**Biotechnology patents at the European Patent Office**

Spanning a vast range of practical applications from chemicals and pharmaceuticals to such areas as energy creation, electronics, food technology and healthcare, biotechnology has become one of the most important platform technologies for industry.

**The biotechnology sector**

Rooted in the ground-breaking works of Louis Pasteur and Robert Koch in microbiology in the 19th century biotechnology gained in importance as techniques such as genetic engineering (in the 1970s) and genomics (in the 1990s) were developed and rapidly enhanced its scope of technical application. Today, biotechnology is a growing discipline with a remarkably strong market: Following [OECD statistics](http://www.oecd.org/innovation/inno/keybiotechnologyindicators.htm), there are at least some 5400 biotechnology firms registered in the EU which, in 2012 employed some 52 000 people, according to Europabio

([www.europabio.org/facts-about-biotech-europe](http://www.europabio.org/facts-about-biotech-europe)).

The US lists more than 7000 biotechnology firms, by far the largest number of such companies in any country.

**Statistics**

The fast development of biotechnology is also reflected in the number of patent applications filed with the European Patent Office (EPO). For several years now, biotechnology inventions have consistently ranked among the largest and most active technical fields in terms of applications.

Since its opening in 1977, the EPO received more than 128 000 European patent applications in this field, corresponding to 5% of the total of 2.5 million applications, and granted 44 600 patents (4% of the total of grants). This means that only about 30% of the biotech applications result in a patent, compared to over 40% in all other fields. More statistics can be found in the [EPO's 2013 Annual Report](http://www.epo.org/about-us/annual-reports-statistics/annual-report/2013/statistics-trends/patent-applications.html).

**Legal aspects**

The EPO takes its decision to grant or refuse a patent in accordance with the relevant European patent law laid down in the European Patent Convention. This means that in principle, biotech patent applications have to meet the same patentability criteria as those in any other technical field: they need to be **new**, be susceptible of **industrial application** and involve an **inventive step**. Moreover, the EPO also implements [EU Directive 98/44/EC](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31998L0044:EN:HTML), known as "Biotech Patent Directive". The Directive further clarifies what is patentable, and what not. This has become particularly relevant in relation with agricultural and also medical biotechnology, where the patentability of plants, human germ line engineering or stem cell technology are of issue. In some areas, important legal developments are still under way.

**Red, White and Green Biotechnology**

In the past five years, the EPO has observed a significant rise in patent applications in three sectors which account for some 70% of the European patent applications filed in the area of biotechnology:

* **Red Biotechnology (Healthcare Biotechnology)** is mainly concerned with the development of new treatments for diseases, i.e. of new medicines (bio medicals), advanced therapies, vaccines and diagnostics.
* **White Biotechnology (Industrial Biotechnology)** relates to the use of an enzyme or micro-organisms to make bio-based products in chemicals, food, animal feed, detergents, paper, textiles, but also for the production of bio fuels.
* **Green Biotechnology (Agricultural Biotechnology)** focuses on modern plant and animal breeding techniques, such as GMO breeding. It is by far the smallest of the three sectors

The chart illustrates the importance of each sector in terms of patents applications in 2012:

In 2012, a total of 8 000 patent applications related to biotechnology were filed with the EPO. Of these,

3 900 concerned Red Biotechnology,

1 590 concerned White Biotechnology,

330 concerned Green Biotechnology and

2 160 concerned all other areas of biotechnology