

MALDI Ionization Mechanism

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In past studies, mistakes in determining the ionization mechanism in MALDI were made because an inappropriate ion-to-neutral ratio was used. We begin by describing the properties of ion-to-neutral ratios and review the past experimental measurements. A discussion of the errors committed in previous theoretical studies and a comparison of recent experimental measurements follow. We describe a thermal proton transfer model and demonstrate how the model appropriately describes ion-to-neutral ratios and the total ion intensity. We demonstrate arguments raised to challenge thermal ionization are not valid and conclude that thermal proton transfer must play a crucial role in the ionization process of MALDI. We then describe the formation of metalated ions and the decomposition of glucose and sucrose, and explain the low detection sensitivity of carbohydrates in MALDI. Potential methods to increase the detection sensitivity are proposed.

References

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