

TECH NOTE



Your Partner in Rehabilitation Outcomes

Empi buffered iontophoresis electrode: description of buffering process

Goal: To eliminate the harmful effects of acid-base formulation (pH changes) that occurs during iontophoresis without hampering the efficiency of iontophoresis drug delivery.

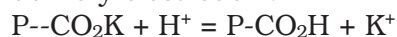
Competition: Competitive products use chemical buffers which are added to the electrode reservoir to help control pH changes. This is undesirable as these chemical buffers introduce into the drug reservoir a high concentration of extraneous mobile ions which compete with the drug ions for current and reduce the overall drug delivery efficiency of the system.

Empi buffered iontophoresis electrode:

Empi has developed an electrode which incorporates immobilized ion-exchange resins (Rohm and Haas powdered Amberlite resins Polyacrillin and Polyacrillin-potassium) into the electrode reservoir of each treatment electrode. These two resins control the pH changes, both acidic and basic caused by the hydrolysis of the water present in the drug solution. The resins very effectively scavenge/buffer the undesirable H^+ and OH^- ions as they are produced.

More specifically, at the negative electrode, the caustic OH^- ions are completely absorbed and are not longer available to cause upward pH shifts and compete with the drug ions. At the positive electrode, the acidic H^+ ions are replaced with much less mobile K^+ ions which have not harmful effects on the skin. **The end result in both cases is an electrode with enhanced drug delivery efficiency.** The equations below represent Empi's ion-exchange buffering process for the delivery electrode.

If delivery electrode +:



If delivery electrode -:



(P indicates polymeric backbone and M^+ indicates dissociated metal ion from drug.)

Amberlite resins are pharmaceutical grade ion-exchange resins which are used as components of various oral drug formulations.



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