

Minimal inhibitory concentrations of basil essential oil (*Ocimum basilicum*) against *Salmonella enterica* from livestock and application of the agar diffusion method.



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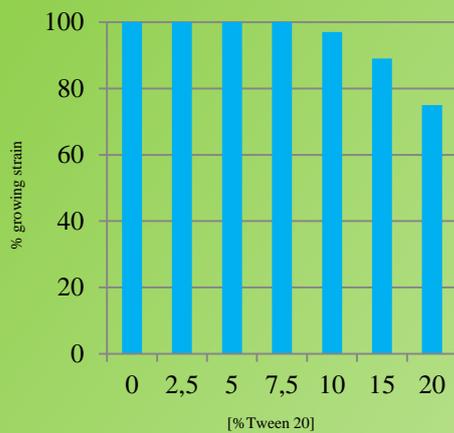
Introduction and objectives : Despite the difficulty to obtain antibiotics in some African countries, the emergence of antimicrobial resistance in some farms can be dramatic. Therefore aromatic and medicinal plant extracts are frequently the last resort as therapeutic option for the breeders. Even though basil plant has been empirically used for decades in animal drinking water in different African countries, basil essential oil (EO) can represent a promising and economical alternative due to a bactericidal effect on different bacterial species. The first aim of this study is the determination of the minimal inhibitory concentrations (MIC) against *Salmonella enterica* isolated from poultry and guinea fowl. The second objective of this work is to develop a basil essential oil sensitivity test by an adaptation of the agar diffusion method through a determination of different parameters like the diffusion curve, the basil essential oil load on the disk and the two critical values.



Materials and Methods : 66 strains from guinea fowl and poultry were collected in traditional breeding farms in a study on the prevalence of these bacteria implicated in mortality of chick. Five serotype (Oakland, Farakan, Kingston, Legon and Sangalkan :51 strains and 3 control) represent more than 80% of strains and have been tested in the liquid medium micromethod to determine the CMI. The used essential oil comes from comoric chemotype and methyl chavicol chemotype of *Ocimum basilicum* (Sigma, Germany) and is solubilized in Mueller Hinton broth by adding Tween 20, which of the bacteriostatic effect has been tested. For the diffusion agar method (Kirby-Bauer), we used Muller-Hinton Agar (Biomerieux, France), Isosensitest Agar (Oxoid, UK), 6 mm sterile filter paper disk and sterile aqueous/tween 20 of essential oil solutions.

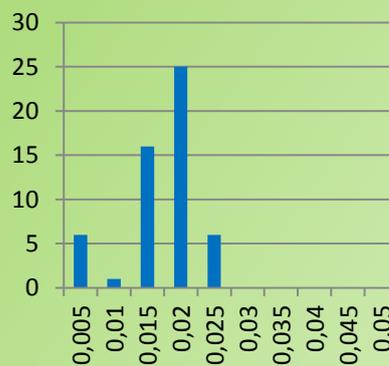
Results :

Bacteriostatic effect of Tween 20

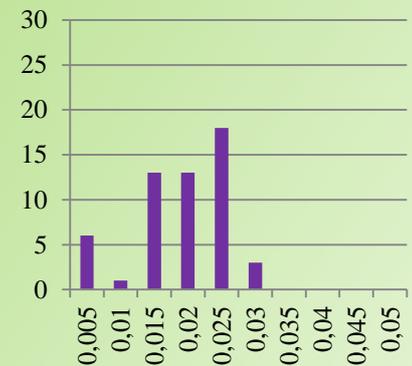


MIC of *Ocimum basilicum* essential oils

Methyl chavicol type



Comoric type



Discussion :

- All strains grown in 7,5% of Tween 20 broth. We choosed to use a 5% solution, which is sufficient to dissolved the essential oil and corresponds to a non-toxic concentration swallowed by many animal species.
- The MIC ranges from 0,005 to 0,03 % for the comoric type and from 0,005 to 0,025 % for the methyl chavicol type. The difference of MIC between this study and the preliminary results can possibly be explained by the extraction and purification method since we used pure commercial solutions.
- A concentration of 0,035% essential oil is sufficient to inhibit the growth of all tested strains with some chemotype. That's why this value can be selected as the critical lower value (c).
- The dosage normally and empirically used in veterinary aromatherapy (cure 2 drops of pure EO 3x/day for 5 days, preventive treatment 1 drop 2x/day for 7 days) covers largely this value.
- The adaptation in agar method has'nt unfortunately given any result . The problem is probably due to poor dissemination of EO in the media. Furthermore , the vapor of this product causes an total inhibition in the Petri dish and not a concentration gradient.

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