

anti-OTA immobilization, blank QCM's performance is tested with BSA conjugated OTA (0.5–250 ng/ml). For the ES-QCM, CA fibers are prepared from 15% w/w CA solution in acetone/DMAC (3:1). The average diameters of the CA fibers are about 250 nm. The aldehyde groups are produced by NaIO<sub>4</sub> oxidation of CA. The antigens immobilized on ES-QCM are OTA (0.5–100 ng/ml) or BSA conjugated OTA (0.5–250 ng/ml). The amount of adsorbed OTA is determined by calculating the frequency shift due to binding of a toxin on the surface. The calibration curves of the blank QCM and ES-QCM are obtained and these curves are compared with in terms of response time, linearity and detection limit. Selectivity of the immunosensor is tested with citrinin (100–250 ng/ml).

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### Molecular cloning, characterization and phylogenetic analysis of pirarucu (*Arapaima gigas*) FSH and LH $\beta$ -subunits



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Pirarucu (*Arapaima gigas*) is a giant, fresh water fish, native to the Amazon River basin, reaching 3 meters in length and weighing up to 250 kg. Its common gonadotropin  $\alpha$ -subunit has been previously isolated by our research group from *A. gigas* pituitaries; in the present work the cDNA sequences encoding FSH $\beta$ - and LH $\beta$ -subunits have also been isolated from the same pituitaries. The FSH $\beta$ -subunit was found of 126 amino acids with an 18 amino acid signal peptide and a 108 amino acid mature peptide, while the LH $\beta$ -subunit of 141 amino acids with a 24 amino acid signal peptide and a 117 amino acid mature peptide. The highest identity, based on amino acid sequences, was with the order of Anguilliformes (61%) for FSH $\beta$  and of Cypriniformes (76%) for LH $\beta$ . Interestingly, the identity with the corresponding human amino acid sequences was still remarkable: 45.1% for FSH $\beta$  and 51.4% for LH $\beta$ . The phylogenetic tree, based on concatenated DNA sequences of FSH $\beta$  and LH $\beta$  from 41 fish species, placed *A. gigas* (Osteoglossomorpha) as the sister group of Clupeocephala, while Anguilliformes (Elopomorpha) appears as the earliest branching lineage among teleosts. This will allow the synthesis of *A. gigas* gonadotropins, useful for physiology and fertility studies of this extremely important source of food for the region.

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### Comparative study on antimicrobial activity of *Sambucus* spp. plant extracts



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Researchers from various fields such as chemistry, microbiology, pharmacology, agriculture and horticulture are investigating natural sources to find active chemical substances that might be used as agents for drug synthesis, in the design of novel antimicrobial products. The present paper studies the antimicrobial activity of plant extracts aiming to draw attention on the role of plant natural compounds as a primary source of antimicrobials. Three *Sambucus* species extracts were evaluated for their potential as antimicrobial agents. The vegetal material used for obtaining ethanolic extracts was obtained from healthy dried plants collected from natural populations existing on non-polluted lands. Agar diffusion method was applied in testing the inhibitory effect of the plant extracts against several plant phytopathogens. The experiments pointed that medicinal plants show strong antimicrobial activity being effective in inhibition of microbial growth. The results highlight the potentiality of further development of pathogen control schemes based on natural antimicrobials.

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### Evaluating the impact of operating parameters on biocidal effects of pulsed ultrasound in natural water disinfection



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The knowledge available in the literature regarding the use of pulsed ultrasound for water disinfection is limited. Hence, this study was designed to provide a thorough investigation for the application of pulsed ultrasound disinfection in water treatment. High power low frequency pulsed ultrasound was used to disinfect natural water samples. Two levels of power, treatment time and On/Off ratio (R) of 40% and 70% amplitudes, 5 and 15 min and 0.2:0.1 and 0.1:0.6, respectively were tested. To scrutinize the effect of the operating parameters on pulsed ultrasound disinfection efficiency,