CRYSTALLINE MULTI-COMPONENT COMPOUNDS INVOLVING HEXAAMMINE COBALT(III) CATIONS AND THEIR EFFECTS AGAINST PLANT PATOGENIC BACTERIA

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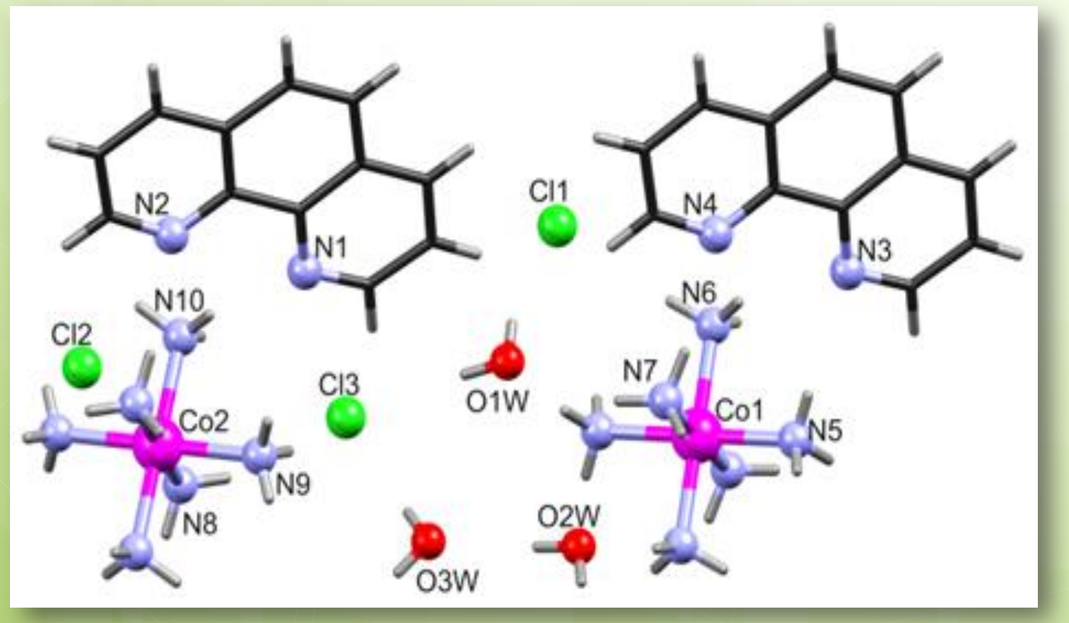
A new series of multi-component compounds containing the cation $[Co(NH_3)_6]^{3+}$ and various N-, N,O-, and O-donor ligands has been synthesized and crystallized. The complexes have been characterized by elemental analysis, IR-spectroscopy, and single crystal X-ray diffraction studies.

The series involves:

$[Co(NH_3)_6]Cl_3 \cdot 2(phen) \cdot 3H_2O$ (1),
$[Co(NH_3)_6](Hbdc)(bdc) \cdot 3H_2O$ (2),
$[Co(NH_3)_6]Cl_2(Hpht) \cdot 4H_2O$ (3),
$[Co(NH_3)_6]Cl(Hpht)_2 \cdot 3H_2O$ (4)
$[Co(NH_3)_6]Cl(2,3\text{-}pdc) \cdot H_2O$ (5),
$[Co(NH_3)_6]_{11}[Co(2,5\text{-}pdc)_3]_8Cl \cdot 84H_2O$ (6),
$[Co(NH_3)_6][Co(3,5\text{-}pdc)_2(H_2O)_4]Cl \cdot 3H_2O$ (7)
$[Co(NH_3)_6]Cl(sb) \cdot 4H_2O$ (8), and
$[Co(NH_3)_6]_2(sb)_3 \cdot EtOH \cdot 3H_2O$ (9)

(where phen = 1,10-phenanthroline, H_2bdc = diphenyl-4,4′-dicarboxylic acid, H_2pht = *o*-phthalic acid, H_2pdc = 2,3-/ 2,5-/ 3,5-pyridinedicarboxylic acid, H_2sb = 4-sulfobenzoic acid).

The coordination compound $[Co(NH_3)_6]Cl_3 \cdot 2(phen) \cdot 3H_2O$ (**1**) possesses pronounced properties as an inhibitor of cancer development in grapevines, a fact established by testing the inhibiting growth effect of ***Rhizobium*** (Agrobacterium) ***vitis*** bacteria.



$[Co(NH_3)_6]Cl_3 \cdot 2(phen) \cdot 3H_2O$ (1)

Additionally, the compounds **1-9** have been tested *in vitro* against *Rhizobium* (Agrobacterium) *vitis*, an oncogenic bacteria that cause the formation of tumors in plants.

Bacterial cancer of the vine caused by oncogenic bacterium *Rhizobium vitis* is a harmful and widespread disease provoking the significant economic damage in viticulture industry.

The lack of chemical substances against this grapevine disease has led to the fact that the disease still cannot be efficiently controlled and occurs in all areas of vine cultivation in world (Fig. 1).

Fig. 1. Symptoms of grape damage by bacterial cancer (*Rhizobium vitis* pathogen).

ADVANTAGES

The addition of cobalt(III) complex **$[Co(NH_3)_6]Cl_3 \cdot 2(phen) \cdot 3H_2O$ (1)** to the medium containing *Rhizobium* (Agrobacterium) *vitis* significantly

inhibits tumor growth
and
can be used against bacterial cancer in plants.

Patents: MD 4725 C1 2021.06.30.; MD 1459 Y 2020.10.31.

APPLICATION: Agriculture, Horticulture, Plant Protection

Acknowledgement: This work has been supported by the State Program of R. Moldova (project ANCD 20.80009.5007.15).