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Application of Meldrum's Acid for Synthesis of Amides of Substituted Cinnamic and Hydrocinnamic Acids

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Several natural antioxidants, *int. al.*, avenanthramides **1** (R=*o*-COOH) and avenulamines **2**, as well as an alkaloid isaindigotone, contain moieties of amides of cinnamic or hydrocinnamic acids.

We synthesized avenanthramides and their analogues **1** from Meldrum's acid **3** and aminobenzoic acids; the obtained malonamides **4** were treated with aromatic aldehydes (containing mainly hydroxy- or methoxygroups) under conditions of Doebner-Knoevenagel reaction [1]. In order to prepare avenulamines **2** the avenanthramides **1** were further refluxed in acetic anhydride. Both 2-styryl-quinazolin-4(3*H*)-ones **5** and diamides **6** were obtained from 4*H*-3,1-benzoxazin-4-ones **2** and primary amines.

The 5-monoalkyl derivatives of Meldrum's acid **7** were obtained by condensation of Meldrum's acid with different benzaldehydes and following reduction of formed 5-

arylidene derivatives with NaBH₄ [2]. We prepared amides of hydrocinnamic acid **8** by cleavage of compounds **7** with corresponding anilines.

All synthesized compounds were screened for free radical scavenging activity according to DPPH test.

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2. Frost, C. G., Penrose, S. D., Gleave, R. A Practical Synthesis of α -Substituted *tert*-Butyl Acrylates from Meldrum's Acid and Aldehydes. *Synthesis*, 2009, vol. 4, p. 627-635.

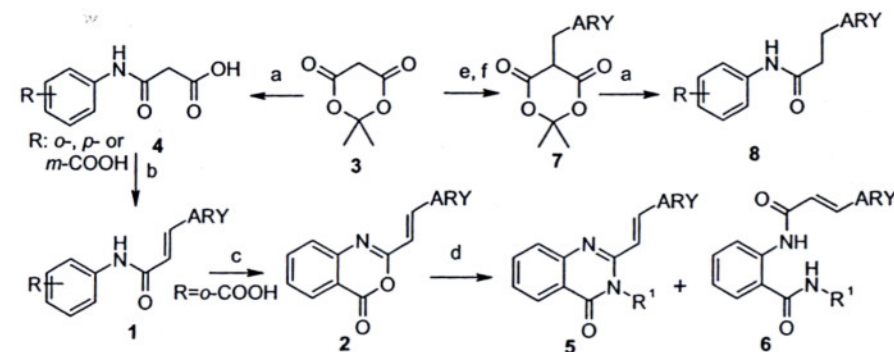


Fig.1 a – aminobenzoic acid, PhMe, reflux; b – aromatic aldehyde, β -alanine, Py, reflux; c – acetic anhydride, reflux; d – primary amine, Py or PhMe, reflux; e – aromatic aldehyde, H₂O, 75°C; f – NaBH₄, acetic acid, CHCl₃, 0...-3°C.