

homeopathy student voice at a large multi modality college of CAM.

Results: Responses to the survey over 3 years varied (Year 1 – n = 508; Year 2 – n = 572; Year 3 – n = 576). Rapid rise in the use of tablets (57%) in learning dominates the results and changing behaviours, and the increasing use of social media channels to facilitate student learning communities and accessing study resources. Increasingly, learners (39%) use the learning management system daily.

Discussion/Conclusion: Front and centre of this yearly collation of students attitudes and decisions is the growing use and in fact dependence on technologies, from apps, to learning management systems, on hardware such as smart phones and tablets. The data points to supporting the clear trends in the university sector world wide, but also key differences, with some resistances to the use of technologies, due to the unique values, demographics and psychographics of those who attends the college, and highlights urgent infrastructure priorities for CAM education.

Ultra-high dilutions of homeopathic remedies alter cell viability and induce apoptosis in the MCF-7 human-cancer-cell-line in an in vitro environment

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Homeopathy is a CAM therapy widely used around the world to treat diseases, cancer being one of them. This trial addresses the question if cancer cells could directly be affected by homeopathic preparations. I used an in vitro setup with automatized screening for cell viability and apoptosis for this purpose. Ultra high dilutions (C30, C200) prepared according to the homeopathic pharmacopeia and therefore called potencies of different remedies (*Phosphorus*, *Carcinosin*, *Phytolacca*, *Thuja*, *Asterias*, *Carbo animalis*, *Agaricus phalloides*, *Sabal serrulata*) had been tested on cultures from breast-cancer cell line MCF-7. HEK293 served as control for cell specificity. The potencies had been tested against demineralized water and dilutions of unpotentized saccharose. Remedies were applied in an 11 point two fold series of dilutions in duplicate. This trial showed that *Phytolacca* and *Carcinosin* altered the viability of MCF-7, whereas the HEK-cells showed only little response. There was no clear correlation between the viability test and the apoptosis test after 24 h, thus the main effects on viability occurred either due to cell cycle delay or arrest. *Phytolacca* and *Carcinosin* showed a distinct pattern of activation and inhibition over the series of dilutions that was very different from other rem-

edies and controls. Strikingly the same dilution could increase or decrease the viability. The findings suggest that ultra-high dilutions of substances have biological activity apart from placebo effects. Remedies that are used since decades to treat breast cancer and are currently used in the Banerji-Protocols showed their ability to significantly alter the behavior of cancer cells through changes in viability and induction of apoptosis.

Keywords: Cancer, In vitro, Viability, Apoptosis, MCF-7, Ultra-high dilution, Cell lines, *Phytolacca*, *Carcinosin*

Cytokine production in mice perinatal model treated by LPS and Zincum metallicum

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Background: This preliminary study developed a model of LPS-induced stress for evaluation of inflammatory process in F1 generation after mother's treatment with *Zincum metallicum* (Zm).

Object: To evaluate the cytokine production in vivo in mothers and in F1 generation with the possible effect of homeopathic dilution of *Zincum metallicum*.

Methods: Animal ethics CEUA-UNIP#156/13. 26 BALB/c parental females (Pf) were divided in 8 groups. LPS (n = 19) and no-LPS (n = 7) each with subgroups: no-Zm, Zm-200cH, Zm-30cH, Zm-5cH. LPS treatment: 9.5 day of Pf pregnancy; and all F1 24 h before euthanasia. Peritoneal washes collected after Pf weaning recovery; and F1-adulthood. The cytokines CCL2, IL-6, IL-10, TNF-alpha, IL-1-beta; IL-12 were ELISA assayed; Nitrite + nitrate by Griess reaction.

Results: In Pf LPS decreased cytokines production especially CCL2, in non-statistically significant way due to high variability and low sample size. This trend was reproduced also in F1 of the same mothers. Zm high dilutions showed a trend to counteract this effect. A marked significant difference in LPS-induced CCL2 and IL-10 production was observed between F1-males (high) and F1-females (low). Zm-200cH and Zm-30cH treatment of mothers increased the CCL2 and IL-10 production in F1-females in a non-statistically significant way. Nitrite + nitrate in Pf was affected by the Zm treatment (p < 0.01), with the maximum effect seen with the Zm-200cH, without influence from the LPS treatment. In F1 generation the Nitrite + nitrate was double in females than in males but no differences were observed between groups for Zm treatment of mothers.

Conclusions: This exploratory study does not rule out the possibility that Zm affects the inflammatory responses in mothers and F1, but further studies with higher number of animals per group would be necessary to reach definite conclusion. The gender markedly affected the F1-cytokine response. CCL2 could be considered one of the best indicators of the in vivo response to intraperitoneal LPS.

Keywords: BALB/c mice, Perinatal, Cytokines, LPS, Ultra-high dilution, *Zincum metallicum*

Homeopathy for marine fish aquaculture: Increased growth and survival of juvenile spotted rose snapper *Lutjanus guttatus*

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Homeopathy medicines have been applied with positive results in agriculture, livestock and freshwater aquaculture. Commercial formulations such as Homeopatia™ have been successfully evaluated in Nile tilapia (*Oreochromis niloticus*) and Pacu (*Piaractus mesopotamicus*) with measurable effects on growth, survival, and immune response during culture, management and transport. The spotted rose snapper *Lutjanus guttatus* is a marine fish with meat of exceptional quality, and commercial importance because of its potential for marine aquaculture.

To assess the value of homeopathy on health enhancement of the species, ten groups of 30 juveniles each (8.72 ± 4.07 g; 8.47 ± 1.24 cm) were cultivated for 30 days in 120 L fiberglass cylinders provided with continuous aeration and filtered (50 μ m) seawater daily exchanged by 900%. An experimental design with five different treatments, each one with two replicates, was developed to determine the effect of three homeopathic mixes: Hel-Mix, Pav-Mix, and Hel-Mix/Pav-Mix, and two control groups: No-Medication (NM) and Ethanol 30°GL (E). Homeopathic medicines (31CH) in treated groups and E in control group were sprayed (5% V/W) in commercial balanced food (Silvercup™) and supplied ad libitum five times a day. Growth in total length and live weight was expressed as percentage increase.

A significant ($p < 0.05$) increase ($T_1 - T_0$) in total length and live weight occurred with homeopathic treatments Hel-Mix/Pav-Mix (15.17% and 68.16%), Pav-Mix (11.50% and 55.04%) and Hel-Mix (9.88% and 47.83%). No signifi-

cant ($p < 0.05$) increase ($T_1 - T_0$) occurred with control treatments NM (5.39% and 13.97%) and E (0.11% and 5.40%). Significantly ($p < 0.05$) higher survival (93.1%) occurred in homeopathic treatments Pav-Mix and Hel-Mix, compared to homeopathic mix Hel-Mix/Pav-Mix (50%) and both control groups (48.21%).

These results suggest that homeopathic medicines have potential application in marine fish aquaculture. We recommend studying overall response of broodstock, larvae and juveniles treated with homeopathic medicines to improve hatchery operations from spawning to stocking size.

Keywords: Aquaculture and homeopathy, Fish growth and mortality

Homeopathy for mollusk aquaculture: Increased growth, survival, and protection of juvenile Catarina scallop *Argopecten ventricosus* against bacterial pathogen-challenge

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Mortality by vibriosis in pectinids such as “Catarina” scallop *Argopecten ventricosus* is mainly caused by the pathogen bacteria *Vibrio alginolyticus*. The use of increasingly potent antibiotics generates bacterial resistance, so new alternatives are required to attain more efficient and eco-sustainable production practices.

A growth bioassay to evaluate the effect of homeopathy in juvenile *A. ventricosus* was conducted for 21 days, and a challenge against *V. alginolyticus* (CAIM 57 www.ciad.mx/caim) was conducted for 120 h to evaluate survival post-infection. For the growth bioassay two homeopathic formulas (Pav-Mix/Pha; Pav-Mix/Sit), two antibiotics (Ampicillin; Oxytetracycline) and two controls (No Treatment = NT; Ethanol 30°G = E) were included. Specific controls (NCH-Control = untreated/not challenged and CH-Control = untreated/challenged) were used for the challenge. For growth assessment, juvenile scallops (4.14 ± 0.06 mm, 13.33 ± 0.01 mg) were cultured in 4L experimental units provided with aerated, filtered, and UV-sterilized seawater and a blend of cultured microalgae as natural food. Homeopathic drugs, antibiotics and ethanol were added to the culture water. For survival