

**Effect of methanolic extract of
Acorus calamus on sterol metabolism of
Candida albicans.**

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Candidiasis

- ✓ *Candida sp.* are fungal pathogens that cause superficial or systemic infections in immunocompromised individuals.
- ✓ During the last decade, mortality rate due to nosocomial infections caused by *Candida* are alarmingly high.
- ✓ They are ranked as fourth common cause of nosocomial infections; third in catheter related infections; second highest in colonization to infection rate and the overall highest in crude mortality

- ✓ **The major reason behind such high rate of infection is the formation of biofilms on the surface of implant devices such as catheters, shunts, stents, lenses and other medically important devices**
- ✓ **Candidal infections are also non-device related biofilm infections such as vaginitis and periodontitis**
- ✓ **In general, these biofilms serve as nidus for infection until the implant is removed. This fact is a curtain raiser that makes *Candida* species a high-risk pathogen rather than still being considered as an opportunistic pathogen.**
- ✓ **These biofilms are obstinate to antifungal therapy.**

Current therapy and need for new drug

Ø Ketoconazole, Voriconazole, Fluconazole

Ø Echinocandins, Griseofulvin , Amphotericin B

Ø Resistance acquired by the fungi

Ø Undesirable side effects

Natural Product as medicine

- Ø WHO reports about three quarter of the worlds population either directly or indirectly depend on natural product for therapeutics
- Ø About 40% of the drug formulation is based on natural products.
- Ø Herbal formulation as drug is being used in almost all systems of medicine



Acorus calamus

Ø Acorus calamus is being used in Indian system of medicine as well as Chinese traditional medicine (TCM) for the cure of epilepsy, insomnia, memory loss and nervous disorders.

Ø Tribes of Yercaud use rhizome part to cure fungal infections (Dr. Anandhan 1987)

Our Approach

- **In vitro studies were carried out to evaluate the antifungal efficacy of Acorus calamus rhizome**
- **The changes in the enzyme profile clearly indicated stability loss of the cell wall of Candida albicans.**
- **Na⁺,K⁺ efflux confirmed the leakage of the cell wall**

Sterol metabolism

- **Sterols are major components of the fungal cell wall.**
- **The major role of sterols is to maintain cell wall integrity and provide stability to cells.**
- **Ergosterol is the major sterol of fungal cell wall**

Ergosterol- target for antifungal therapy

- **Most of antifungal drugs such as Amphotericin , Azoles , Terbinafine target ergosterol biosynthesis.**
- **The methanolic extract of Acorus calamus target the ergosterol biosynthesis pathway**

Ergosterol Biosynthesis Pathway

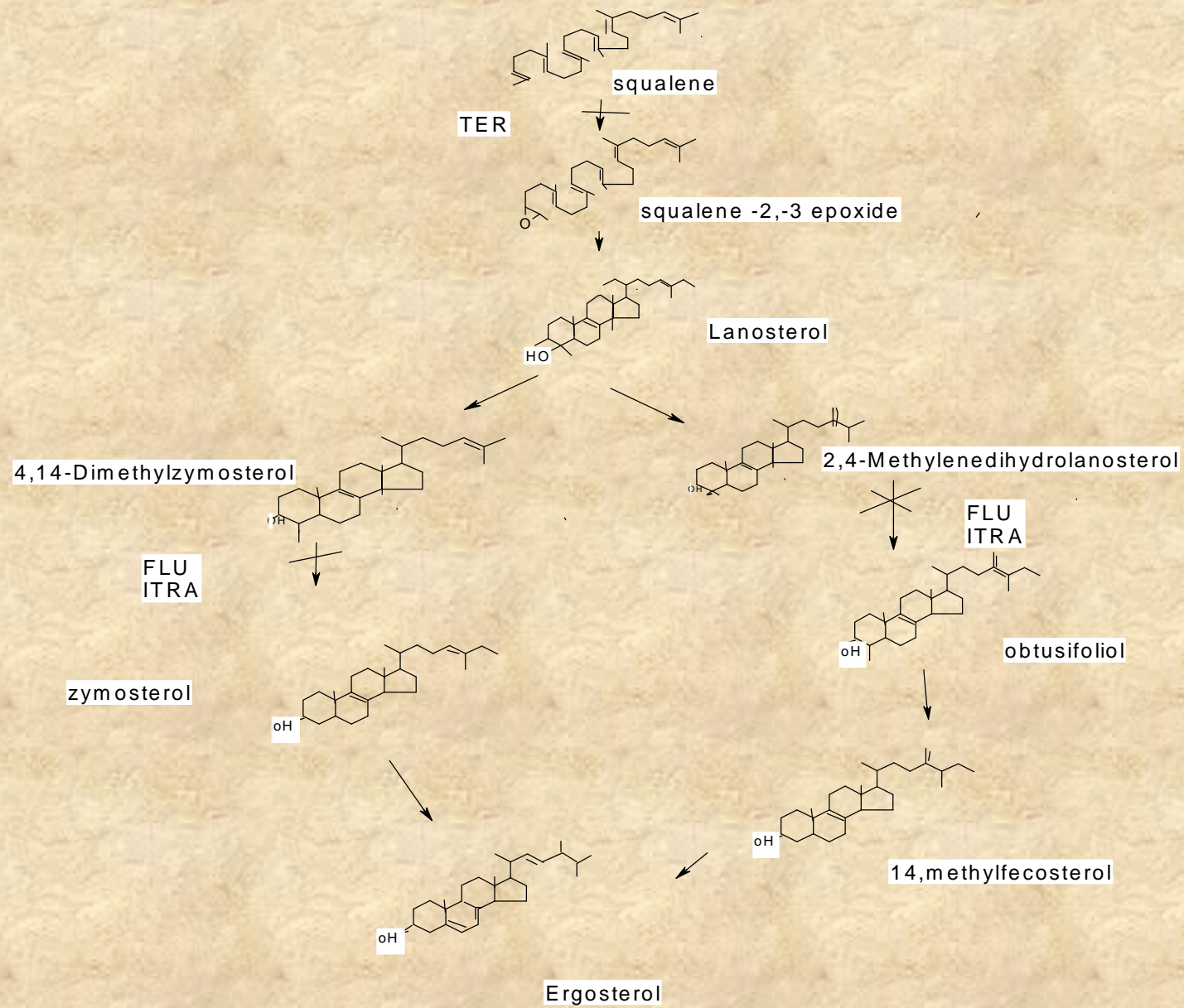


Figure showing variations in sterol profile in *Acorus calamus* treated cells when compared with that of control

UV spectrophotometer-scan

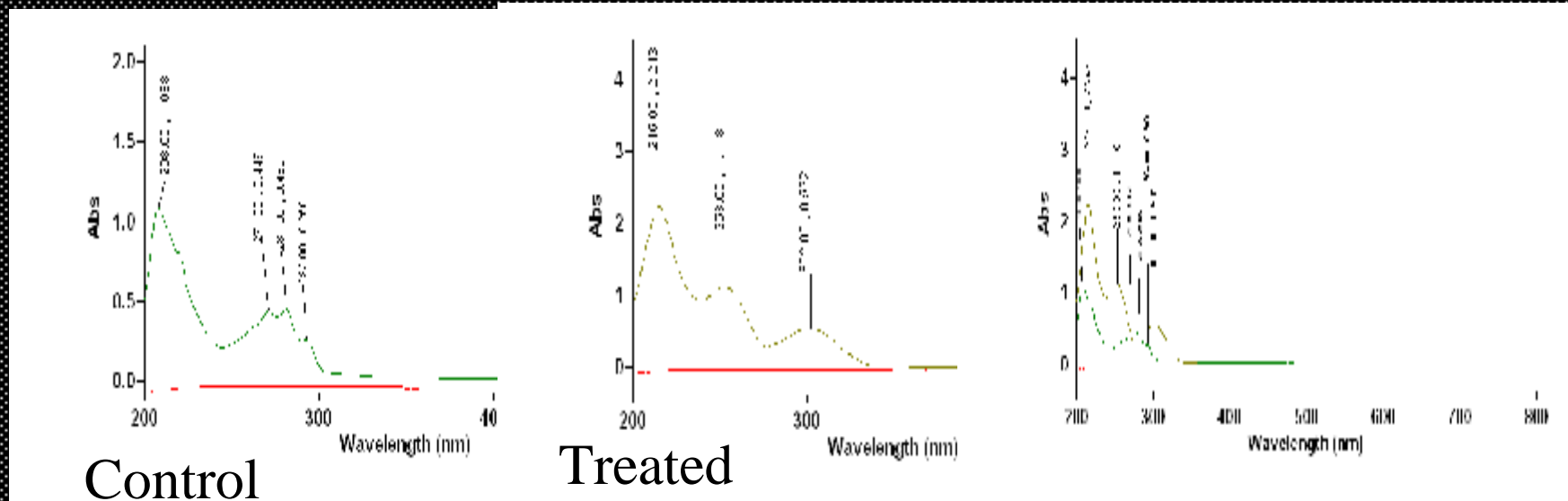
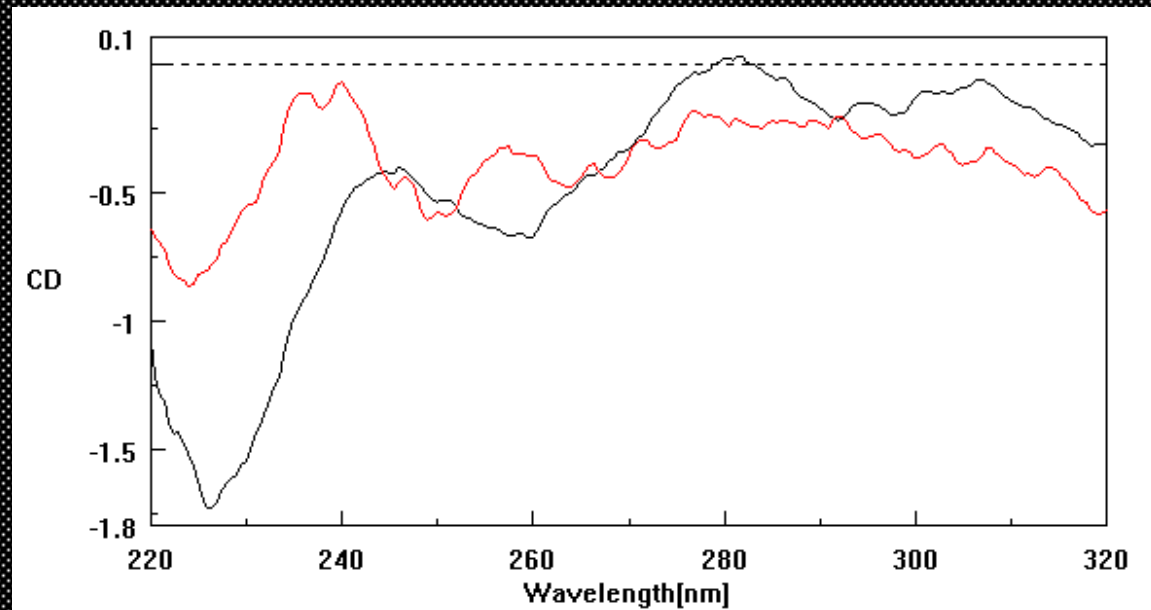


Figure showing the variation in circular dichroism in *Acorus calamus* treated cells when compared with that of control – untreated cells

Circular Dichroism



Black- control

Red- treated

