

International Conference on

Plant Physiology & Pathology

June 09-10, 2016 Dallas, USA

Phytomelatonin: Helping plants to survive and to thrive

Russel J Reiter

UT Health Science Center, USA

Melatonin is synthesized in plants from the amino acid tryptophan. Initially, melatonin will be decarboxylated to tryptamine and this molecule then hydroxylated to serotonin. The conversion of serotonin to melatonin may be similar to that in animals, although there is some debate about this. It is assumed that serotonin is acted upon by N-acetyltransferase (NAT) to generate N-acetylserotonin; the latter molecule is then catalyzed to N-acetyl-5-methoxytryptamine (melatonin) by acetylserotonin methyltransferase (ASMT) (formally known as hydroxylindole-O- methyltransferase or HIOMT). Melatonin may not be the final product in some plant species, since melatonin is acted upon by 2-hydroxylase to produce 2-hydroxymelatonin. Melatonin and 2-hydroxymelatonin function as free radical scavengers to detoxify reactive oxygen species that otherwise damage critical molecules in plant cells. Additionally, melatonin is a potent growth promoting agent in plants. For example, when soybean seeds are coated with a solution that contains melatonin, a larger percentage of the seeds will germinate, plants grow faster and larger and the number of seeds and seed pods will be increased. Thus, melatonin enhances product yield in soybeans. Similarly, when seed corn or cucumber seeds are hydroprimed with melatonin, the percentage of the seeds that germinate elevated and product yield also increased. Plants treated with melatonin either pre- or post-germination are also more resistant to damage by environmental perturbations that interfere with photosynthesis and growth than control plants which are not treated with melatonin. Collectively, the results on the functions of melatonin in plants indicate that this indoleamine is highly beneficial in terms of protecting the plants from stressors and in improving productivity, actions that could have a major impact on food availability.

Biography

Russel J Reiter, PhD, is a Professor of Cell Biology at the UT Health Science Center in San Antonio, Texas. He has been awarded 3 honorary MD degrees and 1 honorary DSc Degree. He has received numerous awards for his research including the A. Ross McIntyre Gold Medal (USA), US Senior Scientist Award (Germany), Lezoni Lincee Award (Italy), the Inaugural Aaron B. Lerner Award (FASEB, USA), etc. His scientific publications have been cited in excess of 90,000 times (Google Scholar) and his h-index is 145. He is on Thomson Reuters List of Highly Cited Scientists (top 100 in his field).

reiter@uthscsa.edu

Notes: