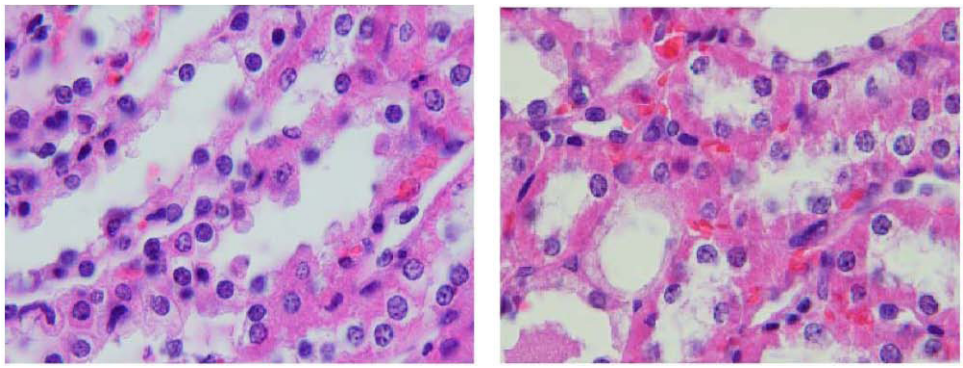

Figure 2: Normal collecting ducts in a rat's kidney; H/E (×40)

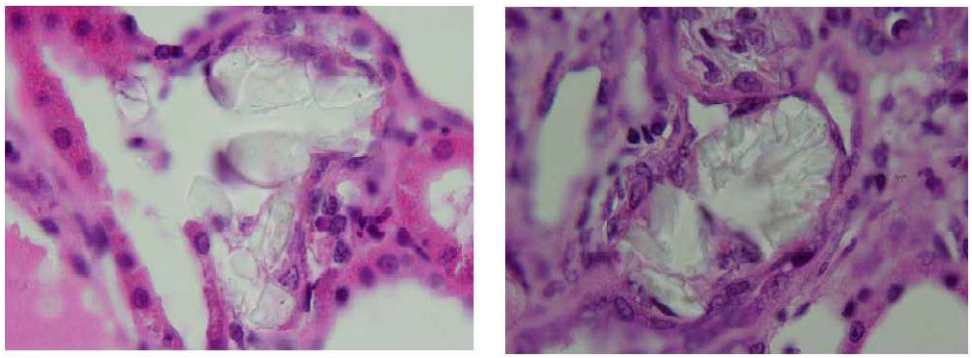

Figure 3: Tubular CaOx crystals in an EG treated rat; H/E (×40).

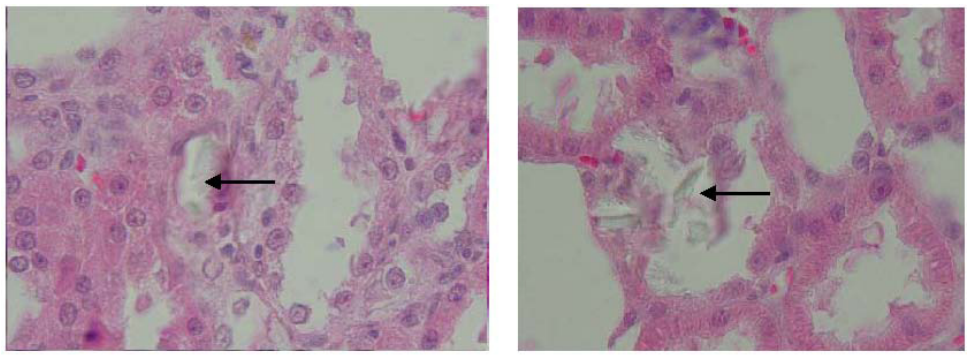

Figure 4: Few tubular CaOx crystals (arrow) in N-butanol fraction group; H/E (×40).

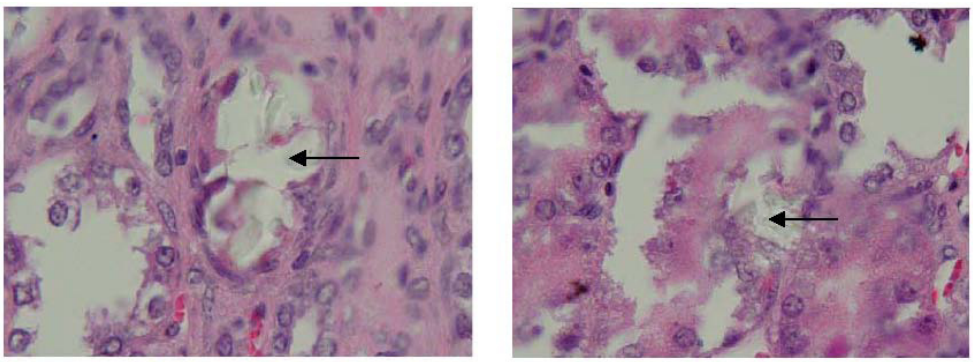

Figure 5: Tubular CaOx crystals (arrow) in N-butanol phase remnant group; H/E (×40).

and distal tubules, loop of Henle and even calyxes in group 2 (Figure 3) were plenty. In group 2 the number of calcium oxalate deposits, which were composed of 6 to 10 large polygonal crystals in different segments of the renal tube, in 10 microscopic fields in the kidney specimens was 45.3±4.27. As it is shown in Figure 1, the number of deposits in group 3 and 4 were 27.8±4.78 and 22.5±1.35 respectively, which were significantly lower than group 2 (p=0.008 and p=0.00). In comparison with group 2, not only the number of CaOx deposits in groups 3 and 4 were significantly lower but also the size of deposits in different parts of renal tubules in these groups was clearly thinner and smaller (Figures 4 and Figure 5).

The results of this study revealed that N-butanol fraction and N-butanol phase remnant from 50% aqueous-ethanolic extract of *Cynodon dactylon* were able to reduce CaOx stones in the rat kidney by 40 and 55% respectively.

DISCUSSION:

Data of the present study demonstrated that *Cynodon dactylon* had a disruptive effect on CaOx crystals formed by EG in the kidney of rat (Figure 1).Recent investigations have speculated that nanobacteria, which are gram-negative and atypical bacteria, may play a role in the formation of renal deposits by nucleating carbonate apatite on their surfaces (15). It was also demonstrated that nanobacteria were present in 70 of 72 kidney stones analyzed by scanning electron microscopy and immunofluorescent staining (16). Based on these findings, it has been hypothesized that nanobacteria colonization could damage renal tubular epithelial cells, resulting in biomineralization and subsequent stone formation (3). Since *Cynodon dactylon* has antibacterial effects, it may be effective in prevention of CaOx deposits formation (6, 7). Also, CaOx crystals in renal tubules may damage epithelial cells to produce superoxide anions and free radicals to induce "hetrogenic crystal nucleation" (17). On the other hand, *Cynodon dactylon* has anti-inflammatory effects (10). Therefore, it may be suggested that part of *Cynodon dactylon* actions on disruption of CaOx kidney calculus might be due to its anti-inflammatory effects.

We concluded that N-butanol phase remnant and N-butanol fractions from 50% aqueous-ethanolic extract of *Cynodon dactylon* significantly decreased the number and size of CaOx deposits in the rat kidney. *Cynodon dactylon* is widely used in traditional medicine in Asia; therefore it may be advised that N-butanol phase remnant and N-butanol fractions from aqueous-ethanolic extract of *Cynodon dactylon* have beneficial effect on treatment of CaOx stones in human.

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