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Antifungal Efficacy of Panchagavya

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Abstract: Panchagavya is an incredible source for growth promoting substances. All previous research studies were determined its role in medicinal and agricultural field. The current study evaluated its use in microbiological medium. 10µl, 100µl, 500µl and 1000µl of Panchagavya mixed with 1.5% water agar medium and after sterilization, incubated at room temperature. After 5 days of incubation, the initial lower dilution showed 100% fungal growth and middle dilutions showed moderate growth. Though higher dilution axes the significant fungal growth, but sticks the identical bacterial colonies and even no bacterial growth on 10 µl, 100 µl and 500 µl concentrations indicates less growth promotional and more antifungal source. According to these data, the higher dilutions of Panchagavya are promising source for simple and naturally derived less expensive bacteriological media with antifungal effect with growth promotion.
Key words: Panchagavya, growth promotion, antifungal effect, microbiology medium.

Introduction and Experimental

Panchagavya is a term used to describe five major substances, obtained from cow, which include cow's urine, milk, ghee, curd and dung. All the five products possess medicinal properties against many disorders and are used for the medicinal purpose singly or in combination with some other herbs. These substances are abundantly used in Ayurveda for treatment of several disorders such as leucoderma, hyperlipidemia, arthritis, renal disorders, dietary disorders, gastrointestinal track disorders, acidity, asthma etc. These remedies seem to be potent anticancer and anti HIV agents[1].

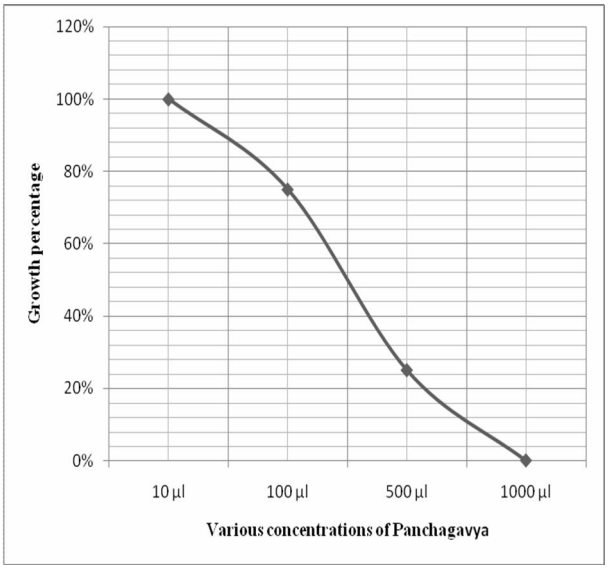
Panchagavya have been used in many applications as growth promoter in poultry industry[2]. Panchagavya has more efficient plant growth stimulant[3]. So, this point intended us, to use it in microbiological medium. Because, the production is less expensive. Though considerable literature is available on Panchagavya and its therapeutic use, there is no proved data of its antifungal efficacy in microbiological medium. So, this present study is also aimed to determine its efficacy on microbial growth.

Dilution method was followed in a modified procedure[4&5]. 10 µl, 100 µl, 500 µl and 1000 µl of purified Panchagavya solution was suspended in 9.99ml, 9.9ml, 9.5ml and 9 ml of distilled water which contains 1.5% of water agar medium[6] and sterilized for 121^0C at 15lbs. Then at ear-bearable temperature the medium suspension was poured into the sterile Petri dishes and 1.5% of agar-agar solution maintained as blank. These plates were kept at room temperature (27 ± 2^0C) and growth was observed from 24hrs.

Results and Discussion

The ability of Panchagavya as microbiological medium was evaluated by dilution method. The data from Figures of plotted graphs summarized the efficiency of Panchagavya. Among the samples from Panchagavya, the 1000 µl dilution alone showed 100% antifungal activity. Additionally, the remaining dilutions (500, 100 µl) showed moderate antifungal activity. But at no antifungal activity at lower dilution (10 µl) and the comparative analysis with control plates were discussed. The 10µl concentration of Panchagavya suspended 1.5% water agar plates has more fungal growth, whereas, in 100 µl and 500 µl concentration it was minimized as half and quarterly percentage while compare with initial lower concentration which indicates the less growth ratio (figure 1) in higher concentration.

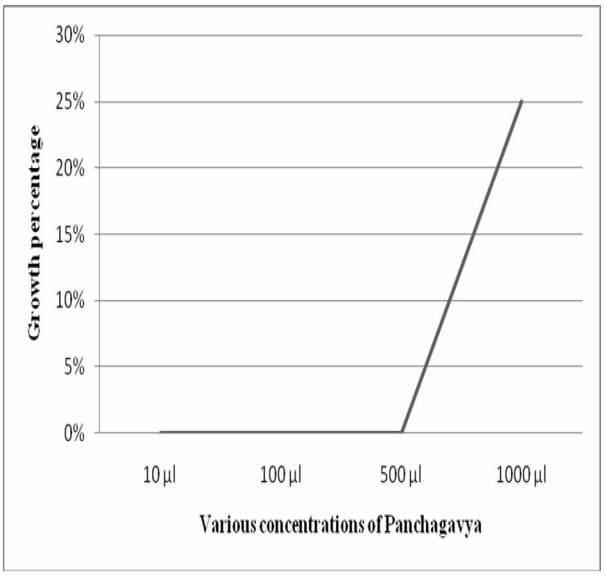
Figure 1: Growth ratio of Fungal colonies on Panchagavya



In 1000 µl concentration the inhibition of total fungal growth was observed which showed lethal dose presence. But, these concentrations supporting the growth of bacterial colonies indicate the presence of bacterial growth substance (figure 2). However, more fungal growth occurred in Blank 1.5% water agar medium.

Interestingly, even though the medium has the lower pH value[2]; but it does not support the growth of fungal organisms at higher concentration but allowed bacterial colonies. This may be due to the antifungal and nutrient compositions present on the sample solution. The presence of various microbial growths in all the plates indicates ensures the availability of the nutrient sources. Because, all the 5 ingredients of this Panchagavya has proved for its vital role in medicine as well as plant growth. So, this antifungal activity might be due to combinational activity or individual of the counterparts.

Figure 2: Growth ratio of Bacterial colonies on Panchagavya



Basically, in agricultural sector the cow urine is used as biofungicide, because it contains Quninolones and Flavoquinolones. A crystalline "cow urine distillate fraction" that enhances the activity of antifungal, antimicrobial and anticancer agents was patented in the US through CSIR (patent no: 6,410,059)[7]. It showed antifungal activity against plant pathogens like *Fusarium oxysporum, Claviceps purpurea, Rhizopus oligosporus, Aspergilus oryzae, Curvularia spp, Alternaria helianthi and Cladosporium spp*[8].

However, the herbivores (cow) dung also contains an antifungal substance which inhibits the growth of Corprophilous fungi[9]. Since the presence of microbial source in cow dung. Patulodin-like compounds CK2108A and CK2801B produced by *Eupenicillium bovifimosum* present in cow dung[10] has more antifungal activity.

While combine with cow urine or plant extracts, its antifungal activity enhanced. The recent study proved that the combination of cowdung and its urine against the growth of *Trichoderma harzianum*[11]. Even, ccombination of cow dung and its urine with Vinca rosea, Piper betle and Azadiracta indica extracts 100% inhibit the conidial germination of leaf blight causing fungi in wheat plant[12].

Medicinal plants grow in anaerobically digested cow dung slurry will enhance their antifungal activity. In recently, *Allium sativum* raised on cow

dung slurry exhibited the highest mean zones of inhibitions with spore germination of the fungi[13].

The major antimicrobial proteins lactoferin B present in cow milk has specturm against various fungal species[14] and it inhibit the environmental fungal flora[15]. This multifunctional protein whose most important role appears to be as a defense mechanism against a broad range of microbial infections[16].

The curd and buttermilk are enriched with a lot amount of lactic acid bacteria. The presence of lactic acid bacteria also produces antifungal metabolites, *e.g.* cyclic dipeptides, phenyllactic acid, proteinaceous compounds, and 3-hydroxylated fatty acid was recently reviewed[17].

The combination of Cow ghee and some selected herbals used to cure the skin diseases[18] and while mix with honey it heal the wounds also[19].

These cow derived products contains more nitrogen, sulphur, phosphate, sodium, manganese, carbolic acid, iron, silicon, chlorine, magnesium, citric, titric, succinic, calcium salts, Vitamin A, B, C, D, E, and minerals, hormones[21], it will enhance the metabolism of prokaryotic cells in both aerobic condition and anaerobic conditions and will pave the way to produce novel secondary metabolites including drugs and enzymes.

This medium will give novel gateway to cultivate the nitrifying, sulphur reducing and minerals up taking microorganisms. The presence of iron substances will induce the growth of fastidious organisms which needs complex and expensive medium. The 65% of Phosphorus and 11 and 79% of potassium[22] will be helpful for the cultivation of solubilizing bacterial cultivation.

Same time, the release of antifungal compounds may be due to microorganisms present in this solution also possible, because, it has reported the presence of bacteria, fungi and Actinomycetes[23]. But the growth of bacterial colonies enhanced by the higher dilution and that indicates the proposition of micronutrients which play as a growth promoter and did not have direct antibacterial activity[24].

So, the use of Panchagavya microbiological medium is more crucial need in microbiology industry. Because, of its efficacy as biofertilizers, and biopesticides, which improves soil fertility and provide food grains free from the health hazards of using chemical fertilizers/pesticides[1].

Conclusion

Finally fermented composite product definitely has more antifungal compounds. It is observed that even after sterilization the activity is not changed. So, this sterilized product will be used as the antifungal source which paves the way for experiments with less expensive, greater accuracy and sensitivity with ecofriendly nature.

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