

METHOD FOR ENHANCING FATTY ACID AMIDE HYDROLASE ACTIVITY – AGRICULTURE APPLICATIONS

Inventors

Kent Chapman, PhD
University of North Texas

Peter Koulen, PhD
University of Missouri –
Kansas City

George John, PhD
City University of New York

Patent Status

International patent
applications filed
US patents:
US 9,474,271 B2
US 9,849,101 B2

Publications

- *Synthesis of phenoxyacyl-ethanolamides and their effects on Fatty Acid amide hydrolase activity.* Faure L, Nagarajan S, Hwang H, Montgomery CL, Khan BR, John G, Koulen P, Blancaflor EB, Chapman KD. **J Biol Chem.** 2014 Mar 28;289(13):9340-51. doi:10.1074/jbc.M113.533315.
- Additional publications pending

Discovery

- Fatty acid amide hydrolase (FAAH) is a key regulator of bioactive lipid signaling. There are several inhibitors of FAAH known. We discovered the first enhancers of FAAH activity. These newly synthesized compounds stimulate the turnover of bioactive lipids in cells and organisms. Hence, these compounds are novel, highly useful tools for manipulating cell growth and biological functions in plants or animals.

Features

- Novel synthesis of first enhancers of FAAH activity covered
- Defined mechanistic pathway: regulation of the product inhibition of an enzyme
- Regulation occurs at the cell and organism (“in vivo”) levels
- Reduces levels of growth inhibiting lipids in plants
- Reduces appetite and feeding behavior

Benefits

- Enhancement of plant germination, root development and growth of seedlings
- Increase in plant seed success and early growth
- Control of feeding behavior of pests affecting plant seeds and seedlings
- Reduction in crop damage at the time of early plant development
- Method to improve growth over the life span of a plant
- Control of plant / crop damage by pests over the life span of a plant

Opportunities

- Both extrinsic factors such as drought stress and soil quality (*E. Lichtfouse (ed.), Alternative Farming Systems, Biotechnology, Drought Stress and Ecological Fertilisation, Sustainable Agriculture Reviews 6, DOI 10.1007/978-94-007-0186-1_6*) as well as intrinsic factors (*International Journal of Agronomy and Plant Production. Vol., 3 (11), 557-560, 2012*) control early plant development and determine crop yields. Novel methods to improve germination and early growth of plants are urgently needed.
- An average of 15% of crops worldwide are currently lost to insects, so controlling animal pests and/or their impact on crop yield is critical (*Yudelman, M., Ratta, A. & Nygaard, D. Pest Management and Food Production; International Food Policy Research Institute, 1998*).
- Potential applications include the coating of seeds, spraying of crops, inclusion in existing seed and crop treatments