A Boiled-Egg to Predict Gastrointestinal Absorption and Brain Penetration of Sulfonylurea Herbicides

K. Krstevska, M. Sencheva Petrevska, I. Jordanov and <u>V. Dimova</u>*

Faculty of Technology and Metallurgy, Ss. Cyril and Methodius University,

Ruger Boskovic 16 1000 Skopje, Macedonia

*[*vdimova@tmf.ukim.edu.mk](mailto:vdimova@tmf.ukim.edu.mk)*

Sulfonylureas (SU) are group of substituted urea herbicides, primarily used for the control of weeds (annual and perennial) in early growth stages of cultivations. Structurally they consist a sulfonyl group ($-S(=O)_2$) (Fig. 1). The side chains (R_1 and R_2) distinguish various sulfonylureas, such as pyrimidinyl-sulfonylureas and the triazinyl-sulfonylureas.
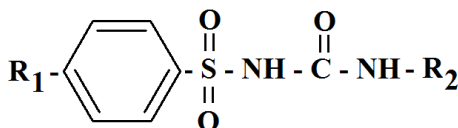

Figure 1. Structural formula of sulfonylurea compounds

SwissADME is a web tool designed for predicting pharmacokinetics parameters, which can be used for pesticides. The BOILED-Egg (Brain or Intestinal Estimated permeation) method, as part of SwissADME tool, can predict the transfer of drugs across the blood-brain barrier with high accuracy.

The BOILED-Egg graph was applied for investigated pyrimidinyl-sulfonylureas and the triazinyl-sulfonylureas. The BOILED-Egg allows for intuitive evaluation of passive gastrointestinal absorption and blood-brain penetration (BBB) in function of the position of the molecules in the WLOGP (a purely atomistic method based on Wildman and Crippen's piecewise system of the octanol-water distribution coefficient (log P) used as a measure of lipophilicity)-versus-TPSA (topological polar surface area) referential in the SwissADME a web tool. In BOILED-Egg graph, the yellow area represents the transition to the blood-brain barrier (BBB), and the white area represents the absorption in the gastrointestinal system (AGS).

Our results showed that a large proportion of studded herbicides (> 92.59%) is predicted to be low absorbed by the human gastro-intestinal tract (gray region). Only sulfometuron methyl and chlorsulfuron are high possibility of passive absorption by the gastrointestinal tract (white region).

Keywords: pesticides, SwissADME, BOILED-Egg graph, sulfonylureas