

# Pharmacological Interactions of Ethanol with Nicotine and Caffeine



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**SUMMARY:** *Legal substances with addictive potential are represented mainly by ethanol, nicotine, and caffeine in the Czech Republic. Concomitant use of these drugs is common among both people addicted to one or more substances and those without addiction. Ethanol and caffeine are likely to interact on the adenosine system level. Ethanol increases the activity of adenosine by several mechanisms which lead to akathisia, somnolence, and anxiolysis. Conversely, caffeine induces anxiety and psychostimulation by acting as a competitive antagonist on adenosine receptors. Moreover, while suppressing motor deficit in low doses, it can produce the opposite effect in high doses. The interaction between caffeine and ethanol may antagonise some of the undesirable effects of the substances (such as anxiety and somnolence), although this was demonstrated in preclinical studies only. The potentiation of the consumption of co-administered caffeine and ethanol is described in most studies, both clinical and experimental ones. Crossed tolerance to the negative side-effects and increased levels of dopamine in nucleus accumbens are the probable mechanism behind such a synergic interaction. This activity appears gender-dependent, as the use of nicotine in women reduces their concomitant consumption of alcohol. It should be stressed that the concurrent use of alcohol and nicotine increases not only the intake of the respective drugs, but also the risk of cardiovascular and cerebrovascular toxicity and the development of malignant tumours. The interaction between ethanol and selected substances is variable and depends not only on the doses of substances used in individual experiments, but also on gender, the duration of their use, or the time setup of the experiment in which interactions are assessed. A more thorough description of the influence of these factors is provided in the article.*

**KEY WORDS:** ETHANOL – ALCOHOL – CAFFEINE – NICOTINE – INTERACTIONS – DRUG ADDICTION – ABUSED SUBSTANCES

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