

REFERENCES

- Aoyagi T, Hayakawa K, Miyaji K, Ishikawa H, Hata M. Cadmium nephrotoxicity and evacuation from the body in a rat modeled subchronic intoxication. *Int J Urol* 2003; 10: 332-8.
- Anderson H, Larsen S, Splid H, Christenson ND. Multivariate statistical analysis of organ weights in toxicity studies. *Toxicology* 1999; 136: 67.
- Aritajat S, Wutteeapol S, Saenphet K. Anti-diabetic effect of *Thunbergia laurifolia* Linn. aqueous extract. *Southeast Asian J Trop Med Public Health* 2004; 35(2): 53-8.
- Asar M, Kayisli UA, Uysal VN, Akkoyunlu G. Immunohistochemical and ultrastructural changes in the renal cortex of cadmium-treated rats. *Biol Trace Elem Res* 2004; 97: 249-63.
- ATSDR. Toxicological profile for cadmium. Agency for toxic substances and disease registry, Atlanta, GA 1998.
- Aughey E, Fell GS, Scott R, Black M. Histopathology of early effects of oral cadmium in the rat kidney. *Environ Health Persp* 1984; 54: 153-61.
- Barbier OB, Dauby A, Jacquilet G, Tauc M, Poujeol P, Cougnon M. Zinc and cadmium interaction in renal cell line derived from rabbit proximal tubule. *Nephron Physiol* 2005; 99: 74-84.

- Bogiswariy S, Jegathambigai R, Marimuthu K. Effect of acute exposure of cadmium chloride in the morphology of the liver and kidney of mice. International conference on environmental research and technology 2008: 1036-42.
- Boonyarat S. Effect of *Thunbergia laurifolia* Lindl. Leaf extract on micronucleus induction by methomyl insecticide. M.S.Thesis, Chiang Mai University, 2004.
- Brzoska MM, Jakoniuk JM, Marcinkiewicz BP, Sawick B. Liver and kidney function and histology in rats exposed to cadmium and ethanol. *Alcohol & Alcoholism* 2003; 38(1): 2-10.
- Brzoska MM, Rogalska J, Galazyn-Sidorczuk M, Jurczuk M, Roszczenko A, Kulikowska-Karpinska E, *et al.* Effect of zinc supplementation on bone metabolism in male rats chronically exposed to cadmium. *Toxicology* 2007; 237: 89-103.
- Bulat ZP, Djukic-Cosic D, Malicevic Z, Bulat P, Matovic V. Zinc or magnesium supplementation modulates cadmium intoxication in blood, kidney, spleen and bone of rabbit. *Biol Trace Elem Res* 2008; 124: 110-7.
- Chaiyasing K. Effect of *Thunbergia laurifolia* Lindl. leaf extract on methomyl-induced cholinesterase inhibition. M.S.Thesis, Chiang Mai University, 2005.
- Chamreondarassame B. The effect of Rang Jert leaves on the body temperature. M.S.Thesis, Chiang Mai University, 1978.
- Chanawirat A. The protective effect of *Thunbergia laurifolia* extract on ethanol-induced hepatotoxicity in mice. M.S.Thesis, Chiang Mai University, 2000.

Chwelatiuk E, Wlostowski T, Krasowska A, Bonda E. The effect of orally administration melatonin on tissue accumulation and toxicity of cadmium in mice. *J Trace Med Bio* 2006; 19: 259-65.

Dan G, Lall SB, Rao DN. Humoral and cell mediated immune response to cadmium in mice. *Drug Chem Toxicol* 2000; 23: 349-60.

Dakeshita S, Kawai T, Uemura H, Hiyoshi M, Oguma E, Horiguchi H, *et al.* Gene expression signatures in peripheral blood cells from Japanese women exposed to environmental cadmium. *Toxicology* 2009; 257: 25-32.

Di Gioacchino M, Petrarca C, Perrone A, Farina M, Sabbioni E, Hartung T, *et al.* Autography as an ultrastructural markers of heavy metal toxicity in human cord blood hematopoietic stem cells. *Sci Total Environ* 2008; 392: 50-8.

Dorian C, Klaassen CD. Protection by zinc-metallothionein (ZnMt) against cadmium metallothionein-induced nephrotoxicity. *Fund Appl Toxicol* 1995; 26: 99-106.

Dudley RE, Gammal LM, Klaassen CD. Cadmium-induced hepatic and renal injury in chronically exposed rats: likely role of hepatic cadmium-metallothionein in neprotoxicity. *Toxicol Appl Pharm* 1985; 77: 414-26.

Egwurugwu JN, Ufearo CS, Abanobi OC, Nwokocha CR, Duruibe JO, Adeleye GS, *et al.* Effects of ginger (*Zingiber officinale*) on cadmium toxicity. *Afr J Biotech* 2007; 6: 2078-82.

El-Demerdash F, Yousef MI, Kedwany FS, Baghdadi HH. Cadmium-induced changes in lipid peroxidation, blood hematology, biochemical parameters and semen

quality of male rats: protective role of vitamin E and β -carotene. *Food Chem Toxicol* 2004; 42: 1563-71.

Esrefoglu M, Gul M, Dogru MI, Dogru A, Yurekli M. Adrenomedullin fails to reduce cadmium-induced oxidative damage in rat liver. *Exp Toxicol Pathol* 2007; 58: 367-74.

Ferguson MA, Vaidya VS, Bonvetre JV. Biomarkers of nephrotoxic acute kidney injury. *Toxicolgy* 2008; 245: 182-93.

Fowler BA. Mechanism of kidney cell injury from metals. *Environ Health Persp* 1992; 100: 57-63.

Fowler BA. Monitoring of human populations for early markers of cadmium toxicity: a review. *Toxicol Appl Pharm* 2009; 238: 294-300.

Gonick HC. Nephrotoxicity of cadmium & lead. *Indian J Med Res* 2008. 128(4): 335-52.

Houem S, Hmad N, Najjar MF, Hani AE, Sakly R. Accumulation of cadmium and its effects on liver and kidney functions in rats given diet containing cadmium-polluted radish bulb. *Exp Toxicol Pathol* 2007; 59: 77-80.

Hispard F, Vauflery A, Martin H, Devaux S, Cosson RP, Scheifler R, *et al.* Effects of subchronic digestive exposure to organic or inorganic cadmium on biomarkers in rat tissue. *Ecotox Environ Safe* 2007; 24: 45-50.

Honda R, Swaddiwudhipong W, Nishijo M, Mahasakpan P, Teeyakasem W, Ruangyuttikarn W, *et al.* Cadmium induced renal dysfunction among residents

of rice farming area downstream from a zinc-mineralized belt in Thailand. *Toxicol Lett* 2010; 198: 26-32.

Horiguchi H, Ogama E, Kayama F. Cadmium and cisplatin damage erythropoietin-producing proximal renal tubular cells. *Arch Toxicol* 2006; 80: 680-6.

Jarup L, Berglund M, Elinder CG, Nordberg G, Vahter M. Health effect of cadmium exposure-a review of the literature and a risk estimate. *Scand J Work Environ Health* 1998; 24: 1-52.

Jarup L. Cadmium overload and toxicity. *Nephrol Dial Transpl* 2002; 17(2). 35-9.

Jemai H, Messaoudi I, Chaouch A, Kerkeni A. Protective effect of zinc supplementation on blood antioxidant defense system in rats exposed to cadmium. *Trace Elem Med Biol* 2007; 21: 269-73.

Jemai H, Lachkar HA, Messaoudi I, Kerkeni A. Effects of zinc pre-treatment on blood glutathione, serum zinc and kidney histological organization in male rats exposed to cadmium. *Trace Elem Med Biol* 2010; 24: 277-82.

Jihen EH, Imed M, Fatima H, Abdelhamid K. Protective effects of selenium (Se) and zinc (Zn) on cadmium (Cd) toxicity in the liver and kidney of the rat: histology and Cd accumulation. *Food Chem Toxicol* 2008; 46: 3522-27.

Jihen EH, Fatima H, Nouha A, Baati T, Imed M, Abdelhamid K. Cadmium retention increase: a probable key mechanism of the protective effect of zinc on cadmium-induced toxicity in the kidney. *Toxicol Lett* 2010; 196: 104-9.

Jitpuwngam. The studies of compounds in Thunbergia laurifolia Lindl. M.S.Thesis,

Chiang Mai University, 1979.

Joseph P. Mechanisms of cadmium carcinogenesis. *Toxicol Appl Pharm* 2009; 238: 272-9.

Kanchanapoom T, Kasai R, Yamasaki K. Iridoid glucosides from *Thunbergia laurifolia*. *Phytochemistry* 2002; 60: 769-71.

Kara H, Cevik A, Konar V, Dayangac A, Servi K. Effects of selenium with vitamin E and melatonin on cadmium-induced oxidative damage in rat liver and kidneys. *Biol Trace Elem Res* 2008; 125: 236-44.

Karadeniz A, Cemek M, Simsek N. The effect of *Panax ginseng* and *Spirulina platensis* on hepatotoxicity induced by cadmium in rats. *Ecotox Environ Safe* 2009; 72: 231-5.

Kido T, Nordberg GF, Roels HA. Cadmium-induced renal effects. *Clin Nephro*. 2003; 2: 507-30.

Kirschvink N, Martin N, Fievez L, Smith N, Marlin D, Gustin P. Airway inflammation in cadmium-exposed rats is associated with pulmonary oxidative stress and emphysema. *Free Radic Res* 2006; 241-50.

Klaassen CD. Casarett and Doull's toxicology: the basis science of poisons, McGraw-Hill, New York, 1995: 721-5.

Kriratcharoen K, Srichaitun N, Rodtong P. The study of active constituents from leaves of *Thunbergia laurifolia*. Special problem, Chiang Mai University, 1999.

Ktapcinska B, Poprzeczki S, Dolezych B, Kimsa E. Cadmium-induced changes in hematology and 2,3-DPG levels in rats. *Environ Contam Toxicol* 2000; 64: 93-9.

Lauwerys RR, Bernard AM. Cadmium and the kidney. *Occup Environ Med* 1986; 43: 433-5.

Limpatanachote P, Swaddiwudhipong W, Mahasakpan P, Krintratun S. Cadmium-exposed population in Mae Sot district, Tak province: 2.prevalence of renal dysfunction in the adults. *J Med Assoc Thai* 2009; 92(10): 1345-53.

Lauhachinda B, Heuseugcharern A. Chemistry, Clinical-Laboratory manuals. Chiang Mai, Tanabun Printing, 2004: 197-207.

Massadeh AM, Al-Safi SA, Momani IF, Alomary AA, Jaradat QM, AlKofahi AS. Garlic (*Allium sativum* L.) as potential antidote for cadmium and lead intoxication: cadmium and lead distribution and analysis in different mice organ. *Biol Trace Elem Res* 2007; 120: 227-34.

Mendez-Armenta M, Rios C. Cadmium neurotoxicity. *Environ Toxicol Pharm* 2007. 23: 350-8.

Misra UK, Gawdi G, Pizzo SV. Induction of mitogenic signaling in the 1LN prostate cell line on exposure to submicromolar concentrations of cadmium+. *Cell Signal* 2003; 15, 1059-70.

Moore JW, Stara JF, Crocker WC, Malanchuk M, Iltis R. Comparison of 115m cadmium retention in rats following different routes of administration. *Environ*

Res 1973; 6: 473-8.

Nambunmee K, Honda R, Nishijo M, Swaddiwudhipong W, Nakagawa H, Ruangyuttikarn W. Bone resorption acceleration and calcium reabsorption impairment in a Thai population with high cadmium exposure. *Toxicol Mech Method* 2010; 20(1): 7-13.

Nemniche S, Chabane-Sari D, Guiraud P. Role of alpha-tocopherol in cadmium-induced oxidative stress in Wistar rat's blood, liver, brain. *Chem Biol Interact* 2007; 170: 221-30.

Nordberg M. General aspects of cadmium: transport, uptake and metabolism by the kidney. *Environ Health Persp* 1984; 54: 13-20.

Panichayupakaranunt P. "Rangchuet." [online]. Available:

<http://pcog.pharmacy.psu.ac.th/thi/Article/2544/11-44/Thunbergia.pdf> (25 Jan 2011).

Panyamoon A, Nambunmee K, Nishijo M, Swaddiwudhipong W, Ruangyuttikarn W.

Detection of urinary kidney injury molecule-1 in a chronic cadmium exposed population, Mea Sot district, Tak province. *Thai J Toxicology* 2009; 24(2): 72-80.

Pari L, Murugavel P. Diallyl tetrasulfide improves cadmium induced alterations of acetylcholinesterase, ATPase and oxidative stress in brain of rats. *Toxicology* 2007; 234: 44-50.

Pari L, Murugavel P, Sitasawad SL, Kumar KS. Cytoprotective and antioxidant role

of diallyl tetrasulfide on cadmium induced renal injury: an *in vivo* and *in vitro* study. *Life Sci* 2007; 80: 650-8.

Pathak N, Khandelwal S. Oxidative stress and apoptotic changes in murine splenocytes exposed to cadmium. *Toxicology* 2006; 220: 26-36.

Pramyothin P, Chirdchupunsare H, Rungsipat A, Chaichantipyuth C. Hepatoprotective activity of *Thunbergia laurifolia* Lindl. extract in rats treated with ethanol: *In vitro* and *in vivo* studies. *J Ethnopharmacol* 2005; 102: 408-11.

Prozialeck WC, Vaidya VS, Liu J, Waalkes MP, Edwards JR, Lamar PC, *et al.* Kidney injury molecule-1 is an early biomarker of cadmium nephrotoxicity. *Kidney Int* 2007; 72(8): 985-93.

Prozialeck WC, Edwards JR, Nebert DW, Woods JM, Barchowsky A, Atchison WD. The vascular system as a target of metal toxicity. *Toxicol Sci* 2008; 102(2): 207-18.

Prozialeck WC, Edwards JR, Lamar PC, Liu J, Vaidya VS, Bonventre JV. Expression of kidney injury molecule-1 (Kim-1) in relation to necrosis and apoptosis during the early stages of Cd-induced proximal tubule injury. *Toxicol Appl Pharmacol* 2009; 238(3): 306-14.

Prozialeck WC, Edwards JR. Early biomarkers of cadmium exposure and nephrotoxicity. *Biometals* 2010; 23(5): 793-809.

Purnima M, Gupta PC. Colouring matters from the flowers of *Thunbergia laurifolia*. *J*

Indian Chem Soc. 1978; 55: 622-3.

Renugadevi J, Prabu SM. Naringenin protects against cadmium-induced oxidative renal dysfunction in rats. *Toxicology* 2009; 256: 128-34.

Renugadevi J, Prabu SM. Quercetin protects against oxidative stress-related dysfunction by cadmium in rats. *Exp Toxicol Pathol* 2010a; 62(5): 471-81.

Renugadevi J, Prabu SM. Cadmium-induced hepatotoxicity in rats and the protective effect of naringenin. *Exp Toxicol Pathol* 2010b; 62: 171-81.

Rockwell P, Martinez J, Papa L, Gomes E. Redox regulates COX-2 upregulation and cell death in the neuronal response to cadmium. *Cell Signal* 2007; 16: 343-53.

Ruangyuttikarn W. The pharmacological studies of Rang Jert leaves. M.S.Thesis, Chiang Mai University, 1980.

Samir H, Najla H, Mohamed FN, Abdelhamid E, Rachid S. Accumulation of cadmium and its effects on liver and kidney functions in rats given diet containing cadmium-polluted radish bulb. *Exp Toxicol* 2000; 59: 77-80.

Satarug S, Garrett SH, Sens MA, Sens DA. Cadmium, environmental exposure and health outcomes. *Environ Health Persp* 2010; 188(2): 182-90.

Simmon RW, Pongsakul P, Saiyasitpanich D, Klinphoklap S. Elevated levels of cadmium and zinc in paddy soils and elevated levels of cadmium in rice grain downstream of a zinc mineralized area in Thailand: implication for public health. *Environ Geochem Hlth* 2005; 27: 501-11.

Sudo J, Hayashi T, Kimura S, Kakuno K, Terui J, Takashima K, *et al.* Mechanism of

nephrotoxicity induced by repeated administration of cadmium chloride in rats. *J Toxicol Environ Health* 1996; 48: 333-48.

Sue ER, Mruk DD, Porto CS, Cheng CY. Cadmium-induced testicular injury. *Toxicol Appl Pharm* 2009. 238; 240-9.

Supalaknaree S, Krungkrai S. Extraction and purification of major components from *Thunbergia laurifolia* Linn. By organic solvent extraction and high performance liquid chromatography. Rangsit University, 1999.

Suru SM. Onion and Garlic extracts lessen cadmium-induced nephrotoxicity in rats. *Biometals* 2008; 21: 623-33.

Swaddiwudhipong W, Limpatanachote P, Mahasakpan P, Krintratun S, Padungtod C. Cadmium-exposed population in Mae Sot district, Tak province: 1. prevalence of high urinary cadmium levels in the adults. *J Med Assoc Thai* 2007; 90(1): 143-8.

Swaddiwudhipong W, Limpatanachote P, Nishijo M, Honda R, Mahasakpan P, Krintratun S. Cadmium-exposed population in Mea Sot district, Tak province: 3. associations between urinary cadmium and renal dysfunction, hypertention, diabetes, and urinary stones. *J Med Assoc Thai* 2010; 93(2): 231-8.

Tangpong P, Satarug S. Alleviation of lead poisoning in the brain with aqueous leaf extract of the *Thunbergia laurifolia* (Linn.). *Toxicol Lett* 2010; 198(1): 83-8.

Teeyakasem W, Nishijo M, Honda R, Satarug S, Swaddiwudhipong W, Ruangyuttikarn W. Monitoring of cadmium toxicity in a Thai population with

high-level environmental exposure. *Toxicol Lett* 2007; 169: 185-95.

Tejasen P. Traditional Medicine. Department of Pharmacology, Faculty of Medicine, Chiang Mai University 1978. (in Thai)

Templeton DM, Liu Y. Multiple roles of cadmium in cell death and survival. *Chem-Biol Interact* 2010; 188: 267-75.

Thiangbuntham W. *Thai herbs dictionary*, 5th ed. Bangkok: Ruam Sat Printing House 1999.

Thompson J, Bannigan J. Cadmium: toxic effects on the reproductive system and the embryo. *Reprod Toxicol* 2008; 25: 304-15.

Thongsaard W, Marsden CA. A herbal medicine used in the treatment of addiction mimics the action of amphetamine on in vitro rat striatal dopamine release. *Neurosci Lett* 2002; 329: 129-32.

Thongsaard W, Marsden CA, Morris P, Prior M, Shah YB. Effect of *Thunbergia laurifolia*, a Thai natural product used to treat drug addiction, on cerebral activity detected by functional magnetic resonance imaging in the rat. *Psychopharmacology* 2005; 180: 752-60.

Utokpach C. Handbook of traditional herb and tropical diseases and treatment. Prae Pittaya International, Bangkok, Thailand 1976. (in Thai)

Vaidya VS, Ramirez V, Ichimura T, Bobadilla NA, Bonventre JV. Urinary kidney injury molecule-1: a sensitive quantitative biomarker for early detection of kidney tubular injury. *Am J Physiol Renal Physiol* 2006; 290: 517-29.

Vincente-Sanchez C, Egado J, Sanchez-Gonzalez S, Perez-Barriocanal F, Lopez-Novoa JM, Morales AI. Effect of the flavonoid quercetin on cadmium-induced hepatotoxicity. *Food Chem Toxicol* 2008; 46: 2279-87.

Waalkes MP. Cadmium carcinogenesis. *Mutat Res.* 2003; 533: 107-20.

Wang Y. Mechanisms for Cadmium lumen-to-cell transport by the luminal membrane of the rabbit proximal tubule. *Biology dissertations* 2007. Paper20.

Wasuwat S. A list of Thai medicine plants. Research report, A.S.R.C.T., No.1 Research project 1976; 17: 22.

Wester RC, Maibach HI, Sedik L, Melendres J, Dizio S, Wade M. In vitro percutaneous absorption of cadmium from water and soil into human skin. *Fundam Appl Toxicol* 1992; 19: 1-5.

WHO, "Environmental health criteria 134: Cadmium", World health Organization, Geneva, 1992.

Willer S, Gerhardsson L, Lundh T. Environmental tobacco smoke (ETS) exposure in children with asthma-relation between lead and cadmium, and cotinine concentrations in urine. *Respir Med* 2005; 99: 1521-7.

Wisitpongpan W, Ruangyuttikarn W, Rujjanavet C. Toxicity tests of Rang Jert (*Thunbergia laurifolia* Linn.) leaves aqueous extracts in rats. *Thai J Phytopharm* 2003; 10(2): 23-36.

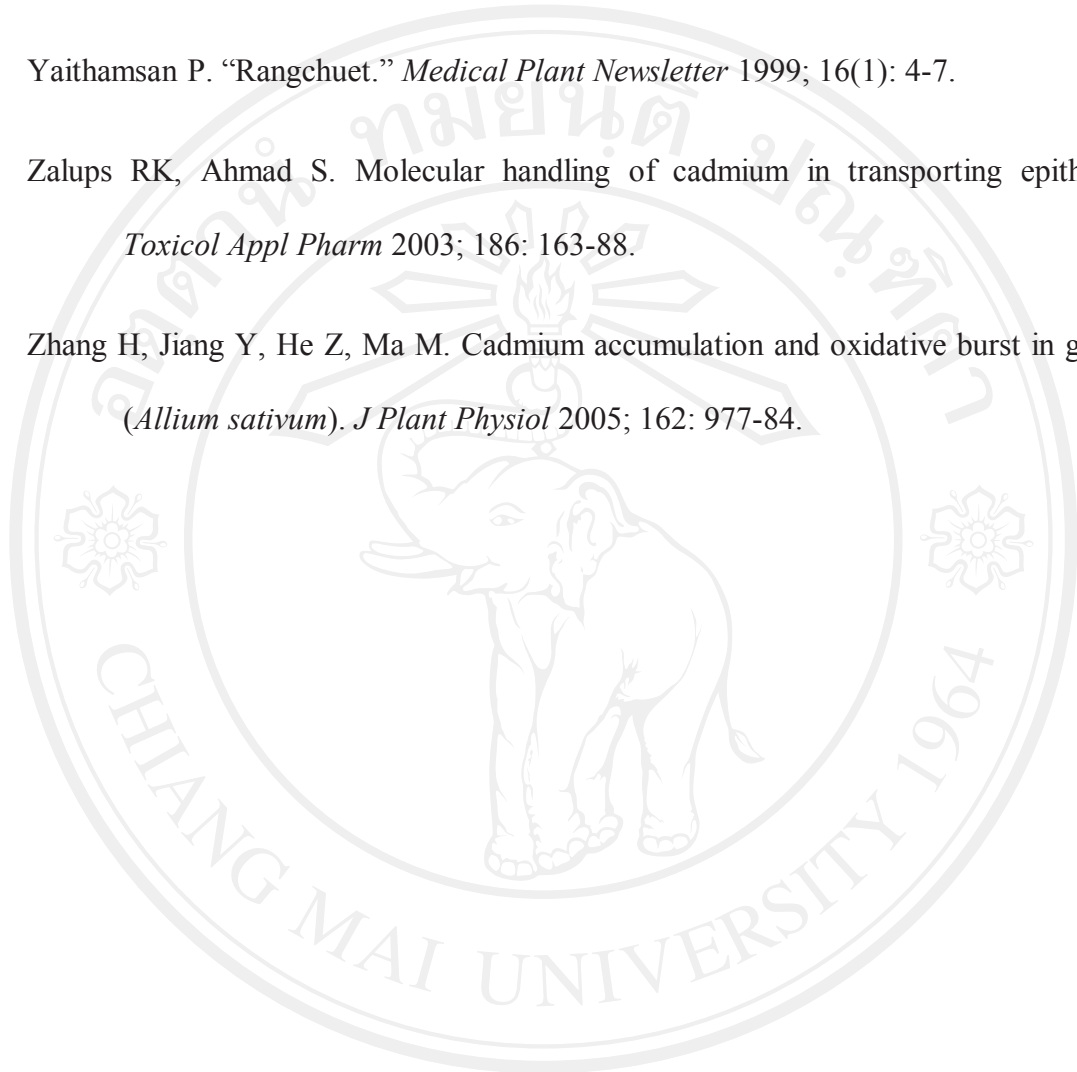
Wuttithamwat W. *Thai herbs encyclopedia*. Bangkok: Odiansato Publishing House 1997

Yadav N, Khandelwal S. Effect of Picroliv on cadmium-induced hepatic and renal damage in the rat. *Hum Exp Toxicol* 2006; 25: 581-91.

Yaithamsan P. "Rangchuet." *Medical Plant Newsletter* 1999; 16(1): 4-7.

Zalups RK, Ahmad S. Molecular handling of cadmium in transporting epithelia. *Toxicol Appl Pharm* 2003; 186: 163-88.

Zhang H, Jiang Y, He Z, Ma M. Cadmium accumulation and oxidative burst in garlic (*Allium sativum*). *J Plant Physiol* 2005; 162: 977-84.



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