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STOPPED-FLOW STUDIES OF THE INTERACTION OF DFH_4 AND ITS DERIVATIVES WITH DPPH•

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In the course of this research, ascordic acid, dihydroxyfumaric acid (DFH4) and ten of its newly obtained derivates were investigated in the modified DPPH• assay using the stopped-flow method.

Fig.1. shows five most potent antioxidants synthesized from DFH_4.

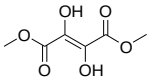
Obtained curves demonstrate the existence of three types of kinetic behaviors: fast, mixed (the fast stage is followed by a slower stage, which can be visually distinguished) and slow kinetic behavior.

The kinetics is determined both by the molecular structure of the studied compound and by the stability of the antioxidant radical formed following the reaction with DPPH•.

Ascorbic acid is the only compound exhibiting rapid reaction with the radical, which is determined by the presence of active functional groups, which allow the rapid transfer of hydrogen atoms.

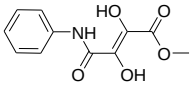
Analysis of the obtained kinetic curves shows that DFH_4, ester 2, acid 12 and diol 13 (Fig.1) show mixed kinetics. Upon interaction with DPPH•, a rapid decrease in radical concentration is observed in the first 3-10 seconds (1 min for ester 2), but the steady state is reached in a longer time (several minutes), compared to ascorbic acid.

Anilide 5 and fumaramide 6 exhibit a slow kinetics in the DPPH• assay, with a reaction time of 45-60 minutes.



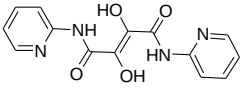
2

dimethyl 2,3-dihidroxifumarate



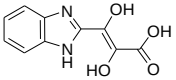
5

(*E*)-methyl 2,3-dihydroxy-4-oxo-4-(phenylamino)but-2-enoate



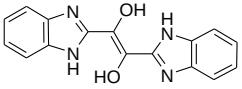
6

2,3-dihydroxy-N^1,N^4-di(pyridin-2-il)fumaramide



12

(*E*)-3-(1H-benzo[*d*]imidazol-2-il)-2,3-dihydroxiacrylic acid



13

(*E*)-1,2-di(1H-benzo[d]imidazol-2-il)etene-1,2-diol

Fig.1. Most potent obtained derivates of DFH_4