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ABSTRACT

Performance Evaluation: Comparing Different Reagents for Calcium Level Measurement in Human Serum

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Background: Calcium is a fundamental mineral in the human body, crucial for various physiological processes, especially in bones and muscles. Accurate measurement of calcium levels is essential for diagnosing and monitoring numerous medical conditions. In this study, we aimed to compare the performance of seven calcium measuring kits utilizing two different methodologies, Arsenazo-III and orthoCresolphthalein-complexone (o-CPC), using ELITROL-I human serumbased control material.

Methods: Thirty experimental trials were conducted over fifteen days from March 18th to April 1st, 2024. The experimental setup included two work shifts per day to ensure comprehensive coverage and consistency in results. The kits were evaluated based on their performance in measuring calcium concentrations using ELITROL-I control material. Data analysis included assessment of mean values, standard deviations, coefficient of variation (CV%), and adherence to reference ranges to assess the accuracy and precision.

Results: The ELITech Arsenazo-III kit demonstrated the highest precision among Arsenazo-III kits, with a CV of 1.7%, while SPINREACT o-CPC kit demonstrated the highest precision among o-CPC kits with a CV of 5.1%. Both kits provided measurements within established reference ranges, although deviations were observed in some experimental runs. Bland-Altman analysis indicated agreement between the SPINREACT and ELITech kits, with occasional discrepancies observed.

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Conclusion: Our study underscores the importance of evaluating calcium measuring kits for accuracy and precision in clinical settings. By identifying the most reliable kit based on performance metrics, healthcare professionals can make informed decisions regarding kit selection, ultimately enhancing the quality of calcium measurements and improving patient care.

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