International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2020): 7.803

Influence of Carbohydrates on the Growth of *Microsporum canis*, a Keratinophylic Fungus

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Abstract: ***During our investigation, some fungal species were isolated which are Keratinophilic and dermatophytic. This group of fungi are potentially pathogenic, causing so many skin diseases in human beings and animals, such as ringworms, mycoses, moniliasis, histoplasmosis, dermatophytosis, maduromycosis, aspergillosis, candidiasis etc. Among twenty eight different fungal isolates from different keratin containing materials such as feathers, nails, hairs (Nigam and Kushwaha 1989) and soils from different localities of Patna, Microsporum canis had been selected to see the influence of different carbohydrates on the growth of the fungus. Carbohydrates play a major role in promoting our health, they form a major part of our food and help a great deal in building strength in the body by way of generating energy and obviously it will also affect the growth of fungus also. So in this project we had analysed the growth of Microsporum canis on about about 15 different carbohydrates as Laevulose, Glucose, Xylose, Dextrose, Fructose, Sucrose, Maltose, Lactose, Raffinose, Sarbose, Pectin, Cellulose, Starch, Mannitol, Sorbitol and one control. A very significant result occurred.***

Keywords: Keratinophilic, Carbohydrates, Fungus

1. Introduction

We isolated a number of fungal species which are Keratinophilic and dermatophytic nature. This group of fungi is potentially pathogenic, causing so many skin diseases in human beings and animals. Among twenty eight different fungal isolates from different keratin containing materials such as feathers, nails, hairs and from soils of different localities (Ramesh 1999) of Patna, Microsporum canis (Brouta et al 2001, Viani F C et al 2001) had been selected to see the influence of different carbohydrates on the growth of the fungus which causes havoc to human beings. Carbohydrates play a major role in promoting our health, they form a major part of our food and help a great deal in building strength in the body by way of generating energy and obviously it will also affect the growth of fungus also. So in this project we had analysed the growth of Microsporum canis on about about 15 different carbohydrates as Laevulose, Glucose, Xylose, Dextrose, Fructose, Sucrose, Maltose, Lactose, Raffinose, Sarbose, Pectin, Cellulose, Starch, Mannitol, Sorbitol and one control. Result obtained will give a very important information regarding its nature of growth and survival on different nutritional carbohydrates.

2. Methods and Methodology

Microsporum canis was grown on Sabouraud Dextrose Agar medium in petridishes at 25^{o} c for 10 days.4m. m. bits were cut after incubation period and aseptically transferred to the sterilized 50 m. l. liquid medium. The growth of *Microsporum canis*, a Keratinoptylic fungus under different carbohydrates was observed replacing the soluble and insoluble carbohydrates (Table - 1) by dextrose in the composition of Sabouraud dextrose liquid medium and grown at 25 ^{o} c and Ph 5.8 adjusted with the help of 0.1 M KH $_{2}$PO4 for 15 days. After expiry of this incubation period the mycelia mat was separated by filtration on dried and weighed filter paper, dried in an incubator at 60 ^{o} c for 24 hours and then in desiccator over fused CaCl for further 24 hours. The actual weight of the mycelium was calculated after subtracting the weight of the filter paper.

Table 1: Influence of Carbohydrate on the growth of *Microsporum canis* (pH 5.8, temp.25+ - 0.5 ^{0}c)

Carbohydrates	Mean dry weight in m. g.
Laevulose	521.000 + - 3.786
Glucose	492.300+ - 1.433
Xylose	217.666+ - 1.452
Dextrose	450.666+ - 3.480
Fructose	402.666+ - 3.712
Sucrose	194.666+ - 2.603
Maltose	989.333+ - 0.666
Lactose	119.333+ - 5.207
Raffinose	208.666+ - 1.333
Sarbose	391.666+ - 1.666
Pectin	321.000+ - 1.666
Cellulose	907.666+ - 1.453
Starch	247.666+ - 1.453
Mannitol	533.333+ - 8.819
Sorbitol	391.000+ - 0.577
Control	194.333+ - 1.202

C. D.1 % 9.355

Table 2

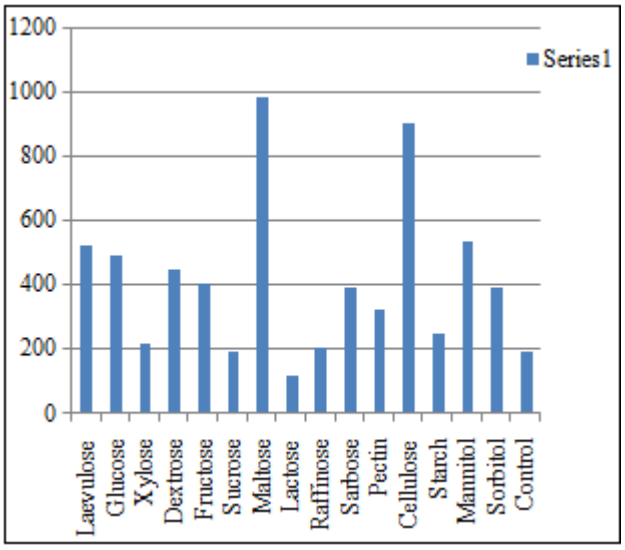
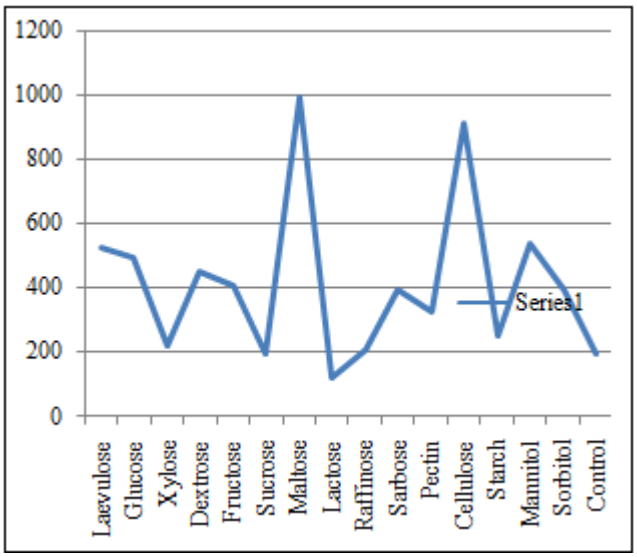


Table 3



3. Results

It appears in above Table that Maltose supported the best growth of M. canis while the worst even worse than control was recorded due to Lactose. The growth of the fungus on carbohydrates in descending order may be arranged as follows:
Maltose > Cellulose > Mannitol > Laevulose > Glucose > Dextrose > Fructose > Sarbose > Pectin > Starch > Xylose > Raffinose > Sucrose Control > Lactose.

4. Discussion

As the very scanty report on the influence of carbohydrates on the growth, cultural characteristics and morphology of the keratinophilic fungus, is amazing though the present investigation provided a clear picture of growth of the fungus.

The luxuriant growth of the fungus on cellulose is very remarkable due to the fact that the fungus under reference has been reported to cause Tinea capitis and Tinea corporis of man and animals (Surendran et. Al.2014) reflects that the dermatophytic fungi may also behave as good cellulolytic ones or the present behaviour might be due to the difference in strain which was not ascertained in the present scheme.

Scanty growth on pectin and starch indicates feeble pectinolytic and amylolytic enzyme activities. Best growth on Maltose and relatively lesser growth on Glucose indicate that Maltose is utilized at least partially as such not after complete simplification to the Glucose units of which the disaccharide is made.

Growth on complex sugar polymers, at least, reflects the saprophytic behaviour of the fungus corroborating the finding of Szathmary (1936), Muende and Webb (1937), Gordon (1953), Ajello (1953), Durie et al. (1955), Lurie, H. I. & M. Way (1957) and Fuentes et al (1955).

It is noteworthy that the growth on sucrose and the control are insignificant, while that in Lactose is significantly lower than control.

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