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Effect of oral co- administration of zeolite nanostructures and artichoke (*Cynara scolymus* L.) extract on urinary clearance of nicotine

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Background and Aims: Nicotine , the main pharmacologically active component in tobacco and cigarette, has some toxic effects and. In this study, the effects of artichoke (Cynara scolymus L.) and zeolite nano-structures on urinary clearance of nicotine were investigated

Methods: Wistar rats were selected for this study. Rats were distributed into four groups (n=6) as follow: A) Animals were received oral administration of nicotine (0.2 mg/kg /day) ; B: Animals were received oral administration of nicotine (0.2 mg/kg /day) + nanozeolite (50 mg/kg /day) ; C: Animals were received oral administration of nicotine (0.2 mg/kg /day) + artichoke leaf extract (250 mg/kg/day) and D: Animals were received oral administration of nicotine (0.2 mg/kg /day) + artichoke leaf extract (250 mg/kg /day) + nanozeolite (50 mg/kg /day). Urine samples were collected from treated animals at predetermined times. In order to determination of urinary nicotine concentration, the samples were analyzed by HPLC.

Results: Oral administration of nanozeolites have been significantly increased the urinary excretion of nicotine in 3hr and 6hr post administration ($p<0.05$). Oral administration of artichoke leaf extract (ALE) can cause significant increase in urinary concentration of systematically adsorbed nicotine after 24hr post administration ($p<0.05$). In this study, it has been proven that the co-administration of zeolite nano-structures in accompany with ALE can statistically increase the elimination of nicotine via urinary flow at 3, 6 and 24 hr post administration ($p<0.05$). The synergism effects of nanozeolites and ALE on increase in urinary elimination of nicotine have been suggested.

Conclusions: It has been shown that the oral co-administration of nanozeolites and artichoke leaf extract (Cynara scolymus L) synergistically increase the elimination of systematically absorbed nicotine as one the toxic and also addictive material in cigarette smoke.

Keywords: Nanozeolite; Artichoke (*Cynara scolymus* L.); Urinary elimination; Nicotine