOUND OR COMPOSITION OR TO SEPARATE OPTICAL ISOMERS FROM A RACEMIC MIXTURE** (fermentation processes to form a food composition A21, A23; compounds in general, see the relevant compound class, e.g. C01, C07; brewing of beer C12C; producing vinegar C12J; processes for producing enzymes C12N 9/00; DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification C12N 15/00) [3]

**Notes**

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

**Note**

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

**Subclass Index****BIOSYNTHESIS OF CHEMICAL SUBSTANCES**

Inorganic compounds .....3/00

**Acyclic or carbocyclic organic**

compounds .....5/00 to 15/00  
 peptides or proteins ..... 21/00  
 Carotenes..... 23/00



|                                      |       |
|--------------------------------------|-------|
| Tetracyclines .....                  | 29/00 |
| Prostaglandins.....                  | 31/00 |
| Steroids .....                       | 33/00 |
| Heterocyclic organic compounds ..... | 17/00 |
| containing saccharide radicals.....  | 19/00 |
| Riboflavin .....                     | 25/00 |

|                                    |              |
|------------------------------------|--------------|
| Giberellin.....                    | 27/00        |
| Cephalosporin; penicillin .....    | 35/00; 37/00 |
| SEPARATION OF OPTICAL ISOMERS..... | 41/00        |
| OTHER PROCESSES FOR BIOSYNTHESIS   |              |
| PREPARATIONS .....                 | 1/00, 39/00  |

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

- 1/02 . by using fungi [3]
- 1/04 . by using bacteria [3]
- 1/06 . by using actinomycetales [3]

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

**5/00 Preparation of hydrocarbons [3]**

- 5/02 . acyclic (producing methane by anaerobic treatment of sludge C02F 11/04) [3]

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

- 7/02 . containing a hydroxy group [3]
- 7/04 . . acyclic [3]
- 7/06 . . . Ethanol, i.e. non-beverage [3]
- 7/08 . . . . produced as by-product or from waste or cellulosic material substrate [3]
- 7/10 . . . . . substrate containing cellulosic material [3]
- 7/12 . . . . . substrate containing sulfite waste liquor or citrus waste [3]
- 7/14 . . . . . Multiple stages of fermentation; Multiple types of micro-organisms or reuse for micro-organisms [3]
- 7/16 . . . Butanols [3]
- 7/18 . . . polyhydric [3]
- 7/20 . . . . Glycerol [3]
- 7/22 . . aromatic [3]
- 7/24 . containing a carbonyl group [3]
- 7/26 . . Ketones [3]
- 7/28 . . . Acetone-containing products [3]
- 7/30 . . . . produced from substrate containing inorganic compounds other than water [3]
- 7/32 . . . . produced from substrate containing inorganic nitrogen source [3]
- 7/34 . . . . produced from substrate containing protein as nitrogen source [3]
- 7/36 . . . . produced from substrate containing grain or cereal material [3]
- 7/38 . . . Cyclopentanone- or cyclopentadione-containing products [3]
- 7/40 . containing a carboxyl group [3]
- 7/42 . . Hydroxy carboxylic acids [3]
- 7/44 . . Polycarboxylic acids [3]
- 7/46 . . . Dicarboxylic acids having four or less carbon atoms, e.g. fumaric acid, maleic acid [3]
- 7/48 . . . Tricarboxylic acids, e.g. citric acid [3]
- 7/50 . . . having keto groups, e.g. 2-ketoglutaric acid [3]
- 7/52 . . Propionic acid; Butyric acids [3]
- 7/54 . . Acetic acid (vinegar C12J) [3]
- 7/56 . . Lactic acid [3]

- 7/58 . . Aldonic, ketoaldonic or saccharic acids (uronic acids C12P 19/00) [3]

- 7/60 . . . 2-Ketogulonic acid [3]

- 7/62 . Carboxylic acid esters [3]

- 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]

- 7/66 . containing the quinoid structure [3]

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

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

**13/00 Preparation of nitrogen-containing organic compounds [3]**

- 13/02 . Amides, e.g. chloramphenicol [3]
- 13/04 . Alpha- or beta-amino acids [3]
- 13/06 . . Alanine; Leucine; Isoleucine; Serine; Homoserine [3]
- 13/08 . . Lysine; Diaminopimelic acid; Threonine; Valine [3]
- 13/10 . . Citrulline; Arginine; Ornithine [3]
- 13/12 . . Methionine; Cysteine; Cystine [3]
- 13/14 . . Glutamic acid; Glutamine [3]
- 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]
- 13/18 . . . using biotin or its derivatives [3]
- 13/20 . . Aspartic acid; Asparagine [3]
- 13/22 . . Tryptophan; Tyrosine; Phenylalanine; 3,4-Dihydroxyphenylalanine [3]
- 13/24 . . Proline; Hydroxyproline; Histidine [3]

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

**17/00 Preparation of heterocyclic carbon compounds with only O, N, S, Se, or Te as ring hetero atoms (C12P 13/04 to C12P 13/24 take precedence) [3]**

- 17/02 . Oxygen as only ring hetero atoms [3]
- 17/04 . . containing a five-membered hetero ring, e.g. griseofulvin [3]
- 17/06 . . containing a six-membered hetero ring, e.g. fluorescein [3]
- 17/08 . . containing a hetero ring of at least seven ring members, e.g. zearalenone, macrolide aglycons [3]
- 17/10 . Nitrogen as only ring hetero atom [3]
- 17/12 . . containing a six-membered hetero ring [3]
- 17/14 . Nitrogen or oxygen as hetero atom and at least one other diverse hetero ring atom in the same ring [3]
- 17/16 . containing two or more hetero rings [3]
- 17/18 . containing at least two hetero rings condensed among themselves or condensed with a common carbocyclic ring system, e.g. rifamycin [3]

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

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

- 19/02 . Monosaccharides (2-ketogulonic acid C12P 7/60) [3]
- 19/04 . Polysaccharides, i.e. compounds containing more than five saccharide radicals attached to each other by glycosidic bonds [3]
- 19/06 . . Xanthan, i.e. Xanthomonas-type heteropolysaccharides [3]
- 19/08 . . Dextran [3]
- 19/10 . . Pullulan [3]
- 19/12 . Disaccharides [3]
- 19/14 . produced by the action of a carbohydrase, e.g. by alpha-amylase [3]
- 19/16 . produced by the action of an alpha-1, 6-glucosidase, e.g. amylose, debranched amylopectin (non-biological hydrolysis of starch C08B 30/00) [3]
- 19/18 . produced by the action of a glycosyl transferase, e.g. alpha-, beta- or gamma-cyclodextrins [3]
- 19/20 . produced by the action of an exo-1, 4 alpha-glucosidase, e.g. dextrose [3]
- 19/22 . produced by the action of a beta-amylase, e.g. maltose [3]
- 19/24 . produced by the action of an isomerase, e.g. fructose [3]
- 19/26 . Preparation of nitrogen-containing carbohydrates [3]
- 19/28 . . N-glycosides [3]
- 19/30 . . . Nucleotides [3]
- 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]
- 19/34 . . . . Polynucleotides, e.g. nucleic acids, oligoribonucleotides [3]
- 19/36 . . . . Dinucleotides, e.g. nicotineamide-adenine dinucleotide phosphate [3]
- 19/38 . . . Nucleosides [3]
- 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]
- 19/42 . . . Cobalamins, i.e. vitamin B<sub>12</sub>, LLD factor [3]
- 19/44 . Preparation of O-glycosides, e.g. glucosides [3]
- 19/46 . . having an oxygen atom of the saccharide radical bound to a cyclohexyl radical, e.g. kasugamycin [3]
- 19/48 . . . the cyclohexyl radical being substituted by two or more nitrogen atoms, e.g. destomycin, neamin [3]
- 19/50 . . . . having two saccharide radicals bound through only oxygen to adjacent ring carbon atoms of the cyclohexyl radical, e.g. ambutyrosin, ribostamycin [3]
- 19/52 . . . . . containing three or more saccharide radicals, e.g. neomycin, lividomycin [3]
- 19/54 . . . the cyclohexyl radical being bound directly to a nitrogen atom of two or more
 

$$\begin{array}{c} >N-C-N< \\ || \\ N \end{array}$$

 radicals, e.g. streptomycin [3]

- 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]
- 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]
- 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]
- 19/62 . . . the hetero ring having eight or more ring members and only oxygen as ring hetero atoms, e.g. erythromycin, spiramycin, nystatin [3]
- 19/64 . Preparation of S-glycosides, e.g. lincomycin [3]
- 21/00 Preparation of peptides or proteins** (single-cell protein C12N 1/00) [3]
- 21/02 . having a known sequence of two or more amino acids, e.g. glutathione [3]
- 21/04 . . Cyclic or bridged peptides or polypeptides, e.g. bacitracin (cyclised by -S-S-bonds only C12P 21/02) [3]
- 21/06 . produced by the hydrolysis of a peptide bond, e.g. hydrolysate products (preparing foodstuffs by protein hydrolysis A23J 3/00) [3]
- 21/08 . Monoclonal antibodies [5]
- 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]
- 25/00 Preparation of compounds containing alloxazine or isoalloxazine nucleus, e.g. riboflavin** [3]
- 27/00 Preparation of compounds containing a gibbane ring system, e.g. gibberellin** [3]
- 29/00 Preparation of compounds containing a naphthacene ring system, e.g. tetracycline** (C12P 19/00 takes precedence) [3]
- 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]
- 33/00 Preparation of steroids** [3]

**Note**

Attention is drawn to Note (1) following the title of subclass C07J, which explains what is covered by the term "steroids". [3]

**Note**

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

- “acting”, “forming”, “hydroxylating”, “dehydroxylating” or “dehydrogenating” means the action of a micro-organism or enzyme rather than other chemical action. [3]

- 33/02 . Dehydrogenating; Dehydroxylating [3]
- 33/04 . . Forming an aryl ring from A ring [3]
- 33/06 . Hydroxylating [3]
- 33/08 . . at 11 position [3]
- 33/10 . . . at 11 $\alpha$ -position [3]
- 33/12 . Acting on D ring [3]
- 33/14 . . Hydroxylating at 16 position [3]
- 33/16 . . Acting at 17 position [3]
- 33/18 . . . Hydroxylating at 17 position [3]
- 33/20 . containing heterocyclic rings [3]

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

- 35/02 . by desacylation of the substituent in the 7 position [3]
- 35/04 . by acylation of the substituent in the 7 position [3]
- 35/06 . Cephalosporin C; Derivatives thereof [3]
- 35/08 . disubstituted in the 7 position [3]

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

- 37/02 . in presence of phenylacetic acid or phenylacetamide or their derivatives [3]
- 37/04 . by acylation of the substituent in the 6 position [3]
- 37/06 . by desacylation of the substituent in the 6 position [3]

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

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

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

**Notes**

- (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 to G01N 29/00, which is covered by subclass G01N. [3]
- (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]
- (3) Attention is drawn to Notes (1) to (3) following the title of class C12. [4]
- (4) In this subclass, test media are classified in the appropriate group for the relevant test process. [3]

**Note**

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

**1/00 Measuring or testing processes involving enzymes or micro-organisms** (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]**

- 1/02 . involving viable micro-organisms [3]
- 1/04 . . Determining presence or kind of micro-organism; Use of selective media for testing antibiotics or bacteriocides; Compositions containing a chemical indicator therefor [3]
- 1/06 . . . Quantitative determination [3]
- 1/08 . . . . using multifield media [3]
- 1/10 . . . Enterobacteria [3]
- 1/12 . . . Nitrate to nitrite reducing bacteria [3]
- 1/14 . . . Streptococcus; Staphylococcus [3]
- 1/16 . . . using radioactive material [3]
- 1/18 . . Testing for antimicrobial activity of a material [3]
- 1/20 . . . using multifield media [3]
- 1/22 . . Testing for sterility conditions [3]
- 1/24 . . Methods of sampling, or inoculating or spreading a sample; Methods of physically isolating an intact micro-organism [3]
- 1/25 . involving enzymes not classifiable in groups C12Q 1/26 to C12Q 1/70 [5]

- 1/26 . involving oxidoreductase [3]
- 1/28 . . involving peroxidase [3]
- 1/30 . . involving catalase [3]
- 1/32 . . involving dehydrogenase [3]
- 1/34 . involving hydrolase [3]
- 1/37 . . involving peptidase or proteinase [5]
- 1/40 . . involving amylase [3]
- 1/42 . . involving phosphatase [3]
- 1/44 . . involving esterase [3]
- 1/46 . . . involving cholinesterase [3]
- 1/48 . involving transferase [3]
- 1/50 . . involving creatine phosphokinase [3]
- 1/52 . . involving transaminase [3]
- 1/527 . involving lyase [5]
- 1/533 . involving isomerase [5]
- 1/54 . involving glucose or galactose [3]
- 1/56 . involving blood clotting factors, e.g. involving thrombin, thromboplastin, fibrinogen [3]
- 1/58 . involving urea or urease [3]
- 1/60 . involving cholesterol [3]
- 1/61 . involving triglycerides [5]
- 1/62 . involving uric acid [3]
- 1/64 . Geomicrobiological testing, e.g. for petroleum [3]

1/66 . involving luciferase [3]

1/68 . involving nucleic acids [3]

1/70 . involving virus or bacteriophage [3]

**3/00 Condition-responsive control processes** (apparatus therefor C12M 1/36; controlling or regulating in general G05) [3]

## **C12R INDEXING SCHEME ASSOCIATED WITH SUBCLASSES C12C TO C12Q OR C12S, RELATING TO MICRO-ORGANISMS [3]**

### **Notes**

- (1) This subclass constitutes an indexing scheme associated with the other subclasses of class C12, relating to micro-organisms used in the processes classified in subclasses C12C to C12Q or C12S. [3]
- (2) The bacteria terminology is based on “Bergey’s Manual of Determinative Bacteriology”, Eighth Edition, 1975. [3]

|   |  |
|---|--|
| <b>1/00 Micro-organisms [3]</b>             | <b>1/325 . . . Mycobacterium avium [3]</b>       |
| 1/01 . Bacteria or actinomycetales [3]      | 1/33 . . . Mycobacterium fortuitum [3]           |
| 1/02 . . Acetobacter [3]                    | 1/34 . . . Mycobacterium smegmatis [3]           |
| 1/025 . . Achromobacter [3]                 | 1/35 . . Mycoplasma [3]                          |
| 1/03 . . Actinomadura [3]                   | 1/36 . . Neisseria [3]                           |
| 1/04 . . Actinomyces [3]                    | 1/365 . . Nocardia [3]                           |
| 1/045 . . Actinoplanes [3]                  | 1/37 . . Proteus [3]                             |
| 1/05 . . Alcaligenes [3]                    | 1/38 . . Pseudomonas [3]                         |
| 1/06 . . Arthrobacter [3]                   | 1/385 . . . Pseudomonas aeruginosa [3]           |
| 1/065 . . Azotobacter [3]                   | 1/39 . . . Pseudomonas fluorescens [3]           |
| 1/07 . . Bacillus [3]                       | 1/40 . . . Pseudomonas putida [3]                |
| 1/08 . . . Bacillus brevis [3]              | 1/41 . . Rhizobium [3]                           |
| 1/085 . . . Bacillus cereus [3]             | 1/42 . . Salmonella [3]                          |
| 1/09 . . . Bacillus circulans [3]           | 1/425 . . Serratia [3]                           |
| 1/10 . . . Bacillus licheniformis [3]       | 1/43 . . . Serratia marcescens [3]               |
| 1/11 . . . Bacillus megaterium [3]          | 1/44 . . Staphylococcus [3]                      |
| 1/12 . . . Bacillus polymyxa [3]            | 1/445 . . . Staphylococcus aureus [3]            |
| 1/125 . . . Bacillus subtilis [3]           | 1/45 . . . Staphylococcus epidermidis [3]        |
| 1/13 . . Brevibacterium [3]                 | 1/46 . . Streptococcus [3]                       |
| 1/14 . . Chainia [3]                        | 1/465 . . Streptomyces [3]                       |
| 1/145 . . Clostridium [3]                   | 1/47 . . . Streptomyces albus [3]                |
| 1/15 . . Corynebacterium [3]                | 1/48 . . . Streptomyces antibioticus [3]         |
| 1/16 . . . Corynebacterium diphtheriae [3]  | 1/485 . . . Streptomyces aureofaciens [3]        |
| 1/165 . . . Corynebacterium poinsettiae [3] | 1/49 . . . Streptomyces aureus [3]               |
| 1/17 . . . Corynebacterium pyogenes [3]     | 1/50 . . . Streptomyces bikiniensis [3]          |
| 1/18 . . Erwinia [3]                        | 1/51 . . . Streptomyces candidus [3]             |
| 1/185 . . Escherichia [3]                   | 1/52 . . . Streptomyces chartreusis [3]          |
| 1/19 . . . Escherichia coli [3]             | 1/525 . . . Streptomyces diastatochromogenes [3] |
| 1/20 . . Flavobacterium [3]                 | 1/53 . . . Streptomyces filipinensis [3]         |
| 1/21 . . Haemophilus [3]                    | 1/54 . . . Streptomyces fradiae [3]              |
| 1/22 . . Klebsiella [3]                     | 1/545 . . . Streptomyces griseus [3]             |
| 1/225 . . Lactobacillus [3]                 | 1/55 . . . Streptomyces hygroscopicus [3]        |
| 1/23 . . . Lactobacillus acidophilus [3]    | 1/56 . . . Streptomyces lavendulae [3]           |
| 1/24 . . . Lactobacillus brevis [3]         | 1/565 . . . Streptomyces lincolnensis [3]        |
| 1/245 . . . Lactobacillus casei [3]         | 1/57 . . . Streptomyces noursei [3]              |
| 1/25 . . . Lactobacillus plantarum [3]      | 1/58 . . . Streptomyces olivaceus [3]            |
| 1/26 . . Methylomonas [3]                   | 1/585 . . . Streptomyces platensis [3]           |
| 1/265 . . Micrococcus [3]                   | 1/59 . . . Streptomyces rimosus [3]              |
| 1/27 . . . Micrococcus flavus [3]           | 1/60 . . . Streptomyces sparsogenes [3]          |
| 1/28 . . . Micrococcus glutamicus [3]       | 1/61 . . . Streptomyces venezuelae [3]           |
| 1/285 . . . Micrococcus lysodeikticus [3]   | 1/62 . . Streptosporangium [3]                   |
| 1/29 . . Micromonospora [3]                 | 1/625 . . Streptoverticillium [3]                |
| 1/30 . . . Micromonospora chalybeata [3]    | 1/63 . . Vibrio [3]                              |
| 1/31 . . . Micromonospora purpurea [3]      | 1/64 . . Xanthomonas [3]                         |
| 1/32 . . Mycobacterium [3]                  | 1/645 . Fungi [3]                                |

|       |   |       |  |
|-------|---|-------|--|
| 1/65  | . . Absidia [3]                         | 1/79  | . . Paecilomyces [3]                   |
| 1/66  | . . Aspergillus [3]                     | 1/80  | . . Penicillium [3]                    |
| 1/665 | . . . Aspergillus awamori [3]           | 1/81  | . . . Penicillium brevi [3]            |
| 1/67  | . . . Aspergillus flavus [3]            | 1/82  | . . . Penicillium chrysogenum [3]      |
| 1/68  | . . . Aspergillus fumigatus [3]         | 1/825 | . . . Penicillium notatum [3]          |
| 1/685 | . . . Aspergillus niger [3]             | 1/83  | . . . Penicillium patulum [3]          |
| 1/69  | . . . Aspergillus oryzae [3]            | 1/84  | . . Pichia [3]                         |
| 1/70  | . . . Aspergillus ustus [3]             | 1/845 | . . Rhizopus [3]                       |
| 1/71  | . . . Aspergillus wentii [3]            | 1/85  | . . Saccharomyces [3]                  |
| 1/72  | . . Candida [3]                         | 1/86  | . . . Saccharomyces carlsbergensis [3] |
| 1/725 | . . . Candida albicans [3]              | 1/865 | . . . Saccharomyces cerevisiae [3]     |
| 1/73  | . . . Candida lipolytica [3]            | 1/87  | . . . Saccharomyces lactis [3]         |
| 1/74  | . . . Candida tropicalis [3]            | 1/88  | . . Torulopsis [3]                     |
| 1/745 | . . Cephalosporium [3]                  | 1/885 | . . Trichoderma [3]                    |
| 1/75  | . . . Cephalosporium acremonium [3]     | 1/89  | . Algae [3]                            |
| 1/76  | . . . Cephalosporium coeruleum [3]      | 1/90  | . Protozoa [3]                         |
| 1/765 | . . . Cephalosporium crotocinigenum [3] | 1/91  | . Cell lines [3,7]                     |
| 1/77  | . . Fusarium [3]                        | 1/92  | . Viruses [5,7]                        |
| 1/78  | . . Hansenula [3]                       | 1/93  | . . Animal viruses [7]                 |
| 1/785 | . . Mucor [3]                           | 1/94  | . . Plant viruses [7]                  |

**C12S PROCESSES USING ENZYMES OR MICRO-ORGANISMS TO LIBERATE, SEPARATE OR PURIFY A PRE-EXISTING COMPOUND OR COMPOSITION** (biological treatment of water, waste water, or sewage C02F 3/00, of sludge C02F 11/02; processes using enzymes or micro-organisms to separate optical isomers from a racemic mixture C12P 41/00); **PROCESSES USING ENZYMES OR MICRO-ORGANISMS TO TREAT TEXTILES OR TO CLEAN SOLID SURFACES OF MATERIALS** [5]

#### Notes

- (1) This subclass covers processes already provided for in:
  - Section A: A21, A23, A61L, A62D;
  - Section B: B01D, B08B, B09C;
  - Section C: C01, C05F, C08, C09B, C09H, C10G, C13, C14C, C21B, C22B, C23F, C23G;
  - Section D: D01C, D01F, D06L, D06M, D06P, D21C, D21H;
  - Section E: E21B;
  - Section F: F24F, F24J, F26B;
  - Section H: H01M.
 This subclass is intended to provide a basis for a complete search to be made with respect to the subject matter defined by the subclass title and, therefore, all relevant information is classified in this subclass, even if classified elsewhere.
- (2) Attention is drawn to Notes (2) and (3) following the title of class C12. [5]
- (3) *In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place.* [2009.01]
- (4) The classification symbols of this subclass are not listed first when printed on patent documents. [5]

#### Note

In this subclass, it is desirable to add the indexing codes of subclass C12R. [6]

|      |  |       |  |
|------|--|-------|--|
| 1/00 | <b>Treatment of petroleum oils, shale oils or sand oils</b> [5]      | 3/18  | . Recovery or purification of glyceridic oils, fats, ester-type waxes or fatty acids [5] |
| 1/02 | . Desulfurising [5]  | 3/20  | . Removal of nucleic acids from intact or disrupted cells [5]                            |
| 3/00 | <b>Treatment of animal or plant materials or micro-organisms</b> [5] | 3/22  | . Treatment of blood fractions [5]   |
| 3/02 | . Recovery or purification of carbohydrate material [5]              | 3/24  | . Treatment of animal secretions or organs [5]   |
| 3/04 | . . Cellulose, e.g. plant fibres [5]                                 | 5/00  | <b>Treatment of emulsions, gases or foams</b> [5]  |
| 3/06 | . . . Treatment of hemp or flax [5]                                  | 7/00  | <b>Treatment of hides, e.g. depilating, bating</b> [5]                                   |
| 3/08 | . . . in the production of paper pulp [5]                            | 9/00  | <b>Cleaning solid surfaces of materials</b> [5]  |
| 3/10 | . . Treatment of sugar or molasses [5]                               | 11/00 | <b>Treatment of textiles, e.g. cleaning</b> [5]  |
| 3/12 | . . Treatment of pectin or starch [5]                                | 13/00 | <b>Processes not provided for in groups C12S 1/00 to C12S 11/00</b> [5]                  |
| 3/14 | . Recovery or purification of proteinaceous material [5]             |       |  |
| 3/16 | . . Collagen or gelatin [5]  |       |  |