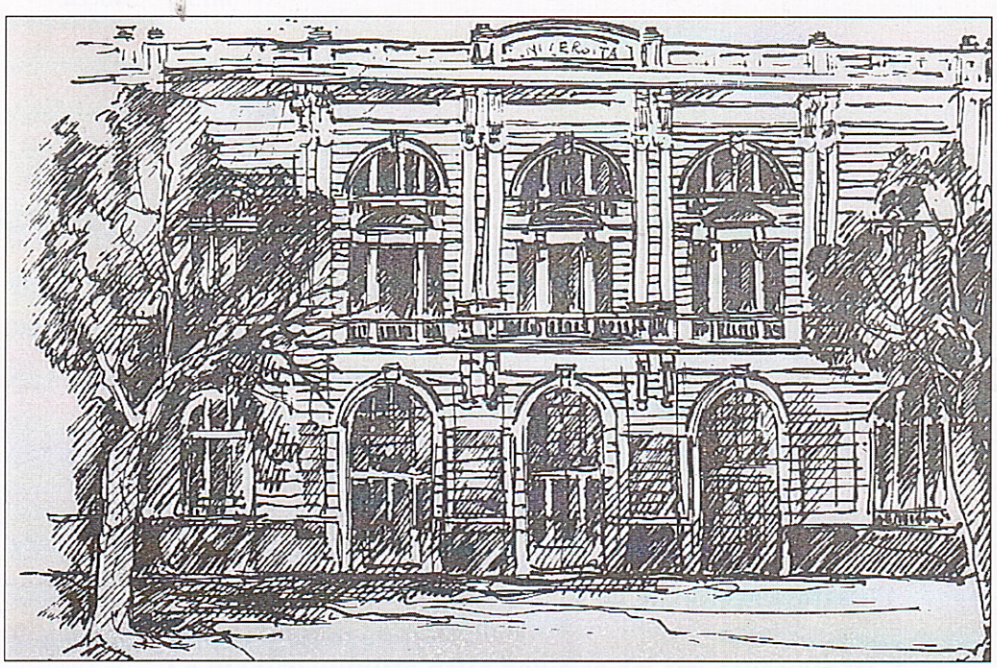
Società Chimica Italiana
Divisione di Chimica dell'Ambiente
e dei Beni Culturali

Università degli Studi di Sassari
Dipartimento di Scienze
Ambientali Agrarie e
Biotecnologie Agro-Alimentari

III Conferenza Organizzativa

Inquinamento da metalli pesanti: la biodisponibilità



Sassari
5 e 6 maggio 2005
Polo didattico - Facoltà di Scienze
Via Vienna

NICKEL IN THE ENVIRONMENT AND HUMAN HEALTH

M.A. Zoroddu, M. Peana, S. Medici

Department of Chemistry, University of Sassari, via Vienna 2, 07100 Sassari, Italy
Email: zoroddu@uniss.it

Several metals and metal containing compounds are potent mutagens and carcinogens.

Nickel is one of the most abundant transition metals in the earth's crust. It is widely distributed in the environment. Natural sources of atmospheric nickel include dusts from volcanic emissions and weathering of rocks and soils; natural sources of aqueous nickel derive from biological cycles and solubilization of metal compounds from soils.

However, anthropogenic sources are the main responsible of the abundance of the metal in the environment. In fact, it is widely used in the modern industry and several industrial processes, including mining and refining, electroplating, production of electronic devices, nickel cadmium batteries, together with the combustion of fossil fuels and the incineration of nickel containing solid waste are responsible for the release of nickel containing aerosols in the workplace as well as in the surrounding environment [1,2].

In industrialized regions and large cities, atmospheric nickel concentration may reach 120-170 ng/m^3, compared to 6-17 ng/m^3 in suburban areas. Human exposure to nickel occurs predominantly *via* inhalation and ingestion and it is particularly high among Ni metallurgy workers. Epidemiological studies have demonstrated a direct correlation between the incidence of respiratory cancer and worksite exposure to Ni.

The relative carcinogenic activity of Ni compounds can be consistently related to their chemical form [3-5].

References

[1] Denkhaus E, Salnikow K. *Nickel essentiality, toxicity, and carcinogenicity*. Crit Rev Oncol Hematol. 2002; 42(1):35-56. Rev.

[2] Kasprzak KS, Sunderman FW Jr, Salnikow K. *Nickel carcinogenesis*. Mutat Res. 2003;533(1-2):67-97. Rev.

[3] Broday L, Peng W, Kuo MH, Salnikow K, Zoroddu M, Costa M. *Nickel compounds are novel inhibitors of histone H4 acetylation*. Cancer Res. 2000; 60(2):238-41.

[4] Cangul H, Broday L, Salnikow K, Sutherland J, Peng W, Zhang Q, Poltaratsky V, Yee H, Zoroddu MA, Costa M. *Molecular mechanisms of nickel carcinogenesis*. Toxicol Lett. 2002;127(1-3):69-75. Rev.

[5] Zoroddu MA, Schinocca L, Kowalik-Jankowska T, Kozlowski H, Salnikow K, Costa M. *Molecular mechanisms in nickel carcinogenesis: modeling Ni(II) binding site in histone H4*. Environ Health Perspect. 2002;110 Suppl 5:719-23. Rev.

Nickel in the Environment and Human Health

Maria Antonietta Zoroddu, Massimiliano Peana, Serenella Medici
Department of Chemistry, University of Sassari, via Vienna 2, 07100 Sassari, Italy
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