Sample Preparation for MALDI-TOF

Samples for MALDI-TOF analysis need to meet certain requirements for obtaining good spectra. The more careful you prepare samples (including early steps of isolation and preparation) the more likely a successful analysis will be. Here are some guidelines of which kind of treatment is advantageous for mass spectrometric analysis and which is not:

► Avoid the use of non-volatile agents like salts (NaCl, $CaCl_2$, KH_2PO_4), detergents (Tween, Triton, SDS), chaotropic agents (Urea, Guanidinium salts) and non-volatile solvents like DMSO, DMF, or Glycerol.

► If you can't avoid these agents, purify. Dialysis, ZipTips, and RP-HPLC are good purification methods if you use volatile solvents and buffers (e.g. 0.1% v/v trifluoracetic acid, 10 mM NH_4HCO_3). After purification, lyophilize if possible. Ion exchange beads may work well for salt removal.

► Suitable solvents are ones that are volatile. For sample work up and purification: water, ammonium hydrocarbonate, ammonium acetate, ammonium formiate, acetonitrile, trifluoroacetic acid.

► Quantitate the sample you are going to provide for analysis by methods like: photometry (e.g. OD, Bradford assay), and ELISA. HPLC is useful since it allows for purification and quantitation in a single procedure. The range for many samples/preparations is not very large, therefore it is necessary to have a good estimate of the sample amount because the sample amount may need to be varied on the target.

► The total amount of sample needed for MALDI analysis depends on the sample type. For small mw peptides (1,000 or less) the minimum amount needed for analysis is 16 picomoles/microliter. The minimum for mw 20,000 or less is 60 picomoles/microliter. For 66,000 mw, the minimum amount needed for analysis is 160 picomoles/microliter. Therefore, the larger the molecular weight the more sample is needed.

► Give information like: structure, sequence, molecular weight, type of compound, biological activity, chemical reactivity, pH, sample amount/concentration, describe purification/isolation with focus on relative agents/solvents, known or suspected impurities, suitable solvents, hazardous properties: radioactivity, carcinogenicity, poison, or explosive.