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3-ALKYLPYRROLES (3-AP's): SYNTHESSES AND ELECTROPOLYMERIZATION.

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A series of 3-AP's (alkyl: ethyl, pentyl, hexyl, nonyl, undecyl and tetradecyl) was synthesized via two methods: a). RCHO, ethyl cyanoacetate, piperidine (AcOH); KCN (90% EtOH, reflux); DiBal-H (toluene) (Overall Yield ca. 30% for ethyl, pentyl, hexyl, nonyl and undecyl-pyrroles). b). Pyrrole, K (THF); p-TsCl (THF); myristoyl chloride, AlCl₃ (CH₂Cl₂); KOH (water, reflux); LiAlH₄ (THF) (40% overall yield for 3-tetradecyl pyrrole).

The 3-AP's were electropolymerized in CH₃CN with tetrabutylammonium perchlorate as supporting electrolyte (stainless steel electrodes with one side of electrode scotch taped, D.C:10mA, 3h). The conductivities(in S/cm) of the poly 3-AP's were measured (four-probe technique) and were found to be 0.0665 (ethyl); 0.268 (pentyl); 0.135 (hexyl); 0.152 (nonyl) and 0.0558 (tetradecyl). The unalkylated polypyrrole conductivity was found to be much higher (7.94).

ESR studies of the poly-3-AP films provided an average g-value of 2.00294.

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VAPOR PRESSURES OF OXYGEN IN EQUILIBRIUM WITH YBa₂Cu₃O_{7-x}

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Vapor pressures of oxygen over the YBa₂Cu₃O_{7-x} superconductor have been determined, utilizing the transpiration method. Oxygen contents of the original samples were determined using the method of Appelmann *et al.*¹ Stoichiometries after the experiments were inferred using the observed mass losses. The calculated vapor pressures for oxygen in equilibrium with YBa₂Cu₃O_{6.84} were 4.9×10^{-5} atm at 613 K and 3.6×10^{-5} at 584 K; for YBa₂Cu₃O_{6.86} the vapor pressure was 2.9×10^{-4} at 581 K. Mass losses for the transpiration experiments were fitted to the statistical mechanical model of Thorn *et al.*², in which the vapor pressure data of Kishio *et al.*³ were fitted to the number of defects, θ_v ; the energy required to create a vacancy, E_v ; and the energy of interaction of nearest neighbor vacancies, E_{vv} . Extrapolating Thorn's data for E_{vv} to the temperature range of the present study enables one to fit the present data to obtain values for E_v . For 613 K one obtains $E_v = 430$ kJ/mol; at 584 K the value of E_v was 422 kJ/mol, and at 581 K, $E_v = 417$ kJ/mol.

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2. K.D. Carlson, L.R. Morss, and R. J. Thorn, *Mol. Cryst. Liq. Cryst.* **184**, 309-314 (1990).
3. K. Kishio, J. Shimoyama, T. Hasagawa, K. Kitizawa, and K. Fueki, *Japn. J. App. Phys.* **26** L1228, (1987)

MULTIPLE BEDROCK EXPOSURES OF ALIBATES SILICIFIED DOLOMITE ALONG THE EASTERN EDGE OF THE CAPROCK ESCARPMENT. K. C. Kraft. Oklahoma Museum of Natural History, Archeology Division, Norman, 73019.

The bedrock location of Alibates silicified dolomite along the Canadian River in Potter County, Texas is well known to contemporary geologists and archaeologists. This material was also well known to hundreds of generations of American Indians. More often than not the location of Alibates and acquisition of the material for stone tool manufacture was thought to be restricted to the exposed outcrops in Texas and the Canadian River was thought to be the only drainage to be entrenched enough to reach the underlying formation. Current research verifies that bedrock exposures of Alibates can be found along other drainages exiting the southern Plains. These include the Salt and North Forks of the Red River, North Canadian River and Cimmaron River. One would assume that clasts would be available along each of these rivers' courses. An inspection of gravel bars along each of the above rivers verifies the assumption. In fact, most of the identified clasts are of a usable size, in excess of that necessary to produce nearly all of the stone tools found at surrounding archaeological sites. These findings will necessitate the rethinking of trade and acquisition models touted by archaeologists working in the region.

PURIFICATION AND CHARACTERIZATION OF CANTALOUPE EXOCARP PEROXIDASES. C. Biles, Biology Dept., ECU, Ada, OK 74820; B. Bruton, J. Zhang, and V. Russo, USDA, ARS, Lane, OK 74555

Peroxidase has been implicated in suberization, lignification, wound healing and disease resistance in plants. The cantaloupe exocarp is the first defense against fruit rot pathogens. According to nitrocellulose blots of cantaloupe fruit, peroxidases were located in exocarp and mesocarp, at each stage of development tested. However, an increase in exocarp peroxidase was observed in 15-to 50-day old fruit. Total peroxidase activity of exocarp tissue peaked in 30-day old fruit. IEF-PAGE and Native-PAGE indicated a shift in isoforms from anionic to cationic as the fruit matured. Cationic and anionic isoforms were purified using acetone protein extraction, ion-exchange chromatography, and size-exclusion chromatography. Ion-exchange chromatography revealed 2 cationic and 2 anionic peaks of peroxidase activity. Cationic and anionic peroxidases have an apparent native molecular weight range of 17-28 kD. SDS-PAGE of cationic peroxidases indicated two isoforms with molecular weights of ca. 48 and 55 kD; anionic peroxidases were ca. 32 and 41 kD. Cationic isoforms appeared to be more stable and more abundant than anionic peroxidases in the exocarp.

PROTECTION OF BALDCYPRESS PLANTINGS FROM BEAVER AND NUTRIA HERBIVORY. Ty Swirin and Hans M. Williams. College of Forestry, Stephen F. Austin State University, PO 6109, Nacogdoches, TX. 75962

Future development of new baldcypress (*Taxodium distichum* L.) stands may depend on the success of artificial regeneration. Newly planted seedlings may need to be protected from both beaver (*Castor canadensis*) and nutria (*Myocastor coypu*) herbivory to increase survival. In a ongoing study at Potter's Point, LA on Caddo Lake, 200 1-0 bareroot baldcypress seedlings were planted on February 15, 1997. Seedlings were planted in both mesic soil conditions and permanently flooded conditions. One half of all seedlings were fitted with 48 inch tall polyethylene tree protectors. By February 21, 1997, 48 of 50 flooded, unprotected seedlings had been clipped by herbivory. On March 6, 1997, 50 new 1-0 bareroot seedlings were planted in the water and fitted with 24 inch tall diamond mesh polypropylene tree guards. By March 23, 1997 all diamond mesh guards had been invaded with all 50 seedlings clipped. On April 4, 1997, 34 1-0 baldcypress seedlings were planted in a 10 foot by 10 foot, 48 inch tall, 2 inch by 4 inch welded wire fenced enclosure. As of September 1, 1997, no other damage from herbivory has occurred. Diamond mesh tree guards were of no deterrence to herbivory. Both the fencing and the polyethylene tree shelters were effective in stopping herbivory from nutria and beaver.

ROLE OF COMPETITION FOR SUGARS BY YEASTS IN THE BIOCONTROL OF GRAY MOLD OF APPLE.

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Cryptococcus laurentii or *Sporobolomyces roseus* but not *Saccharomyces cerevisiae* biologically controlled gray mold, caused by *Botrytis cinerea*, when applied to wounds of Golden Delicious apples in storage. Mechanisms of antagonism responsible for this result were studied at 22 C. Yeasts produced no antibiotics or β 1,3-glucanase *in vitro*. *C. laurentii* and *S. roseus* populations in wounds reproduced faster than those of *S. cerevisiae*. Wounds containing yeasts in apple slices utilized more ^{14}C -labeled fructose, glucose or sucrose than wounds with conidia of *B. cinerea* during 48 h, but yeasts did not differ in their use of sugars. Use of ^{14}C -sugars *in vitro* by yeasts after 48 h was typically greater than that for conidia, whereas uptake always was greater for yeasts. *In vitro* use of ^{14}C -sugars by *S. roseus* was greater than that of other yeasts, but uptake and use of glucose or fructose by *C. laurentii* or *S. cerevisiae* typically did not differ. Yeasts comixed with conidia in sterile, dilute apple juice inhibited conidium germination compared to no-yeast controls. *S. cerevisiae* was less effective than *C. laurentii* or *S. roseus* in this regard. Competition for sugars by yeasts most likely played a role in biocontrol, but some other mechanism is needed to explain differences in yeast biocontrol efficacy.

FACTORS AFFECTING VIRULENCE IN *NAEGLERIA FOWLERI*.

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Naegleria fowleri is an opportunistic amoeba and the cause of a rapidly fatal infection involving the central nervous system. The purpose of this study was to determine the effect of various growth conditions on the virulence of *N. fowleri* for mice. Strains of *N. fowleri* were grown axenically in either Nelson's medium or Mix amoeba medium. Vero cells were cultivated in Eagles MEM with 10% fetal bovine serum. Male 21-day-old CD-1 mice were inoculated intranasally with a 10 µl drop containing the desired inoculum. Results. Amoebae incubated at 30 and 37°C were more virulent than amoebae grown at 23 or 44°C. Late logarithmic and early stationary growth phase amoebae caused more deaths than early logarithmic, late stationary or decline phase amoebae. The strains of *N. fowleri* varied in virulence. Prolonged axenic cultivation caused a decrease in virulence. However, virulence could be restored to original levels by 3 serial passages in mice. Finally, the continuous maintenance of amoebae in Vero-cell cultures enhanced the virulence of a weakly virulent strain of *N. fowleri*, making it an attractive alternative to mouse passage for restoring virulence.

HISTOPATHOLOGIC EVALUATION OF HEMODILUTION AND HYPOTHERMIA AS PROVIDING POST- ISCHEMIC PROTECTION TO BRAIN. K.L. Jarolim, G.M. Brenner, and L.G. Martin. O.S.U College of Osteopathic Medicine, Tulsa, OK 74107.

Global cerebral ischemia was produced in male Wistar rats using a four vessel occlusion model (Pusinelli & Brierley, Stroke, 10(3):267, 1979). Following ischemia, the rats were placed into three groups. Group 1 received no intervention (neither hemodilution nor hypothermia); Group 2 received normothermic saline (0.36 ml/kg B.W. @ 37°C). Group 3 received hemodilution with hypothermic saline (0.36 ml/kg B.W. @ 33°C). The body temperature was also lowered to 33°C. All animals were monitored two hours following global ischemia. Twenty-one days post-ischemia, the animals were transcardially perfused with formaldehyde-acetic acid-methanol. Brains were removed and the CA 1 hippocampal areas histologically evaluated at four levels for neuron cell death using celestin blue and acid fuchsin staining. Group 1 demonstrated the most damage (Mean = 750 viable neurons); Group 2, compared to group 1, demonstrated higher neuron counts (Mean = 950 viable neurons). Group 3, compared to groups 1 and 2, demonstrated the least damage (Mean = 1200 viable neurons). The animal survival rates were 46% in Group 1, 55% in Group 2, and 100% in Group 3. These studies demonstrate the combination of hemodilution and hypothermia best protect neurons of the rat hippocampus and dramatically improve survival rates following global ischemia.

SEX STEROID INDUCED CHANGES IN HEMATOCRIT AND ERYTHROCYTIC OSMOTIC FRAGILITY IN THE RAT. L.G.Martin, G.M. Brenner, K.L. Jarolim, D.L. Coons and A.K. Wolfe. O.S.U. College of Osteopathic Medicine, Tulsa, OK 74107.

Both hemoglobin and hematocrit values are higher in males than in females. This difference is usually ascribed to menstrually-related red cell loss in the female and to androgen-related stimulation of erythropoiesis in bone marrow in the male. In the present study, using male and female castrate rats, physiological replacement doses of estradiol benzoate (7µg/100g body weight/day) and/or testosterone propionate (50 µg/100g body weight/day) were administered I.P. (intraperitoneally) in 0.1 ml of cottonseed oil for 16 weeks. While neither hormone significantly altered red cell osmotic fragility, the presence of estradiol significantly reduced mean hematocrit values in both male (-18%, $P < 0.00001$) and female castrates (-14%, $P < 0.003$), whether given alone, or in combination, with testosterone. Testosterone did not significantly elevate hematocrit values over those of the sham (oil) injected castrates. Thus, it appears that the presence of estrogen is the primary determinant of hematocrit levels, and that testosterone, at physiological concentrations, does not markedly influence the concentration of red cells in circulating body fluids.

RADIAL ARM MAZE EVALUATION OF HEMODILUTION AND HYPOTHERMIA AS AGENTS TO REDUCE POST-ISCHEMIC MEMORY DEFICITS. G. M. Brenner, K.L. Jarolim, and L. G. Martin. O.S.U. College of Osteopathic Medicine, Tulsa, OK 74107.

Cerebral ischemia, may cause neurological damage and cognitive dysfunction. The ability of hemodilution and hypothermia to reduce post-ischemic memory deficit was evaluated in groups of male Wistar rats. Rats were trained on an unbaited 6-arm radial maze (Neurotoxicol. 15(2): 349-58, 1994) for 2 weeks before being subjected to 10 minutes of cerebral ischemia produced by carotid artery occlusion. Following ischemia, animals received a normothermic (NORM, 37 °C) or hypothermic (HYPO, 33 °C) intravenous saline injection (0.36 mL/100g body weight) and were maintained at 37± 0.5 °C (NORM group) or 33 ± 0.5 °C (HYPO group) for 2 hours. Maze performance was evaluated at 1, 2, and 3 weeks post-ischemia. At 1 week, HYPO rats exhibited better reference and working memory than NORM rats. Both reference and working memory improved in NORM rats after 2 and 3 weeks, and there were no significant differences between NORM and HYPO rats at these times. Reference and working memory also improved in HYPO rats at weeks 2 and 3. These studies show that hypothermia and hemodilution can protect against ischemia-induced memory deficits.