

#### 4. Private Enterprise R&D Expenditures

There is no information publicly available on the total level of Danish private enterprise investments and R&D expenditures in biotechnology. There is, however, no doubt that it is a high growth area and that the massive public R&D efforts corresponds to a massive effort in the private enterprise sector, not only in R&D but also in production facilities and marketing. The sector is highly internationalized and a number of companies, especially Novo Nordisk, invest also in production facilities in other countries, including Japan and the USA.

##### Exhibit 3

Several Danish companies involved in biotechnology have reported information on R&D expenditures to the Ministry of Education and Research, which is the legislative power for the Government's R&D programs. Exhibit 3 summarizes the R&D expenditures in biotechnology in 1989 based on the companies which reported this information. The number of companies and research institutes involved in biotechnology R&D between 1987 and 1989 has increased by 16% (from 43 to 50). The majority is in the small firm category. Typically, biotechnology companies, or the research groups within large companies, are small.

The summary figures by reporting companies indicate that the total biotechnology R&D effort in 1989 was CAD 190 Million, of which the private enterprise sector accounted for 56%. Biotechnology accounts for approximately 9% of the total Danish R&D effort.

#### 5. Government Legislation and Regulation of Biotechnology

In 1986, a Gene Technology Act was passed by the Danish Parliament as the first of this type of legislation in the EEC. Its purpose is to protect nature, the environment, and public health, including nutritional quality in connection with the application of recombinant DNA. This legislation resulted for the first time in the EEC in acceptance of continued use of transgenic organisms in industrial research but special exemption is required on a case-by-case basis for deliberate release of genetically modified organisms. Despite a contentious debate before the passage of this law, industry has found the law rather easy to live with. It is certainly not deterring either the pharmaceutical or the food industry from continued R&D within genetic engineering. The first exemption was granted in 1989 to Danisco for testing a genetically engineered sugar beet.