STRUCTURAL MODIFICATION OF AMINO ACIDS AND PEPTIDES USING LOW-PRESSURE MICROWAVE PLASMA

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The interaction of plasma with living organisms or biological materials has been extensively studied using low pressure plasmas[1-3] or atmospheric pressure plasmas[4,5]. Due to their properties the usefulness of low temperature plasmas could include the detoxification of some protein type molecules as toxins or prion abnormal molecules which cause Transmissible Spongiform Encephalopatie.

Our research aims to prove the ability of low temperature microwave excited surface wave plasma to do this kind of modifications at low temperature and without involving any toxic substance. Also of great interest is revealing the mechanisms and the factors inside the plasma responsible for an eventual modification.

The microwave plasma reactor was used in the present experiment. A 2.45 GHz microwave is introduced to the stainless chamber through a quartz window placed at the extremity of a rectangular waveguide. The plasma was excited at pressure 13.3 Pa. The gas flow rate was kept constant at 100 sccm.

As samples, *[Arg^{8}]-Vasotocin* molecules as peptide and cystine as amino acid were used. These have disulfide linkage in molecular structure. It is known that disulfide linkage has an important role in the biomolecules. It is a significant determinant of the tertiary structure of most proteins.

The effect of Ar or oxygen plasma irradiation on amino acids or was studied by X-ray photo- electron spectroscopy(XPS), nuclear magnetic resonance(NMR) spectroscopy, and time-of –flight mass spectroscopy(TOF-MS). The present results show an apparent change of the molecular structure after plasma treatment.

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