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Safety Assessment of Melanoidins in Cell Line Studies*K.-H. Wagner*Department of Nutritional Sciences, University of Vienna,
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The identification of substances capable of inducing mutations has become an important procedure in safety assessment of foods. Gene mutations are readily measured in bacteria and cell systems when they cause a change in the growth requirements of the cell, whereas chromosome damage in mammalian cells is typically measured by observing the cell's chromosomes under magnification for breaks or rearrangements. In particular, free radicals and reactive oxygen species (ROS), which are generated permanently, cause mutagenic alterations resulting in cancer, aging and abnormalities in the nervous system. Several tests in cells (in vitro and in vivo grown cells like lymphocytes) are used, e.g. chromosome aberrations, micronuclei and DNA damage, in order to evaluate the mutagenic potential. Tests on the risk assessment of Maillard reaction products, which are also known as non-enzymatic browning products and mainly formed at heating processes, have started around 25 years ago, being more detailed and sophisticated since around ten years. Most of the tests performed so far are based on cell line and bacteria tests. Summarizing the results obtained so far identified brown coloured end products of the Maillard reaction, which are also called melanoidins, are able to induce some genomic marker. However, when the tests are performed with a metabolic activation system by adding a defined enzyme mixture to the cells in order to simulate body conditions, less information is given so far, which identifies melanoidins as mutagenic or genotoxic.