ANTIMICROBIAL ACTIVITY OF *CHELIDONIUM ALKALOIDS* INVESTIGATED BY BIOARENA SYSTEM

Ágnes Sárközi[a], Ágnes M. Móricz[b], Péter G. Ott[c], Ernő Tyihák[c] and Ágnes Kéry[a]

[a]Department of Pharmacognosy, Faculty of Pharmacy, Semmelweis University, H-1085 Budapest, Üllői út 26. Hungary
[b]Department of Chemical Technology and Environmental Chemistry, Eötvös University P.O.B. 112. H-1518 Hungary
[c]Plant Protection Institute, Hungarian Academy of Science, P.O.B. 102, H-1525 Hungary

BioArena system, which integrates the up-to-date methodology and biological results of bioautography with TLC, is especially suitable for investigating biochemical interactions in a sorbent bed after chromathographic separation. The antimicrobial effect of *Chelidonium alkaloids* has been investigated in this system.

Greater celandine (*Chelidonium majus* L.), a member of Papaveraceae family, is widely distributed in Europe and Western Asia. This plant is a well known source of benzophenanthridine (chelidonine, sanguinarine and chelerythrine), protoberberine (berberine) and protopine (coptisine) alkaloids. These alkaloids exhibit choleretic, colagogue, spasmolytic, antitumor, antiinflammatory and antimicrobial actions.

Although the antimicrobial activity of *Chelidonium alkaloids* against human bacteria has been reported the mechanism of this action is almost unknown. In this case for bacterial biotest, the phytopathogen *Pseudomonas savastanoi pv. phaseolicola* race 6, causing halo blight on bean, was used. The antibacterial activity of *Chelidonium alkaloids* was visualised by staining of bioautograms with aqueous solution of MTT (3-[4,5-dimethiltiazol-2-yl]-2,5-diphenyltetrazonium bromide). To study the mechanism of action of *Chelidonium alkaloids* co-factor substances, as L-arginine, glutathione and copper(II)-sulphate were added separately to the cell suspension in different concentration before inoculation [1].

An important fact is that there is a relationship between the amount of HCHO-capturing agent and antimicrobial activity of *Chelidonium alkaloids*, that is, larger quantities of L-arginine and glutathione always resulted in a greater decrease in antimicrobial activity. These alkaloids exhibite an antibacterial activity, while their methylated derivates promote cell proliferations under the same conditions. The Cu(II), the oxidized form of copper, an essential trace metal found in all biological systems which enhances the antibacterial activity of HCHO.

It is obvious that BioArena provides more information than conventional bioautography. We can change the incubation time, and may observe the changes on the sorbent layer during 5-6 or more days, using endogenous and/or exogenous substances in culture medium on the antimicrobial action of the separated components.

[1] Tyihák E, Botz L, Ott P, Nagy S, Kocsis B, Király-Véghely Zs and Mincsovics E. The combination of the overpressured chromatography and bioautography and its applications to the ananlysis of molecules influancing cell proliferation. *Chemical Analysis (Warsaw)* 2003; 48: 543-553.