

SCHIFF BASE DERIVATIVES AS POTENTIAL ACETYLCHOLINESTERASE INHIBITORS- AN *In vitro* STUDY

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INTRODUCTION

Acetylcholinesterase inhibitors are widely recognised as potential drugs for treating symptoms of the Alzheimer's disease. Inhibitory properties of AChE inhibitors have been used for the development of active compounds in plant protection treatments. Environmental impact as well as the lack of sustainability have made the green chemistry advantages such as milder reaction conditions, higher yields and faster reaction times much more preferable in recent chemical synthesis trends. Schiff base derivatives were synthesized by utilizing the green chemistry methods such as microwave-assisted, ultrasound-assisted and mechanochemical synthesis.

EXPERIMENTAL

24 Schiff base derivatives were tested as potential acetylcholinesterase inhibitors. 2 mM stock solutions of tested compounds were prepared by desolving the compound in a 1:1 mixture of dimethyl sulfoxide (DMSO) and water. The volume percentage of DMSO in the final reaction mixture was $\leq 1\%$. The enzyme used in the experiment was acetylcholinesterase from electric eel (Sigma Aldrich). In vitro experiment has been conducted on a 96-well microplate UV-Vis reader (Tecan Spark) by utilizing the modified Ellmann's method. [2] Absorbance readings were obtained by measuring at the wavelength of 412 nm. Donepezil was used as a standard acetylcholinesterase inhibitor.

RESULTS

Table 1. Inhibition percentages of tested compounds

COMPOUND	Inhibition/%
2	21.03
3	30.62
5	30.08
6	24.34
7	29.49
9	22.09
10	34.58
11	32.44
12	5.96
13	11.54
14	23.88
15	28.75
16	21.69
17	26.93
18	17.82
19	30.22
20	0.00
21	0.00
22	0.00
23	0.00
24	0.00
25	9.65
26	3.88
27	0.00

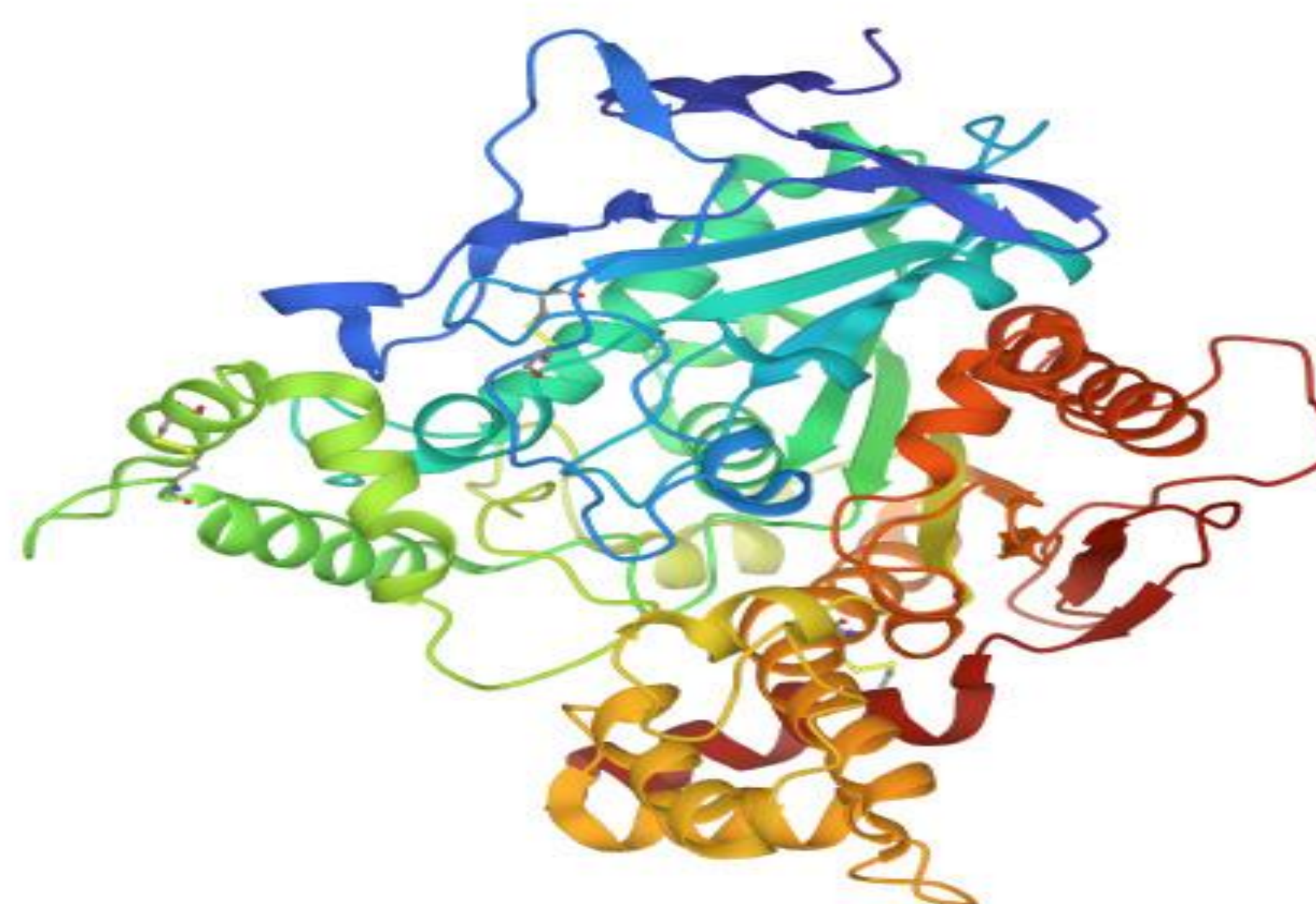


Figure 1. Acetylcholinesterase

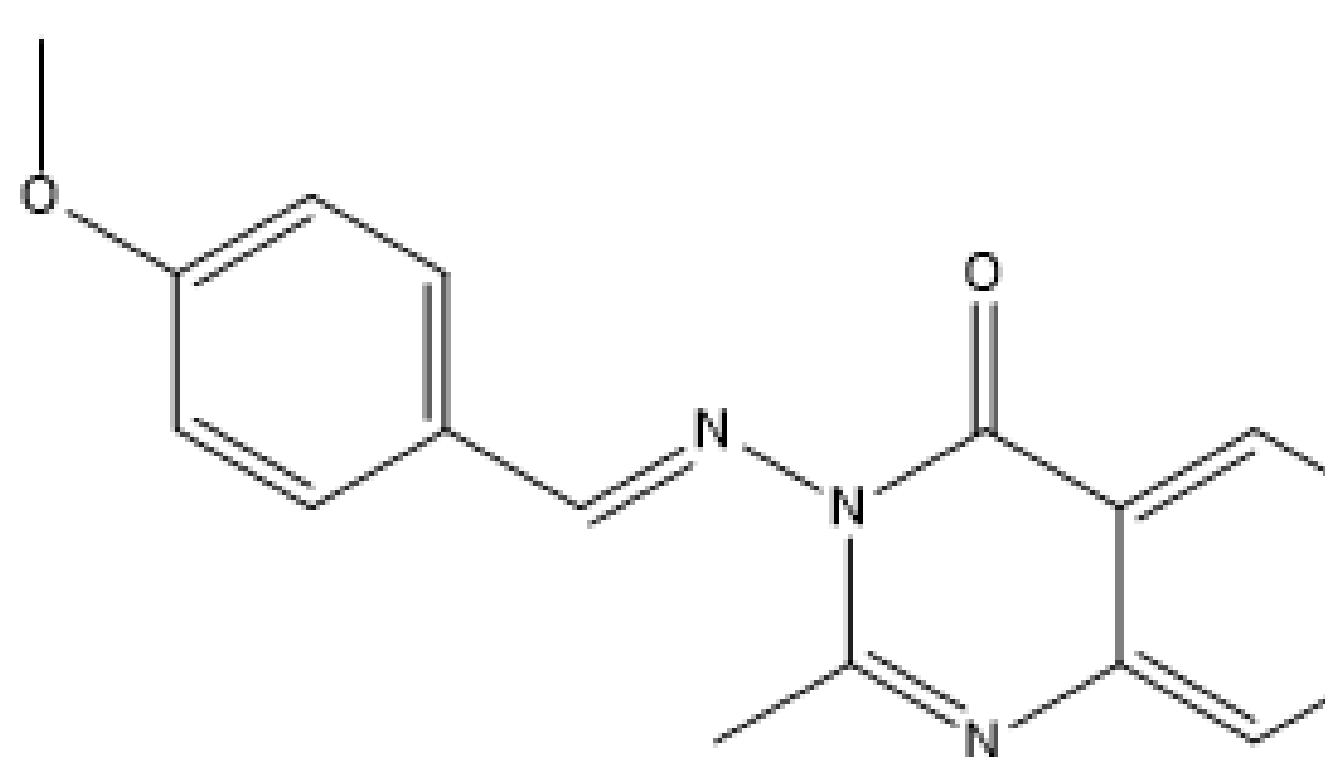


Figure 2. Compound 10

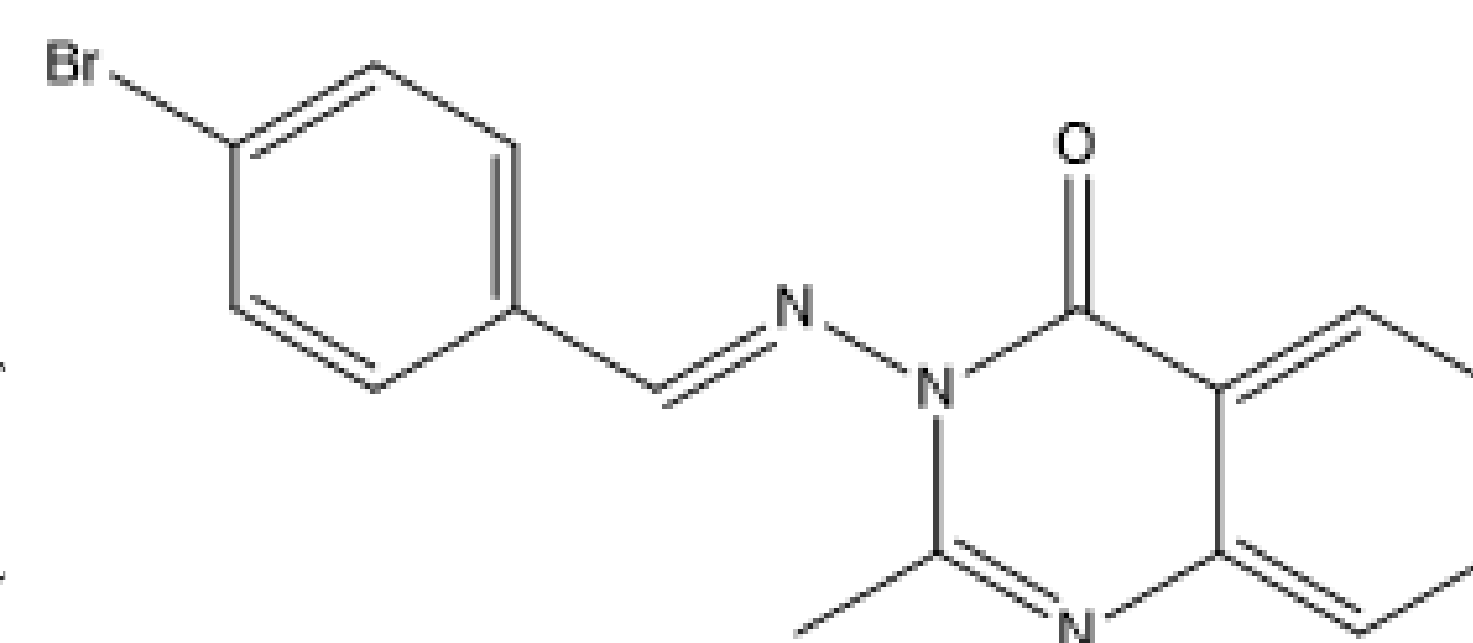


Figure 3. Compound 26

CONCLUSION

- Among the 24 tested compounds, compound **10** has shown the highest inhibition activity while compound **26** showed the lowest measurable inhibition activity.
- Low values of the inhibition percentage of all tested compounds could possibly be attributed to the poor solubility of the compounds by using the conventional DMSO/water solution as a solvent, therefore causing an interference in absorbance readings.

REFERENCES:

- [1] Komar Mario, Prašnikar Fran, Kraljević Gazivoda Tatjana, Aladić Krunoslav, Molnar Maja, "3-Amino-2-methylquinazolin-4-(3H)-one Schiff Bases Synthesis - A Green Chemistry Approach - A Comparison of Microwave and Ultrasound Promoted Synthesis with Mechanochemistry", *Current Green Chemistry* **2021**; 8(1).
<https://doi.org/10.2174/2213346107999201231125434>
- [2] G.L. Ellman, K.D. Courtney, V. Andres, R.M. Featherstone, *Biochemical Pharmacology*, 7(2) (1961) 88-95.