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Use of Sephadex gel filtration and Light Dependent Resistor (LDR) System for screening Microalbuminuria

Microalbuminuria is defined as urinary excretion of 20 -299 mg/ 14 h, which predicts development of clinical diabetic nephropathy.

The addition of sulphosalicylic acid (SSA) to urine results in precipitation of the protein. The sensitivity of the SSA test can be enhanced by the use of Tyndall effect where incident light is reflected by colloidal particles in state sector hospitals. Objective of this study was to set up a simple cost –effective semi quantitative method to assess the microalbuminuria.

A simple cost-effective microalbuminuria assay method was set up based on the visual observation made of precipitate of protein by 25% w/v (SSA). The sensitivity was enhanced by exploiting the Tyndall effect/ turbidity by using a LDR (Light Dependent Resistor). As the Tyndall effect was disturbed by the coloured urine specimens, the coloured compound was separated by gel filtration method using Sephdex G-25 superfine column (7.5 X 1.3 cm). The second and third elution fractions, which carried 91% of albumin, were pooled and precipitated with 25% SSA and the concentrations were measured using LDR system. The values were compared with the gold standard (micro protein assay kit DMA/ USA).

Analysis of 173 specimens revealed that the present test detects urine micro albumin in the range 20 – 200 mg/L with a 83% sensitivity, 79% specificity, and 92% positive predictive value respectively.