

MOLDOVA STATE UNIVERSITY
INSTITUTE OF CHEMISTRY
Scientific Research Laboratory
Coordination Chemistry



HR EXCELLENCE IN RESEARCH

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Tris(dimethyl pyridine-2,6-dicarboxylate)calcium tetra(isothiocyanate)cobaltate(II) with biostimulatory properties of lipolytic activity for the fungal strain *Rhizopus arrhizus* CNMN FD 03

PATENT: MD 4853/2023.04.30

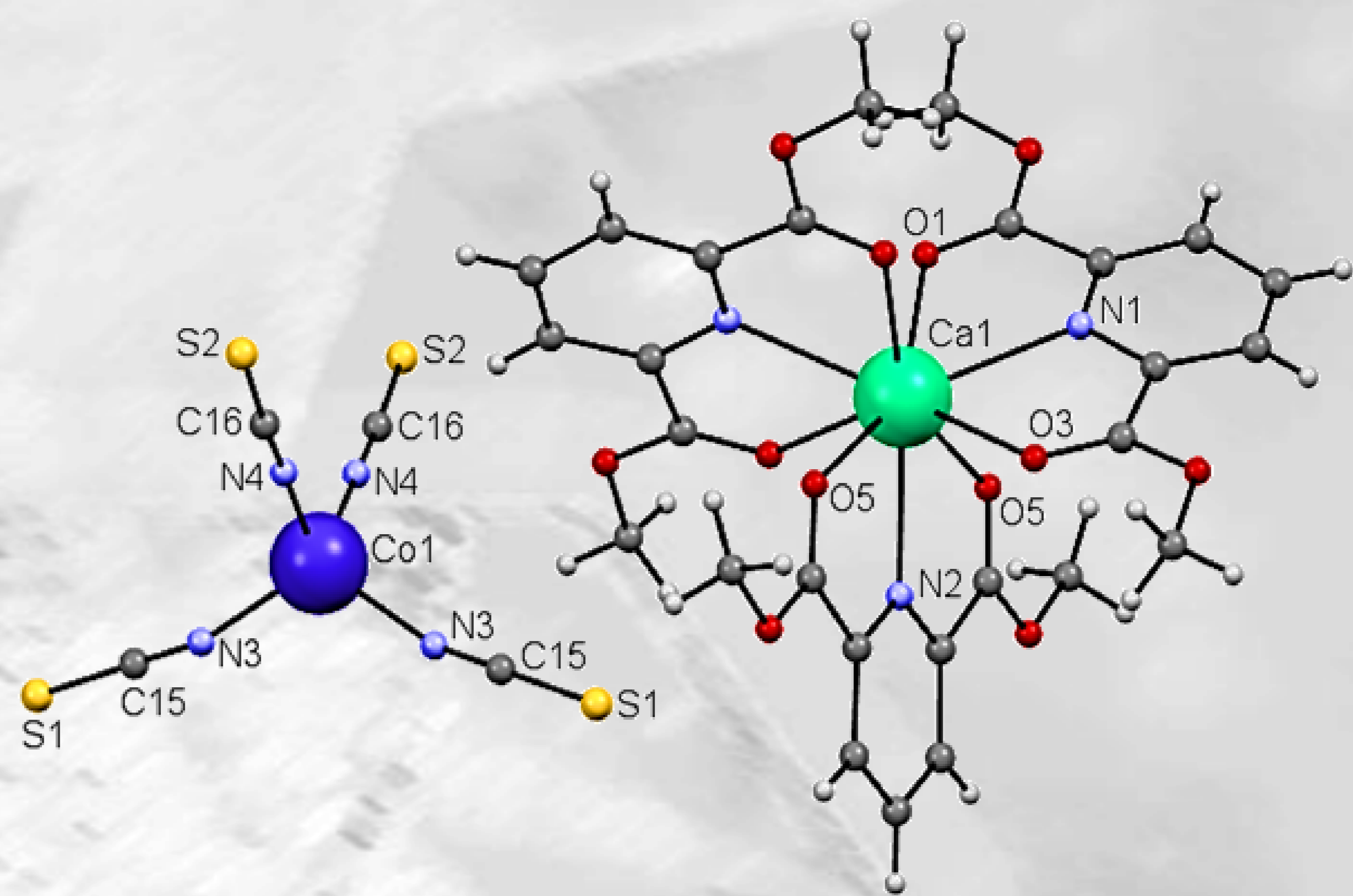
AUTHORS: Ion Bulhac, Dumitru Ureche, Pavlina Bouroș, Olga Danilescu, Alexandra Ciloci,
Steliana Clapco

APPLICATION FIELDS: Agriculture – Horticulture – Gardening

AIM: coordination chemistry and microbiology, especially in the synthesis of a compound of Ca(II) and Co(II), which can be used as a stimulator of lipolytic activity in the fungal strain *Rhizopus arrhizus* CNMN FD 03.

SOLUTION: New Ca(II) and Co(II) coordination compound with dimethyl-2,6-pyridinedicarboxylate (L) ligand was obtained.

The influence of the claimed compound on the lipolytic activity of the micromycete *Rhizopus arrhizus* CNMN FD 03



Molecular structure of the compound $[\text{CaL}_3][\text{Co}(\text{NCS})_4]$

Compusul	Conc., g/L	1 st day		2 nd day		3 rd day	
		Activity, u/mL	%/control	Activity, u/mL	%/control	Activity, u/mL	%/control
$[\text{CaL}_3][\text{Co}(\text{SCN})_4]$	0,005	20125	112,2/107,3	22500	120,3	1875	33,3
	0,010	35583	198,4/189,8	27500	146,7	3750	66,7
	0,015	26250	146,3/140,0	35000	186,7	3750	66,7
Control	-	17930	100,0	18750	100,0	5625	100,0

*112,2/107,3 – vs. the daily control/ vs. the absolute maximum of the control (day 2)

ADVANTAGES: The lipolytic activity in the variants with the synthesized compound $[\text{CaL}_3][\text{Co}(\text{SCN})_4]$ constituted 20125 u/mL (0.0005 g/L), 35583 u/mL (0.0010 g/L) and 26250 u/mL (0.0015 g/L) depending on the applied concentration, exceeding the maximum level of the control sample, the 2nd day of cultivation - by 7-90%. At the same time, the enzyme activity is maintained at high levels: 22500 u/mL, 27500 u/mL, 35000 u/mL at all concentrations tested and on the second day of cultivation, which increases the certainty of obtaining a higher amount of lipolytic enzymes compared to the control.

IMPLEMENTATION STAGE: At the laboratory level.

ACKNOWLEDGMENTS: This research was supported by the research projects: 20.80009.5007.28 and 20.80009.5007.15.



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Tris(dimethyl pyridine-2,6-dicarboxylate)strontium tetra(isothiocyanate)cobaltate(II) with lipolytic activity biostimulatory properties for the fungal strain *Rhizopus arrhizus* CNMN FD 03

PATENT: MD 4831/2022.11.30

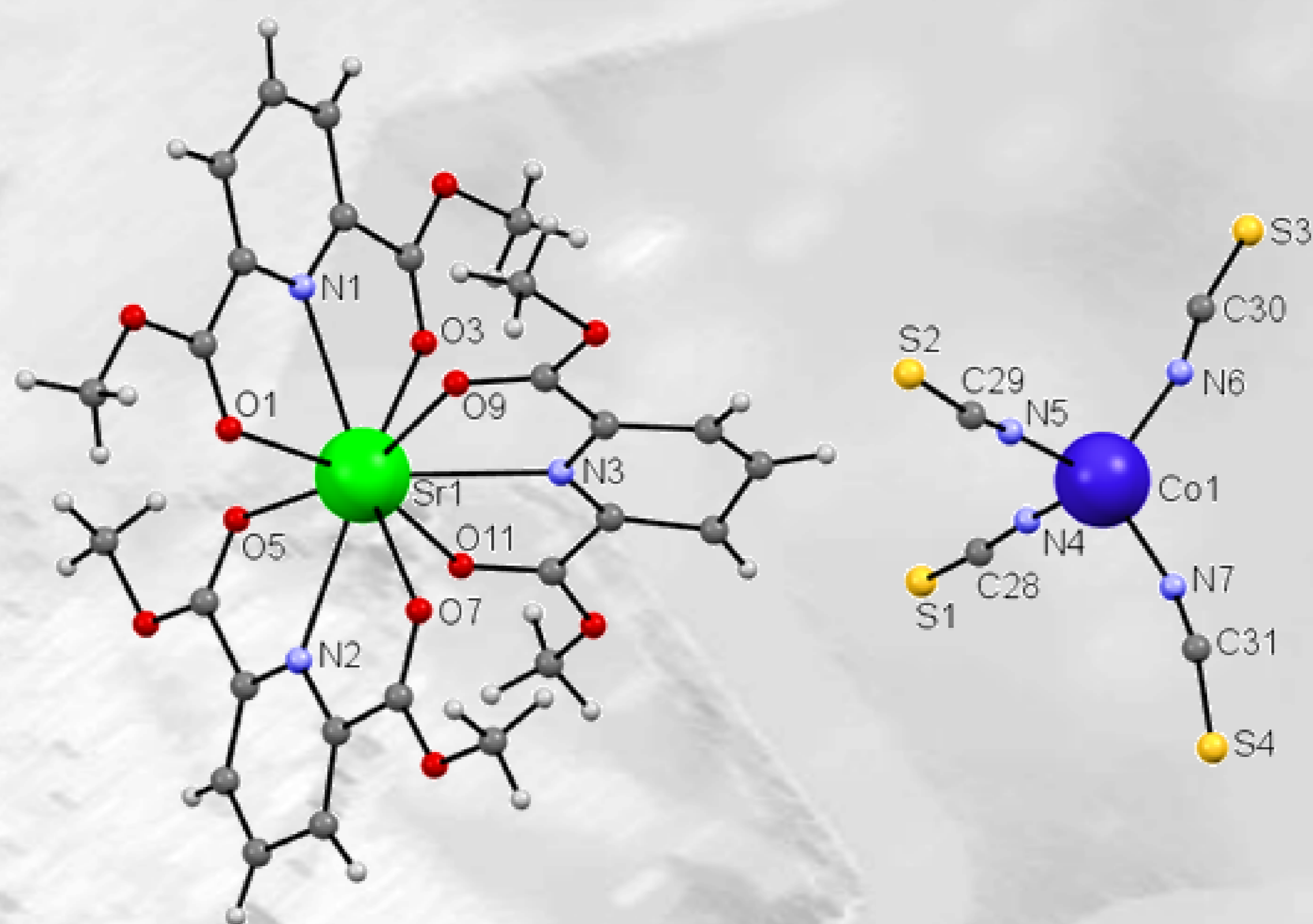
AUTHORS: Ion Bulhac, Dumitru Ureche, Alexandra Ciloci, Pavlina Bouroș, Janeta Tiurina, Svetlana Labliuc

APPLICATION FIELDS: Agriculture – Horticulture – Gardening

AIM: coordination chemistry and microbiology, especially in the synthesis of a compound of Sr(II) and Co(II), which can be used as a stimulator of lipolytic activity in the fungal strain *Rhizopus arrhizus* CNMN FD 03.

SOLUTION: New Sr(II) and Co(II) coordination compound with dimethyl-2,6-pyridinedicarboxylate (L) ligand was obtained.

The influence of the claimed compound on the lipolytic activity of the micromycete *Rhizopus arrhizus* CNMN FD 03



Molecular structure of the compound $[\text{SrL}_3][\text{Co}(\text{NCS})_4]$

Compound	Conc., mg/L	1 st day		2 nd day	
		Activity, U/mL	%/control*	Activity, U/mL	%/control
$[\text{SrL}_3][\text{Co}(\text{SCN})_4]$	0,5	27562	153,7/146,9	20000	106,7
	1.0	21000	117,1/112,0	20000	106,7
	1,5	15312	85,4	15000	80,0
Control	-	17930	100,0	18750	100,0

*153,7/146,9 – vs. the daily control/ vs. the absolute maximum of the control (day 2)

ADVANTAGES: The synthesized $[\text{SrL}_3][\text{Co}(\text{NCS})_4]$ compound increases the activity of exocellular lipases by 12-46.9%, depending on the applied concentration. Thus, the lipolytic activity was 27562 u/mL (0.0005 g/L) and 21000 u/mL (0.0010 g/L) on the 1st day of cultivation, exceeding the level of the control sample from the same day by 53.7, respectively, 17.0% and of the witness from day 2 – with 46.9 and 12.0%, respectively. Respectively, in the same case, an intensification of the biosynthesis of lipases by 24 h in relation to the control is found.

IMPLEMENTATION STAGE: At the laboratory level.

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