

7<sup>th</sup> Euro Global Summit on

# Clinical Microbiology and Mycotoxins

February 27-28, 2017 Amsterdam, Netherlands

## The antibacterial effect of ethanolic extraction of *Pimpinella anisum* L. in inhibition of *Mycobacterium bovis* compared with ethambutol

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**Introduction:** Botanical medicine is available and has a little side effects and toxic effects compared with chemical drugs. In this research, we consider effects of *Pimpinella anisum* L. with ethambutol in growth of *Mycobacterium bovis*.

**Methods & Materials:** Ethanolic extract was prepared by percolation method. 0.5 Mc Farland of *Mycobacterium bovis* from Pasteur institute BCG vaccine was cultured on 24 wells plates contain middle brook 7H10 in different dilution. All plates were incubated at 37°C and examined after 1 week.

**Results:** Most effective concentration of extraction of *Pimpinella anisum* L. was 400 mg/ml that had inhibition growth effect as like as MIC of ethambutol. We didn't have any inhibition zone with disks containing ethanolic extraction by disk diffusion method because extraction couldn't diffuse across the disk.

**Conclusion:** As extraction of *Pimpinella anisum* L. with 400mg/ml concentration caused to inhibit the growth of *Mycobacterium bovis*, we suggest to isolate and consider antibacterial effect of matter in whole extraction by HPLC in the further studies.

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## Household level spatio-temporal analysis of *Plasmodium falciparum* and *Plasmodium vivax* malaria in Ethiopia

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**Introduction:** The global decline of malaria burden and goals for elimination led to increased interest in fine-scale epidemiology of malaria. Micro-geographic heterogeneity of malaria infection could have implications for designing targeted small-area interventions.

**Methods:** Two-year longitudinal cohort study data were used to explore the spatial and spatio-temporal distribution of malaria episodes in 2040 children aged less than 10 years in 16 villages near the Gilgel-Gibe hydropower dam in Southwest Ethiopia. All the selected households (HHs) were geo-referenced and children were followed up through weekly house-to-house visits to identify febrile episodes of *P. falciparum* and *P. vivax* infections. After confirming the spatial dependence of malaria episodes with Ripley's K function, SatScan™ was used to identify purely spatial and space-time clusters (hotspots) of annual malaria incidence for two years follow-up.

**Results:** In total, 685 *P. falciparum* episodes (in 492 HHs) and 385 *P. vivax* episodes (in 290 HHs) were identified, representing incidence rates of 14.6 (95% CI: 13.4-15.6) and 8.2 (95% CI: 7.3-9.1) per 1,000 child-months at risk, respectively. In year 1, the most likely (128 HH with 63 episodes, RR=2.1) and secondary (15 HH with 12 episodes, RR=5.31) clusters of *P. vivax* incidence were found respectively in southern and north-western villages; while in year 2, the most likely cluster was located only in north-western villages (85 HH with 16 episodes, RR=4.4). Instead, most likely spatial clusters of *P. falciparum* incidence were consistently located in villages south of the dam in both years: year 1 (167 HH with 81 episodes, RR=1.8) and year 2 (133 HH with 67 episodes, RR=2.2). Space-time clusters in southern villages for *P. vivax* were found in August-November in year 1 and between November and February in year 2; while for *P. falciparum*, they were found in September-November and October-November, in year 1 and year 2 respectively.

**Conclusion:** Hotspots of *P. falciparum* incidence in children were more stable at geographical level and over time than those of *P. vivax* incidence during the study period.

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