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Research Paper

A Comprehensive Analysis of Xanthates and Their Intrusion in Different Biological Interaction

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ABSTRACT:
The magic of chemicals on the regulation of germination, growth and productivity of crops has intrigued plant secrets for the last more than four decades. Interest was first initiated by plant physiologist and their practical application was discovered by horticulturist. In the meantine, there have been multidimension studies. Now wave of interest have arisen periodically, with the discovery of new biologically active chemicals. Chemical applications to the plants offers a wide range of possibilities for exploring physiological phenomenon inside the plants. There are large number of reports on the effects of plant hormones on various physiological phenomenon in the plants. Besides the plant hormones, several chemicals are being used today for the regulation of plant growth.
KEYWORDS:

I. INTRODUCTION

Many chemicals when introduced into the plant in relatively small quantity intervene and exert recognizable effects on growth and development in various plants. Chemicals can be applied to modify assimilative activity, growth and developmental function and to intensify or ameliorate the effects of environmental conditions. (1-5)The use of chemicals has been increased tremendously for the improvement of agricultural and horticultural crops, as modifiers of nutrients or as regulators of growth, However, it has become clear that total control of plants growth is vested not in a single hormonal type but is shared by growth promotors and inhibitors i.e. auxins, gibberellins, crytokinins and ethylene and further subject to modifications by certain naturally occuring inhibitors namely phenols, flavanols and abscisic acid and artificially synthesized growth regulators.

The co-ordination chemistry of sulphur containing ligands has assumed greatest importance in view of the fact a large number of such compounds containing sulphydryl and disulphide group have found to possess biological activity, thereby finding medicinal and industrial applications. Keen interest in this class of compounds is due to their strong metal binding capability through both or one of its sulphur atom and insolubility of metal salts with exception of sodium and other alkali and alkaline earth metals and capability to form chelates and also their wide applications in industrial analytical," agricultural insecticidal pesticidal, fungicidal"and medicinalis chemistry In the past twenty years there has been a considerable increase of interest in the chemistry of metal xanthates and other similar compounds due to their industrial and analytical value and are used in medicines and are also used as fungicides, pesticides" herbicides. (6-8)

The commercial importance of such ligands in biological fields play an important role in medicine, antioxidents, enzyme deactivators, antibacterial action, (8-13) antifungal action and in many other biological processes. " The various other applications of these compounds have been described.

II. ROLE OF XANTHATES IN BIOLOGICAL SCIENCES:

BIOLOGICAL APPLICATION

Research in last two decades has demonstrated that xanthate have profound effect on biological system Eber hard" and others observed therapeutic properties of xanthate compound on herb, simplex virus in skin prision of mice and guineapigs. Derivatives of benzimideazole 15 are effective in vitro inhibitors of secretion by rabbit gastric mucosa. Several review have appeared on their biological activity of sulphur ligand. (14-19)

It was observed that many xanthates have fungicidal activity. Ahmad Shafiullah et, alobserved the xanthates upto Cg for toxicityin Mice and Tubifex worm. Benzyl butylxanthate is used as insecticidal for red spider. Reid aelus review of Zinc, cadmium and mercury has been used in agriculture as pesticides, herbicides and fungicides. Peri reported the parasitiocidal activity of arsenic (III) xanthate. The organoarsenic xanthate complexs are used as fungicides and herbicides. (19-22)

The survey of literature reveals that work has been carried out on the effect of dithiocarbamates on various plants, therefore it would be interesting to study the effect of similar compound xanthate etc on germination, physiology and early seedling growth in wheat. There are many techniques which have been used to obtain the substance in the high state of purity. Besides, chemical method many physical methods like distillation, fractional precipitation and crystallization have also been effectively used for the separation and purificaiton of chemical compounds. Some times it become necessary to follow a chemical method for separation by the physical method of purification and identification. In the field of chemistry and biochemical science many substances are obtained where classical methods for their identification and purification do not work satisfactorily.

Xanthic acids have long been known to act as reducing agents. Recently, D609, a tricyclodecanol derivative of xanthic acid, has been reported to have anti-apoptotic and anti-inflammatory properties that are attributed to specific inhibition of phosphatidyl choline phospholipase C (PCPLC). However, because oxidative stress is involved in both of these cellular responses, the possibility that xanthates may act as antioxidants was investigated in the current study. Finding that xanthates efficiently scavenge hydroxyl radicals, the mechanism by which D609 and other xanthate derivatives may protect against oxidative damage was further examined. The xanthates studied, especially D609, mimic glutathione (GSH). Xanthates scavenge hydroxyl radicals and hydrogen peroxide, form disulfide bonds (dixanthogens), and react with electrophilic products of lipid oxidation (acrolein) in a manner similar to GSH.

XANTHATES AND SOIL BACTERIAL INTERACTION:

Xanthates (ROCS2− Na+/K+) are man-made organic chemicals that not only have high mineral selectivity, but are also cost-effective and are the compounds commonly used as sulfide minerals' flotation collectors [11]. Sodium isopropyl xanthate (SIPX) and potassium ethyl xanthate (PEX) are the most frequently used for Ni flotation and recovery. Of the input reagents' quantity, 10 g to more than 400 g/ton ore [10], only half is effectively consumed during the flotation [11]. The remaining part and the unrecovered metals are discharged into the environment, with no treatment in general [12]. In addition, the reported increase in Ni demand [6] and the gradual depletion of high-grade ore reserves leads to the exploitation of complex and low-grade ore [13]. This results in an increased amount of ore processed and xanthates consumed, by 2–3% per year [12], leading to higher Ni and xanthates released into the environment. Xanthates are also released into the environment from their use in the agriculture sector (e.g., pesticides), rubber sector (i.e., vulcanizing agents), and in metallurgy, etc., and can reach the soil from their manufacturing, transportation (e.g., accidental spills), and improper disposal [14]. Both Ni and xanthates are also spread into the environment from mine tailings [15], the main mining waste dumping sites, from which they are dispersed to surface and ground waters by leaching and infiltration and can also reach long distances by wind, run-off and erosion, plant uptake [1], and transfer via the food web [16].

III. DISCUSSION

This study suggest that derivatives of xanthic acid are good reducing agents and are capable of protection against neuronal oxidative stress. For example, the xanthates studied efficiently scavenge hydroxyl radicals generated in a cell-free environment. Although the R-groups of the various xanthates, the xanthate analogs maintain similar hydroxyl radical scavenging capabilities in solution. This structure-independent radical scavenging suggests that the xanthic acid functionality is responsible for this phenomenon and not the hydrocarbon side chain (R-group). Consistent with this notion the methylated-D609 failed to scavenge radicals.

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