

## ANTIFUNGAL ACTIVITIES OF FRESH JUICE AND AQUEOUS EXTRACTS OF TURMERIC (*CURCUMA LONGA*) AND GINGER (*ZINGIBER OFFICINALE*)

ANU KAPOOR

Department of Botany, SMM Govt. College, Bhilwara-311 001 (Raj.), India.

Antifungal activities (*in vitro*) of fresh juice and aqueous extracts, i.e. extracted from the left overs of the same finger/tuber of the turmeric and ginger from which previously juice is taken out, are tested against the fungi *Aspergillus niger* and *Penicillium degitatum*. Both the juices and aqueous extracts are used without further concentration. A positive result is observed with all the tested extracts in arresting the growth of these fungi. Juices showed a better antifungal activity compared to aqueous extracts.

Both the genus *Curcuma* and *Zingiber* fam. Zingiberaceae, used as common Indian spices since ancient times and has been explored for their various activities and properties. In literature there are special references on their medicinal properties of *Curcuma*<sup>1,2</sup> and *Zingiber*<sup>3-6</sup>. In the present work fresh juices and aqueous extracts of *Curcuma* and *Zingiber* were isolated under laboratory conditions and used directly for the experiment without further concentration or any kind of sterilisation. These fresh extracts were utilised for their antifungal activities against *Aspergillus* and *Penicillium*.

Antifungal activities of the juice and aqueous extracts were screened by filter paper disc diffusion plate method by Vincet and Vincet<sup>7</sup>. Juice is taken out from single fresh finger/tuber of turmeric and ginger by squeezing them with the help of mortar and pestle. This extracted juice is then filtered through a muslin cloth. Aqueous extracts were prepared from the same finger/tuber used previously for the isolation of juice again with the help of mortar and pestle and filtered through a muslin cloth. Both juice and aqueous extract were prepared at room temperature and they are not concentrated further before tested against fungi. Sterilised

filter paper disc were placed on spore seeded petri plates (90 mm diam) containing Johanson's (1957) Agar media after being drip-drained in the extracts isolated. The plates were incubated at 25-28°C for 72 hours and zone of inhibition produced were measured as an average of mass dimension of zone of inhibition in 4 different directions across the paper disc.

The inhibition of growth of fungi *Penicillium* and *Aspergillus* were determined by comparing it with the amount of growth of control plate (without the extract) incubated likewise as the test agar-plate (Figs. 1-C2). Average diameter in cm including that of the filter paper disc diameter (6mm) are recorded as shown in the Table 1 for *Aspergillus* and *Penicillium*. It has been observed that the juice of *Zingiber officinale* shows maximum antifungal activity as evident from the photographs (Table 1).

In general both fresh juice and aqueous extracts of *Curcuma* and *Zingiber* possess the capacity to inhibit the growth of fungi tested. There are some reports on *Curcuma* and *Zingiber* as antifungal agents in the literature. Apisariyakul *et al.*<sup>8</sup> extracted tumeric oil from *Curcuma longa* and determined its antifungal activity. Similarly



ANTIFUNGAL ACTIVITIES OF FRESH JUICE AND AQUEOUS  
EXTRACTS OF TURMERIC (*CURCUMA LONGA*) AND GINGER  
(*ZINGIBER OFFICINALE*)

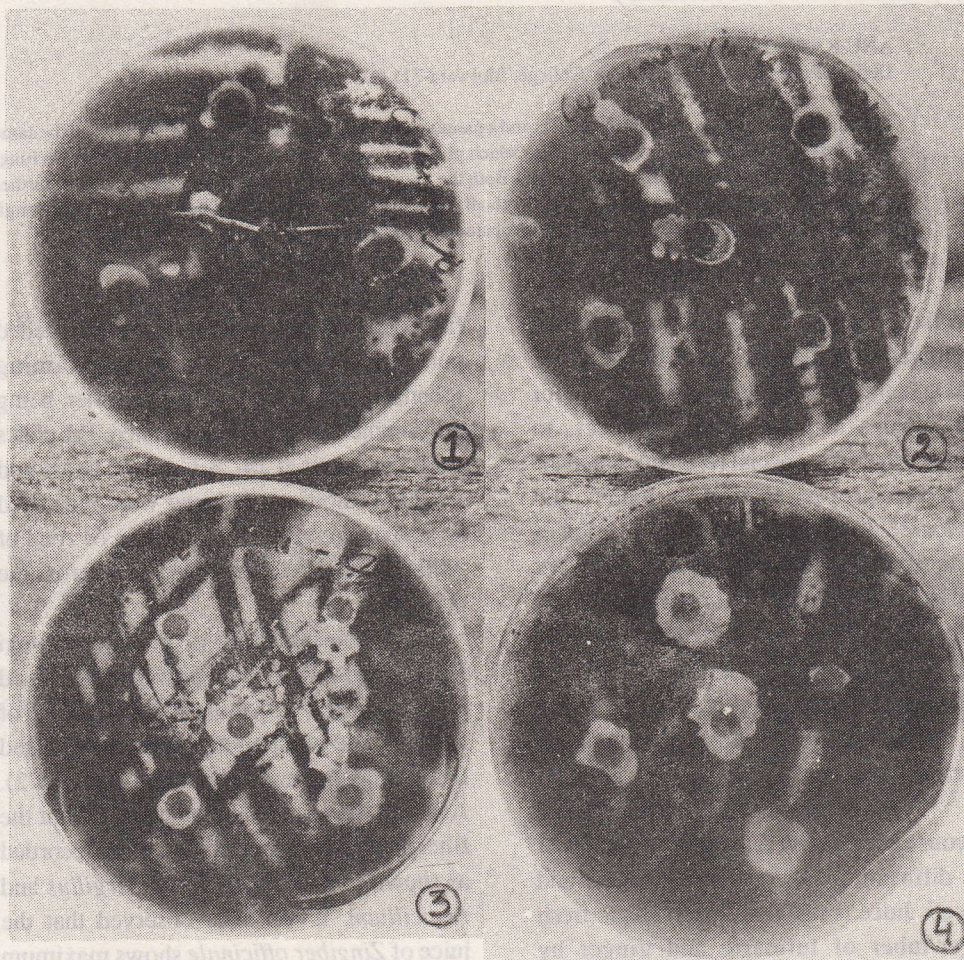


Fig. 1 - *C. longa* juice activity against *A. niger*.

Fig. 2 - *C. longa* juice activity against *P. digitatum*.

Fig. 3 - *Z. officinale* juice activity against *A. niger*.

Fig. 4 - *Z. officinale* juice activity against *P. digitatum*.



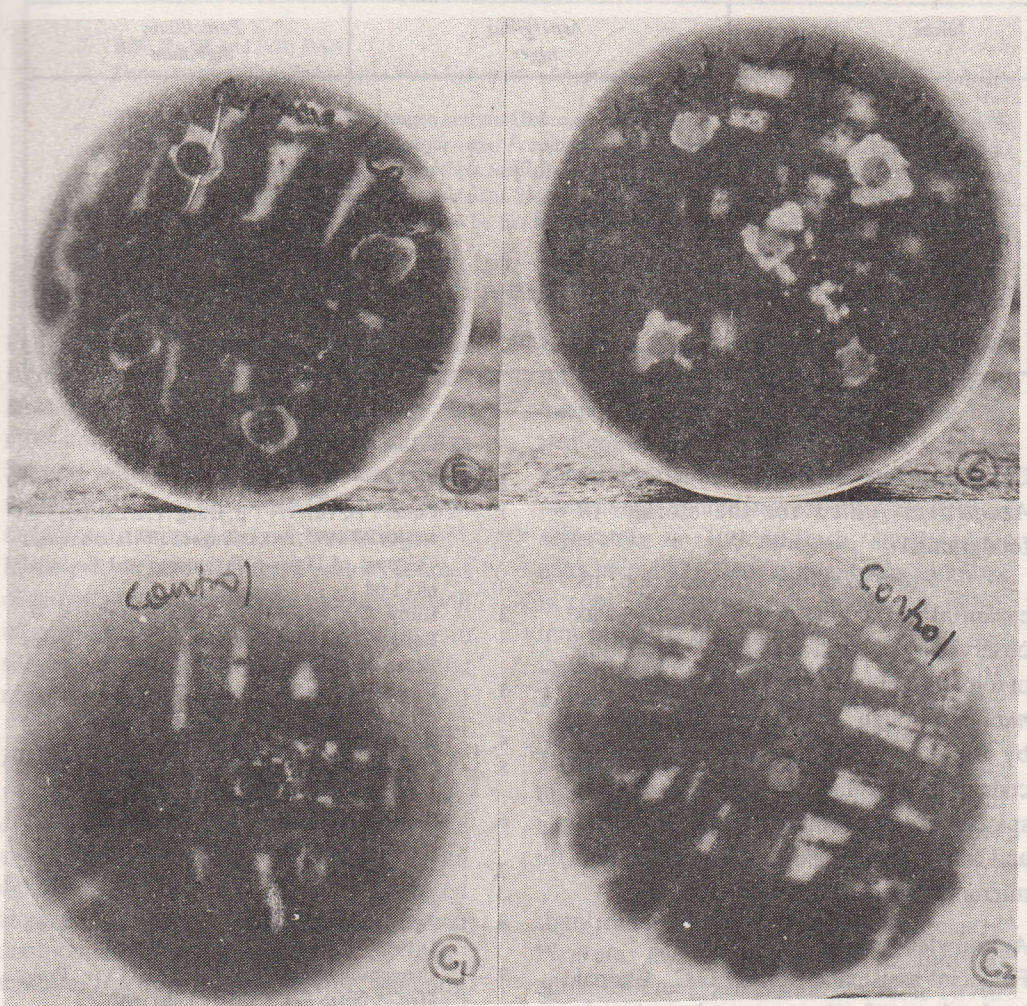


Fig. 5 - *C. longa* aqueous extract activity against *A. niger*.

Fig. 6 - *Z. officinale* aqueous extract activity against *A. niger*.

Fig. C1 - Control (without extract) with *A. niger*.

Fig. C2 - Control (without extract) with *P. digitatum*.



Table 1. The Antifungal Activity of Juices and Aqueous Extracts. \*

Diameter of Zone of Inhibition in cm.*		
Juices	<i>Aspergillus niger</i>	<i>Penicillium digitatum</i>
<i>Curcuma longa</i>	1.02	1.06
<i>Zingiber officinale</i>	1.03	1.2
Aqueous extract		
<i>Curcuma longa</i>	1.03	—
<i>Zingiber officinale</i>	1.00	—

\*including the diameter of paper disc (6mm)

Gangopadhyay<sup>9</sup> used *C. longa* along with *Azadiracta indica* for the storage of foodgrains.

From *Zingiber officinale* too, its essential oil's antifungal activity was observed by Sharma and Singh<sup>10</sup>. Induction of somatic segregation activity in *Aspergillus nidulas* through *Z. officinale* investigated by Ruiz *et al*<sup>11</sup>. From the results it is concluded that these two common Indian spices possess a strong antifungal component and can be tested against other fungus and microorganisms.

#### Acknowledgement

Financial assistance from U.G.C., Bhopal in the form of minor research project is thankfully acknowledged.

#### References

1. Chinh T D, Tuyet N T B, Dung N X, Lecleq P A and Ky P T 1995, Proceedings of 13<sup>th</sup> International Congress of Flavour, Fragrances and Essential oils 1 68
2. Ruby J A, George J, Dinesh Bahu K V, Rajesekharan K N and Kuttan R 1995, *Amala Research Bulletin* 15 57
3. Bhandari U and Sharma J N 1994, *Int. Conf. Curr. Prog. Med. Aromat. Pl. Res.* Calcutta India p133
4. Jain S K 1995, *Ethnobotany* 7 83
5. Maheshwari A K, Tiwari M P and Pant M C 1995, *Ind. J. Hospital Pharmacy* 32 18
6. Nugyoho B W, Schwarz B, Wary V and Praksch P 1996, *Phytochem.* 41 129
7. Vincet J G and Vincet H W 1944, *Proc. Soc. Expt. Biol. Med.* 55 162
8. Apisariyakul A, Vanittanakam N and Buddhasukh D 1995, *J. of Ethnopharmacol* 49 163
9. Gangopadhyay S 1994, *Int. Conf. Curr. Prog. Med. Aromat. Res.* Calcutta India p99
10. Sharma S K and Singh V P 1979, *Ind. Drugs & Pharm. Industr.* p3
11. Ruiz A R, De la Torre R A, Alonso N, Villaescusa A, Betancourt J and Vizoso A 1996, *Ethanopharmacol.* 52 123