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Effect Of Organic And Chemical Fertilizer Application On Anti-Inflammatory Activity Of Ginger

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ABSTRACT

The medicinal properties of ginger have long been known and it is used not only to improve taste but also as a spice to increase nutritional value. A large amount of agricultural waste, including cow dung and other bio waste, exists in rural areas but is not recycled or properly utilized. Tiwari, KP and others said. Organic waste is an alternative to use for agriculture. Organic waste as a fertilizer not only provides nutrients and growth but also increases the soil's water- holding capacity. The experiments to identify suitable bio organic compounds were conducted in Shivpuri, Madhya Pradesh. A comparative study on the anti-inflammatory activity of phytochemicals in cultivated and commercial ginger (obtained from the local market) was conducted, analyzed and documented. The results of this study also support the use of planting materials such as organic fertilizer and cocopeat in sustainable agriculture to provide nutrients to plants and increase productivity. This means that the combined use of fertilizer resources (chemical fertilizers, organic fertilizers) and organic growing substrates will result in more effective anti-inflammatory activity of ginger phytochemicals.

Keywords: anti-inflammatory activity, organic fertilizer, ginger, growth, chemical fertilizer, organic fertilizer and agricultural products

INTRODUCTION

Ginger (Zingiber officinale), a member of the Zingiberaceae family , has been prized since ancient times for its aroma, spiciness and medicinal properties. It has been commonly used as a spice for more than 2000 years (Bartley and Jacobs, 2000) and is characterized by its unique aroma and spicy taste (Jolad et al., 2005). Ginger occupies an important position among the country's main cultivated spices and is a valuable source of foreign exchange. Ginger oleoresin and essential oils are the company's main value- added products, and the export volume of these products is increasing year by year. Its fresh aroma and spicy taste make it an important ingredient in food and food processing industries around the world. Ginger is a long-growing crop that requires a balanced supply of nutrients, which can be obtained from organic sources to achieve high yields of high-quality fresh rhizomes. Insufficient or unbalanced nutrients are a major obstacle to mass production of fresh rhizomes.

Excessive use of chemical fertilizers deteriorates the physical, chemical and biological parameters, health of soil and associated with other problems such as nitrogen leaching, instability, denaturation and phosphorus immobilization. Therefore, other sources of phytonutrients should be used, such as organic fertilizers and vermicomposts, which are reliable sources of phytonutrients. Careful utilization and efficient management of chemical and biological resources not only improve soil productivity and health but also meet the specific requirements of chemical fertilizer that also maintain agricultural production, soil health and biodiversity.

METHOD

Five fully grown mature plants were randomly selected from each pot and rhizome were harvested and were coded Sample:1 (S═1), Sample:2 (S═2), Sample:3 (S═3), Sample:4 (S═4) and Sample: 5 (which was purchased from the local market) (S═5). Next, place these rhizomes outdoors to dry, but avoid direct sunlight. Finally pack the rhizomes of Samples 1 to 5 into plastic boxes and made into a powder that met the requirements.

Table 1: Showing coding details of different samples based on fertilizer treatment of pots

Sr. No.	Sample	Sample code	Treatment of plot done by different type of fertilizers
1.	Sample:1	S═1	Organic fertilizer
2.	Sample:2	S═2	Chemical fertilizer
3.	Sample:3	S═3	Mix (Both Organic and Chemical fertilizer)
4.	Sample:4	S═4	No treatment

STATICAL ANALYSIS

In vitro anti-inflammatory activity evaluation

Ginger extract was evaluated by the Protein Denaturation Method (described by Padmanabhan and Jangle., 2012). Diclofenac sodium is a potent non steroidal anti-inflammatory drug used as standard medication. Reaction mixtures consisting of 2 ml of different concentrations of *Aegle marmelos* extract (100–500 µg /ml) or standard diclofenac sodium (100–500 µg ml−1) and 2.8 ml of phosphate buffered saline (pH 6.4) was mixed with 0.2 ml of egg white protein (from fresh eggs) and incubated at (37± 1) °C for 15 minutes. Denaturation was induced by keeping the reaction mixture in a water bath at 70°C for 10 min. After cooling, use double-distilled water as a blank and measure the absorbance at 660 nm. The percentage inhibition of protein denaturation was calculated by using the following formula:

$$\% \text{ Inhibition} = \frac{\text{At-Ac}}{\text{Ac}} \times 100$$

Where, At=absorbance of test sample; Ac=absorbance of control

RESULTS

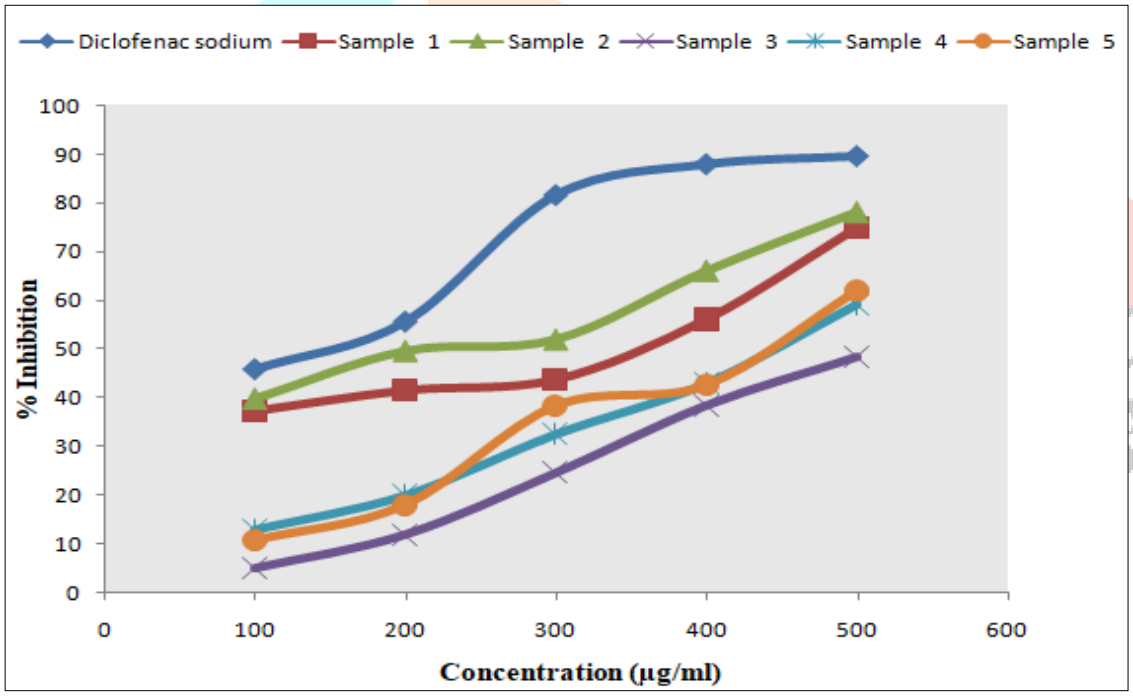
In vitro anti-inflammatory activity results

Table 2:Absorbance of Diclofenac Sodium and given samples

Concentration (µg/ml)	**Absorbance**					
	Diclofenac sodium	S=**1**	S=**2**	S=**3**	S=4	S=5
100	0.461	0.532	0.511	0.808	0.741	0.758
200	0.378	0.496	0.428	0.749	0.681	0.696
300	0.157	0.477	0.408	0.641	0.574	0.524
400	0.103	0.372	0.289	0.523	0.485	0.488
500	0.089	0.212	0.187	0.438	0.347	0.324
Control	**0.851**					

Table 3:% Inhibition of Diclofenac Sodium and given samples

Concentration (µg/ml)	% Inhibition					
	Diclofenac sodium	**S=1**	**S=2**	**S=3**	S=4	S=5
100	45.82	37.48	39.95	5.05	12.92	10.92
200	55.58	41.71	49.7	11.98	19.97	18.21
300	81.55	43.94	52.05	24.67	32.54	38.42
400	87.89	56.28	66.03	38.54	43.00	42.65
500	89.54	75.08	78.02	48.53	59.22	61.92
IC_{50}	**116.38**	**292.58**	**223.91**	**515.94**	**444.86**	**424.66**



***In vitro anti-inflammatory activity* map**

CONCLUSION

A comparative study of the anti-inflammatory activity of phytochemicals in cultivated and commercial ginger (obtained from local market) was conducted, analyzed and documented. For this, it is effective and reliable to use organic fertilizers as a growing medium. The result of this study is also support the use of planting materials such as organic fertilizer and cocopeat in sustainable agriculture to provide plants with the nutrients. This means that the combined use of fertilizer resources (chemical fertilizers, organic fertilizers) and organic cultivation substrates is effective in producing better anti-inflammatory activity of phytochemicals of ginger.

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