Antidepressant-like Effect of *Citrus sinensis* (L.) Osbeck Essential Oil and Its Main Component Limonene on Mice

Lu-Lu Zhang, Zi-Yu Yang, Gang Fan*, Jing-Nan Ren, Kai-Jing Yin, and Si-Yi Pan
Key Laboratory of Environment Correlative Dietology, Ministry of Education, College of Food Science and Technology, Huazhong Agricultural University, 1 Shizishan Street, Hongshan District, Wuhan, Hubei 430070, People's Republic of China

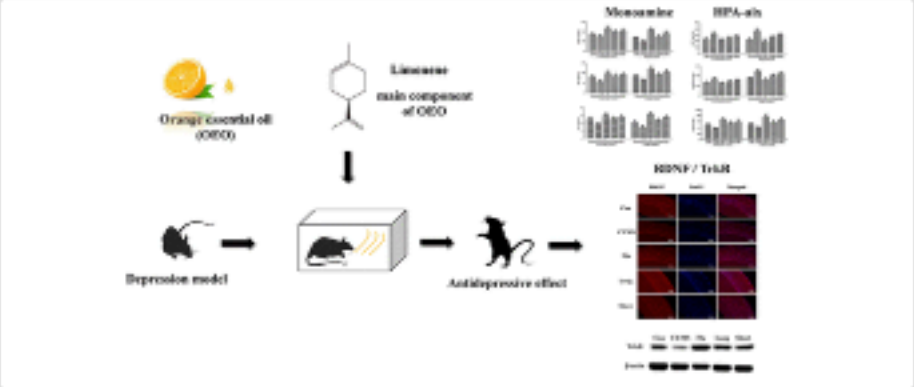
J. Agric. Food Chem., Article ASAP
DOI: 10.1021/acs.jafc.9b00650
Publication Date (Web): March 24, 2019

*Telephone: +86-27-87282111. Fax: +86-27-87288373. E-mail: fangang@mail.hzau.edu.cn.
This article is part of the 2nd International Flavor Fragrance Shanghai special issue.

Cite this: *J. Agric. Food Chem.* XXXX, XXX, XXX-XXX

RIS Citation GO

Abstract



The present study investigated the antidepressant-like effects of navel orange [*Citrus sinensis* (L.) Osbeck] essential oil (OEO) and its main components using the chronic unpredictable mild stress (CUMS) model mice and explored its possible mechanisms. The results indicated that OEO inhalation significantly ameliorated the depression-like behaviors of CUMS mice with decreased body weight, sucrose preference, curiosity, and mobility as well as shortened immobile time and attenuated dyslipidemia. Limonene was the most abundant compound in the sniffing OEO environment and mice brain after sniffing, and it was not metabolized immediately in the brain. In addition, limonene inhalation significantly restored CUMS-induced depressive behavior, hyperactivity of hypothalamic–pituitary–adrenal axis, and the decrease of monoamine neurotransmitter levels, with downregulation of brain-derived neurotrophic factor and its receptor expression in the hippocampus. Thus, the study indicates that the improvements in neuroendocrine, neurotrophic, and monoaminergic systems are related to the antidepressant effects of limonene.