COOPERATIVE PATENT CLASSIFICATION

CHEMISTRY; METALLURGY

CHEMISTRY

BIOCHEMISTRY; BEER; SPIRITS; WINE; VINEGAR; MICROBIOLOGY; ENZYMEOLOGY; MUTATION OR GENETIC ENGINEERING

MEASURING OR TESTING PROCESSES INVOLVING ENZYMES, NUCLEIC ACIDS OR MICROORGANISMS; COMPOSITIONS OR TEST PAPERS THEREOF; PROCESSES OF PREPARING SUCH COMPOSITIONS; CONDITION-RESPONSIVE CONTROL IN MICROBIOLOGICAL OR ENZYMEOLOGICAL PROCESSES

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 - 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. Documents describing the use of an electrode for analysis of a specific analyte are classified in C12Q 1/001 or subgroups and not according to the last place rule.
6. Documents relating to new peptides, e.g. enzymes, or new DNA or its corresponding mRNA, encoding for the peptides, and their use in measuring or testing processes are classified in subclass C07K or in group C12N 9/00 according to the peptides, with the appropriate indexing codes relating to their use in diagnostics. However where the new nucleic acids are principally used in diagnostic processes, e.g. PCR, hybridisation reactions, the documents are also classified in group C12Q 1/68.
7. When classifying in groups C12Q 1/68 - C12Q 1/70 it is desirable to classify with symbols from groups C12Q 2500/00 - C12Q 2565/634, relating to relevant technical features of the invention, using Combination Sets.
8. In groups C12Q 1/6876 - C12Q 1/6895 and C12Q 1/70 - C12Q 1/708 it is desirable to add the indexing codes C12Q 2600/00 - C12Q 2600/178 which reflect the use of the product in combination with the virus groups only if the application refers to products.

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

1/001 (Enzyme electrodes)
1/002 (Electrode membranes)
1/003 (Functionalisation)
1/004 (mediator-assisted)
1/005 (involving specific analytes or enzymes (including groups of enzymes, e.g. oxidases; C12Q 1/004 takes precedence))
1/006 (for glucose)
1/007 (involving isoenzyme profiles (for detection of an individual isoenzyme C12Q 1/25 - C12Q 1/66))
1/008 (for determining co-enzymes or co-factors, e.g. NAD, ATP)
1/02 (involving viable microorganisms)
1/025 (for testing or evaluating the effect of chemical or biological compounds, e.g. drugs, cosmetics (antimicrobial activity C12Q 1/18))

1/04 . . Determining presence or kind of microorganism; Use of selective media for testing antibiotics or bacteriocides; Compositions containing a chemical indicator therefor ((C12Q 1/6897 takes precedence))
1/045 . . (Culture media therefor)
1/06 . . Quantitative determination
1/08 . . using multifield media
1/10 . . Enterobacteria
1/12 . . Nitrate to nitrite reducing bacteria
1/14 . . Streptococcus; Staphylococcus
1/16 . . using radioactive material
1/18 . . Testing for antimicrobial activity of a material
1/20 . . using multifield media
1/22 . . Testing for sterility conditions
1/24 . . Methods of sampling, or inoculating or spreading a sample; Methods of physically isolating an intact microorganisms
1/25 . . involving enzymes not classifiable in groups C12Q 1/26 - C12Q 1/66
1/26 . . involving oxidoreductase
1/28 . . involving peroxidase
NOTE

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)
1/6806 . . . Preparing nucleic acids for analysis, e.g. for polymerase chain reaction [PCR] assay (C12Q 1/6804 takes precedence)
1/6809 . . . Methods for determination or identification of nucleic acids involving differential detection
1/6811 . . . Selection methods for production or design of target specific oligonucleotides or binding molecules
1/6813 . . . Hybridisation assays
1/6816 . . . . . . characterised by the detection means (C12Q 1/6804 takes precedence)
1/6818 . . . . . . involving interaction of two or more labels, e.g. resonant energy transfer
1/682 . . . . . . Signal amplification
1/6823 . . . . . . Release of bound markers
1/6825 . . . . . . Nucleic acid detection involving sensors
1/6827 . . . . . . for detection of mutation or polymorphism
1/683 . . . . . . involving restriction enzymes, e.g. restriction fragment length polymorphism [RFLP]
1/6832 . . . . . . Enhancement of hybridisation reaction
1/6834 . . . . . . Enzymatic or biochemical coupling of nucleic acids to a solid phase
1/6837 . . . . . . using probe arrays or probe chips (C12Q 1/6874 takes precedence)
1/6839 . . . . . . Triple helix formation or other higher order conformations in hybridisation assays
1/6841 . . . . . . In situ hybridisation
1/6844 . . . . . . Nucleic acid amplification reactions [Common amplification features]
1/6848 . . . . . . characterised by the means for preventing contamination or increasing the specificity or sensitivity of an amplification reaction
1/6851 . . . . . . Quantitative amplification
1/6853 . . . . . . using modified primers or templates
1/6855 . . . . . . Ligating adaptors
1/6858 . . . . . . Allele-specific amplification
1/686 . . . . . . Polymerase chain reaction [PCR]
1/6862 . . . . . . Ligase chain reaction [LCR]
1/6865 . . . . . . Promoter-based amplification, e.g. nucleic acid sequence amplification [NASBA], self-sustained sequence replication [3SR] or transcription-based amplification system [TAS]
1/6867 . . . . . . Replicase-based amplification, e.g. using Q-beta replicase
1/6869 . . . . . . Methods for sequencing
1/6872 . . . . . . involving mass spectrometry
1/6874 . . . . . . involving nucleic acid arrays, e.g. sequencing by hybridisation
1/6876 . . . . . . Nucleic acid products used in the analysis of nucleic acids, e.g. primers or probes
1/6879 . . . . . . for sex determination
1/6881 . . . . . . for tissue or cell typing, e.g. human leukocyte antigen [HLA] probes
1/6883 . . . . . . for diseases caused by alterations of genetic material
1/6886 . . . . . . for cancer (immunoassay for cancer G01N 33/574)
1/6888 . . . . . . for detection or identification of organisms
1/689 . . . . . . for bacteria
1/6893 . . . . . . for protozoa
1/6895 . . . . . . for plants, fungi or algae
1/6897 . . . . . . involving reporter genes operably linked to promoters
1/70 . . . . . . involving virus or bacteriophage
1/701 . . . . . . { Specific hybridization probes }
1/702 . . . . . . { for retroviruses }
1/703 . . . . . . { Viruses associated with AIDS }
1/705 . . . . . . { for herpetoviridae, e.g. herpes simplex, varicella zoster }
1/706 . . . . . . { for hepatitis }
1/707 . . . . . . { non-A, non-B Hepatitis, excluding hepatitis D }
1/708 . . . . . . { for papilloma }

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

2304/00 Chemical means of detecting microorganisms (hydrolase substrates C12Q 2334/00; peptidase substrates C12Q 2337/00)

2304/10 . . . . . . DNA staining
2304/12 . . . . . . Ethidium
2304/13 . . . . . . Propidium
2304/16 . . . . . . Acridine orange
2304/18 . . . . . . Thionin-type dyes, e.g. Azure, Toluidine Blue
2304/20 . . . . . . Redox indicators
2304/22 . . . . . . Resazurin; Resorufin
2304/24 . . . . . . Tetrazolium; Formazan
2304/26 . . . . . . Quinone; Quinol
2304/40 . . . . . . Detection of gases
2304/44 . . . . . . Oxygen
Reaction characterised by the enzymatic activity

**2326/00 Chromogens for determinations of oxidoreductase enzymes**
- Benzidines
- 3,3',5,5'-Tetramethylbenzidine, i.e. TMB
- Ortho-Tolidine, i.e. 3,3'-dimethyl-1,1'-biphenyl-4,4'-diamine
- Ortho-Phenylenediamine
- 2,2’-Azinobis (3-ethylbenzothiazoline-6-sulfonic acid), i.e. ABTS
- Phenols; Naphthols; Catechols
- 3-Methyl-2-benzothiazolinone hydrazone hydrochloride hydrate, i.e. MBTH
- Triphenylmethane dye chromogens, e.g. fluorescein derivatives
- Phosphatase
- Glycosylase
- Protease
- Deaminase
- Immobilised enzyme(s)

**2324/00 O-linked chromogens for determinations of hydrolase enzymes, e.g. glycosidases, phosphatases, esterases**
- p-Nitrophenol derivatives
- Coumarin derivaties
- 4-Methylumbelliferyl, i.e. beta-methylumbelliforone, 4MU
- Naphthol derivatives, e.g. alpha-naphthyl-esters, i.e. alpha-NE, beta-naphthyl-esters, i.e. beta-NE
- Triphenylmethane dye chromogens, e.g. fluorescein derivatives
- Indoles
- 5-Bromo-4-chloro-3-indolyl, i.e. BCI
- the product, e.g. phenol, naphthol being diazotised in situ, e.g. with Fast Red

**2337/00 N-linked chromogens for determinations of peptidases and proteinases**
- Anilides
- Para-Nitroanilides p-NA
- Coumarin derivatives
- 7-Amino-4-methylcoumarin, i.e. AMC, MCA
- 7-Amino-4-trifluoromethylcoumarin, i.e. AFC
- Naphthyl amides, e.g. beta-NA, 2-NA, 4-methoxy-beta-naphthylamine, i.e. 4MNA
- Rhodamine derivatives
- Indoles
- 5-Bromo-4-chloro-3-indolyl, i.e. BCI

**2500/00 Analytical methods involving nucleic acids**

**2520/00 Reactions involving nucleic acids**
- Reaction characterised by the enzymatic activity
- Nucleotidyl transfering
- DNA polymerase
- RNA dependent DNA polymerase, (i.e. reverse transcriptase)
- Telomerase
- RNA polymerase
- Methyl transferase, i.e. methylase

**2521/00 Modifications characterised by**
- Terminal transferase
- Phosphoric diester hydrolysing, i.e. nuclease
- Endonuclease
- Single strand endonuclease
- Type II endonucleases, i.e. cutting outside recognition site
- Exonuclease
- Single stranded exonuclease
- RNAse, e.g. RNaseH
- Methylation site specific nuclease
- Ribozyme
- Abzyme
- DNAzyme
- Other enzymatic activities
- Ligase
- Recombinase
- Winding/unwinding enzyme, e.g. helicase
- Mismatch repair protein
- Topoisomerase
- Phosphatase
- Glycosylase
- Protease
- Deaminase
- Immobilised enzyme(s)

**2523/00 Reactions characterised by treatment of reaction samples**
- Characterised by chemical treatment
- Crosslinking agents, e.g. psoralen
- Chemical cleaving agents
- chemical ligation between nucleic acids
- Denaturing agents
- oxidising agents
- Renaturing agents
- Bisulfite(s)
- Characterised by physical treatment
- Sonication
- Applying a physical force on a nucleic acid
- Denaturation or renaturation by physical action
- Denaturation or renaturation by electric current/voltage
- Adsorption or desorption
- Electrostatic interactions, e.g. use of cationic polymers in hybridisation reactions
- Irradiation, e.g. UV irradiation
- Photocleavage, photolysis, photoactivation
- Centrifugation

**2525/00 Reactions involving modified oligonucleotides, nucleic acids, or nucleotides**
- Modifications characterised by
- incorporating non-naturally occurring nucleotides, e.g. inosine
- incorporating a peptide nucleic acid
- incorporating modified backbone
- incorporating modified base
- incorporating abasic sites
Reactions of nucleic acids characterised by

- Analysis of gene expression or genome comparison
  - The purpose being sequence identification by
    - Probe or oligonucleotide ligation
    - Linear amplification, i.e. non exponential amplification
    - Circular oligonucleotides
    - Hairpin oligonucleotides
    - Circular oligonucleotides
    - Branched oligonucleotides

Reactions demanding special reaction conditions

- Temperature
- Temperature of melting, i.e. Tm
- Pressure
- Time
- pH
- Specific component of sample, medium or buffer
- the enzyme inhibitor or activator used
- Concentration of a component of medium
- Concentration of primer or probe
- Concentration of target or template
- Concentration of an enzyme
- Gradients
- Viscosity
- Permeability

Reactions of nucleic acids characterised by

- the purpose being amplify/increase the copy number of target nucleic acid
  - Linear amplification, i.e. non exponential amplification
  - Probe or oligonucleotide ligation
  - PCR
  - Strand displacement amplification [SDA]
  - Rolling circle
  - Inverse PCR
  - Ligase Chain Reaction [LCR]

Promoter based amplification, e.g. NASBA, 3SR, TAD
Replicate based amplification, e.g. Q beta replicase

Reactions characterised by the enzymatic reaction principle used

- the purpose being to increase the length of an oligonucleotide strand
  - Primer extension
  - Probe or oligonucleotide ligation

Reactions characterised by the assay type for determining the identity of a nucleotide base or a sequence of oligonucleotides

- Sanger sequencing method, i.e. oligonucleotide sequencing using primer elongation and dideoxynucleotides as chain terminators
- Maxam and Gilbert method, i.e. sequential release and detection of nucleotides
- Cycle sequencing
- Double strand sequencing
- Massive parallel sequencing
- Allele specific primer extension
- Allele specific probes
- Amplification Refractory Mutation System [ARMS]
- Amplified fragment length polymorphism [AFLP]
- Random amplification polymorphism detection [RAPD]

Reactions characterised by the reaction format or use of a specific feature

- the purpose or use of
  - Homogeneous assay format, e.g. one pot reaction
  - Homoduplex formation
  - Heteroduplex formation
  - Triple helix formation
  - Sandwich assay format
  - Multiplexing, i.e. use of multiple primers or probes in a single reaction, usually for simultaneous analysis of multiple samples

Sequential reactions
- Cyclic reactions
- A reaction step characterised by the number of molecules incorporated or released
- Reduction of complexity, e.g. amplification of subsets, removing duplicated genomic regions
- Assays for determining copy number or wherein the copy number is of special importance
- A competitive reaction step
- Helper probe
- blocking probe
- Methylation detection other than bisulfite or methylation sensitive restriction endonucleases
- Mathematical modelling, e.g. logarithm, ratio

Reactions characterised by analysis of gene expression or genome comparison

- The purpose being sequence identification by analysis of gene expression or genome comparison characterised by
- Subtraction analysis
C12Q

2539/103 . . Serial analysis of gene expression [SAGE]
2539/105 . . Involving introns, exons, or splice junctions
2539/107 . . Representational Difference Analysis [RDA]
2539/113 . . Differential Display Analysis [DDA]
2539/115 . . Comparative genomic hybridisation [CGH]

2543/00 Reactions characterised by directed evolution
2543/10 . the purpose being the selection or design of target specific nucleic acid binding sequences
2543/101 . . Selex

2543/00 Reactions characterised by the reaction site, e.g. cell or chromosome
2543/10 . the purpose being "in situ" analysis
2543/101 . . in situ amplification

2545/00 Reactions characterised by their quantitative nature
2545/10 . the purpose being quantitative analysis
2545/101 . . with an internal standard/control
2545/107 . . with a competitive internal standard/control
2545/113 . . with an external standard/control, i.e. control reaction is separated from the test/target reaction
2545/114 . . involving a quantitation step

2547/00 Reactions characterised by the features used to prevent contamination
2547/10 . the purpose being preventing contamination
2547/101 . . by confinement to a single tube/container
2547/107 . . Use of permeable barriers, e.g. waxes

2549/00 Reactions characterised by the features used to influence the efficiency or specificity
2549/10 . the purpose being that of reducing false positive or false negative signals
2549/101 . . Hot start
2549/107 . . Cold start
2549/113 . . using nested probes
2549/119 . . using nested primers
2549/125 . . using sterilising/blocking agents, e.g. albumin
2549/126 . . using oligonucleotides as clamps

2560/00 Nucleic acid detection

2561/00 Nucleic acid detection characterised by assay method
2561/101 . . Taqman
2561/107 . . Enzyme complementation
2561/108 . . Hybridisation protection assay [HPA]
2561/109 . . Invader technology
2561/113 . . Real time assay
2561/119 . . Fluorescence polarisation
2561/12 . . Fluorescence lifetime measurement
2561/125 . . Ligase Detection Reaction [LDR]
2561/127 . . Protein truncation assay

2563/00 Nucleic acid detection characterized by the use of physical, structural and functional properties
2563/101 . . radioactivity, e.g. radioactive labels
2563/103 . . luminescence
2563/107 . . fluorescence
2563/113 . . the label being electroactive, e.g. redox labels
2563/116 . . electrical properties of nucleic acids, e.g. impedance, conductivity or resistance
2563/119 . . the label being proteinic
2563/125 . . the label being enzymatic, i.e. proteins, and non proteins, such as nucleic acid with enzymatic activity
2563/131 . . the label being a member of a cognate binding pair, i.e. extends to antibodies, haptons, avidin
2563/137 . . Metal/ion, e.g. metal label
2563/143 . . Magnetism, e.g. magnetic label
2563/149 . . Particles, e.g. beads
2563/155 . . Particles of a defined size, e.g. nanoparticles
2563/157 . . Nanotubes or nanorods
2563/159 . . Microreactors, e.g. emulsion PCR or sequencing, droplet PCR, microcapsules, i.e. non-liquid containers with a range of different permeability's for different reaction components
2563/161 . . Vesicles, e.g. liposome
2563/167 . . Mass label
2563/173 . . staining/intercalating agent, e.g. ethidium bromide
2563/179 . . the label being a nucleic acid
2563/185 . . Nucleic acid dedicated to use as a hidden marker/bar code, e.g. inclusion of nucleic acids to mark art objects or animals

2565/00 Nucleic acid analysis characterised by mode or means of detection
2565/10 . Detection mode being characterised by the assay principle
2565/101 . . Interaction between at least two labels
2565/1015 . . . labels being on the same oligonucleotide
2565/102 . . Multiple non-interacting labels
2565/1025 . . . labels being on the same oligonucleotide
2565/107 . . Alteration in the property of hybridised versus free label oligonucleotides
2565/113 . . based on agglutination/precipitation
2565/119 . . based on extraction of label to an organic phase, i.e. partitioning of label between different organic phases
2565/125 . . Electrophoretic separation
2565/131 . . Single/double strand conformational analysis, i.e. SSCP/DSGP
2565/133 . . conformational analysis
2565/137 . . Chromatographic separation
2565/20 . Detection means characterised by being a gene reporter based analysis
2565/201 . . Two hybrid system
2565/207 . . Three hybrid system
2565/30 . . Detection characterised by liberation or release of label
2565/301 . . Pyrophosphate (Pi)
2565/40 . . Detection characterised by signal amplification of label
2565/401 . . Signal amplification by chemical polymerisation
2565/50 . . Detection characterised by immobilisation to a surface
2565/501 . . being an array of oligonucleotides
2565/507 . . characterised by the density of the capture oligonucleotide
2565/513 . . characterised by the pattern of the arrayed oligonucleotides
2565/514 . . characterised by the use of the arrayed oligonucleotides as identifier tags, e.g. universal addressable array, anti-tag or tag complement array
2565/515 . . characterised by the interaction between or sequential use of two or more arrays
characterised by the immobilisation of the nucleic acid sample or target

characterised by the capture moiety being a single stranded oligonucleotide

characterised by the capture oligonucleotide being double stranded

characterised by the capture moiety being a protein for target oligonucleotides

characterised by the capture oligonucleotide acting as a primer

characterised by the use of two or more capture oligonucleotide primers in concert, e.g. bridge amplification

characterised by the capture oligonucleotide being a reporter labelled capture oligonucleotide

Detection means characterised by use of a special device

being a microscope, e.g. atomic force microscopy [AFM]

being a sensor, e.g. electrode

being a video camera

being a nucleic acid test strip device, e.g. dipsticks, strips, tapes, CD plates

being a flow cytometer

being a mass spectrometer

being a surface plasmon resonance spectrometer

being a microfluidic device

being a biochannel or pore

being a surface enhanced, e.g. resonance, Raman spectrometer

NMR

being an acoustic wave sensor

Oligonucleotides characterized by their use

Pharmacogenomics, i.e. genetic variability in individual responses to drugs and drug metabolism

Disease subtyping, staging or classification

Prognosis of disease development

Animal traits, i.e. production traits, including athletic performance or the like

Plant traits

Screening for pharmacological compounds

Toxicological screening, e.g. expression profiles which identify toxicity

Screening for cosmetic compounds

Methylation markers

Polymorphic or mutational markers

Expression markers

Primer sets for multiplex assays

Oligonucleotides used as internal standards, controls or normalisation probes

Haplotypes

miRNA, siRNA or ncRNA