# Evaluation of antidermatophytes activity of Nystatin

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**Abstract:**

Antifungal activity of Nystatin was tested against three species with two variants of *Trichophyton*, one genera of Dermatophytes groups, (*Trichophyton mentagrophytes var. mentagrophytes, T. mentagrophytes var. interdigitale, T. rubrum and T. simii*) which are revealed a significant differences (P<0.01) effect on the growth of *T. rubrum & T. mentagrophytes* at concentration 2 mg/ml and against *T. simii* at 3 mg/ml , whereas complete inhibition of *T.rubrum & T. simii* had shown after culturing on media containing 4 mg/ml of Nystatin .

**الخلاصة**

اختبرت فعالية النستاتين ضد ثلاثة أنواع (يحتوي احدهما على ضربين) من مجموعة الفطريات الجلدية Dermatophytes ضمن الجنس *Trichophyton* :
*Trichophyton mentagrophytes var. mentagrophytes , T. mentagrophytes var. interdigitale , T. rubrum and T. simii* ) , إذ لوحظ حصول تثبيط معنوي عند احتمالية (P< 0.01) في نمو مستعمرات الفطريات *T. rubrum & T. mentagrophytes* بعد زراعتها على الوسط الغذائي Sabouraud's glucose agar الحاوي على 2 ملغم / مل من النستاتين , في حين ثبط نمو الفطر *T. simii* بالتركيز 3 ملغم / مل .
أما التثبيط الكامل لنمو مستعمرات الفطريات *T. rubrum & T. simii* فقد لوحظ عند احتواء الوسط على التركيز 4 ملغم / مل من النستاتين .

## Introduction

Nystatin is a tetraene macrolide of polyenes antibiotic produced by *Streptomyces noursei* (1).It is mainly used against various types of yeasts , principally *Candida* species which can be isolated from vaginia , hair , throat, nail and ear (2) .

Nystatin has the ability to inhibit approximately 81.72 % of *Candida* species (3), whereas 99 % of other yeast strains such as : *Cryptococcus , Saccharomyces, Rhodotorula* and *Torulopsis* inhibited at minimium inhibitory concentration 8 µ / ml of this compound (4) , furthermore it has a high activity against *Trichosporon beigelii* and *Trichosporon capitatum* isolated from stool and skin of immunosuppressant patients (5) .

On the other hand, it has shown that no activity against Dermatophyte groups either *in vitro* or *in vivo* (6,7), as noted when infected horses *with Trichophyton equinium var. autotrophicum* was failed to cure by 10 % Nystatin ointment (8), while other groups of mold fungi are shown a sensitivity when nystatin used in solution to prevent rat and mice contamination by *Aspergillus sp.* (9), and significantly inhibition of *Fusarium oxysporum* spore germination after ED 50 and ED 90 value determination with 2.76 times more effective than Amphotercin B (10) .

This study will tried to evaluation the Nystatin activity against one of the most important genera of Dermatophytes .

## Materials and Methods

Skin scales collected from Dermatophytoses patients at Dermatology consultation of Morjan hospital in Hilla , from January to March 2004 .

The scales were cultured on Sabouraud's chloramphenicol- cycloheximid glucose agar (11) and incubated at 25–28 ºC for 1-2 weeks after microscopically examination revealed clearly occurring

of fungi cells. *Trichophyton* species were diagnosed according to Rippon (7) and Emmons (12) as: *Trichophyton mentagrophytes var . mentagrophytes ,*
*T. mentagrophytes var. interdigitale , T. rubrum and T. simii .*

Colony diameter of grown fungi was measured after inoculation of a disk (9 mm) of old culturing (one week at 25 – 28 ºC) in a center of Petri dishes containing Sabouraud's glucose agar mixed with various concentrations of Nystatin (0.1, 0.5, 1, 2, 3, 4) (11). Two types of controls were used in this experiments, Griseofulvin (1 mg/ml) and media without any composition and each experiment was repeated three times with three replicate for each concentration .
ANOVA had been used for statistically analyses between Nystatin and control .

**Results**

Colony diameter of *Trichophyton rubrum* and two variants of *Trichophyton mentagrophytes* was decreased with significant differences ($p<0.01$) at more than or equal to 2 mg/ml of Nystatin, whereas *Trichophyton simii* was revealed significant differences ($p < 0.01$) at 3 mg/ ml .

*Trichophyton rubrum* was very sensitive to Nystatin than other species of *Trichophyton* at concentration 3 mg/ml and 4 mg/ ml when the inoculation disk dose not growing after incubation time, furthermore
*T. simii* was also completely inhibited at concentration 4 mg/ml of Nystatin .

**Discussion**

Topical preparations of Nystatin include ointments, cream and powders (1) were used in the treatment of cutaneous and vaginal infection *with Candida* and it is available in formulations for treatment of intestinal infections (13) with successfully treatment of burn wounds containing yeast species (14) .

Nystatin act on plasma membrane of the fungal cells and the primary mode of action is believed to be through interaction with sterols, at grown inhibitory concentrations, it also inhibit plasma membrane enzymes
( ATPase , glucan synthase , adenyl cyclase & 5 ´- nucleotidase) (15,16) .
Although, Nystatin is routinely used to treatment of cutaneous candidasis (1,6) , it is not absorbed from the skin (13) and that may makes it useful locally used to treatment of Dermatophytes infection whatever it concentration.

Nystatin has been given a good result as antidermatophytes compound after colony diameter of some species of *Trichophyton* was measured, especially at concentration 2 mg/ml, which show a significant differences ( $P<0.01$) after comparing with control (media without composition). This activity was gave very clear inhibition of *Trichophyton rubrum* and *Trichophyton simii* growth with a completed block of colony disk to grow which means it has a high ability to inhibit some species of dermatophytes and because of *T. rubrum* is the most important species of *Trichophyton* due to it responsibility for a chronic infection in the body, it could be useful to use in the treatment of dermatophytes infection.

We can inclusion from the results that Nystatin has antidermatophytes activity after increasing it concentration more than used against yeast species .

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Table (1) :- Colony diameter (mm) of *Trichophyton* species after culturing on Sabouraud's glucose agar for one week , including inoculated disk ( 9 mm ) .

| Tested compound | Conc. mg/ml | *Colony diameter ( mm ±SE )* | | | |
|---|---|---|---|---|---|
| | | *T. ment. var. mentagrophytes* | *T. ment. var. interdigitale* | *T. rubrum* | *T. simii* |
| Control | | 55 ± 3 | 56 ± 2 | 29 ± 2 | 47 ± 2.5 |
| Griseofulvin | 1 | 12 ± 1 | 13 ± 1.8 | 11 ± 2 | 11 ± 1 |
| Nystatin | 0.1 | 41 ± 2 | 45 ± 1.5 | 23 ± 2 | 41 ± 1 |
| | 0.5 | 32 ± 1.8 | 33 ± 2 | 18 ± 0.9 | 37 ± 2.5 |
| | 1 | 30 ± 1 | 29 ± 2 | 13 ± 1.5 | 31 ± 2 |
| | 2 | 24 ± 2 * | 21 ± 0.8 * | 12 ± 1.5 * | 25 ± 1.8 |
| | 3 | 18 ± 1 * | 17 ± 2.5 * | Zero * | 12 ± 1 * |
| | 4 | 11 ± 2 * | 11 ± 1.8 * | Zero * | Zero * |

* significant differences ( $p < 0.01$ ) between control and Nystatin .