

Effect of garlic extract on human intestinal microflora

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SUMMARY

Influence of aqueous extract of five garlic genotypes (HG-1, HG-6, HG-17, HG-19, G-1) was examined on the population of *Salmonella typhimurium*, *Staphylococcus aureus*, *Enterococcus faecalis* and *Escherichia coli*. Monitoring of the growth after 6h and 24h revealed that garlic extract was effective in checking the growth of these pathogens. The aqueous extract of garlic variety HG-19 bulbs showed the maximum inhibition against all the microorganisms tested. The best garlic extract concentration emerged to be 1.5% that produced more than 90% growth inhibition.

Key words : Garlic, Intestinal microflora, Growth inhibition, Colony forming units, Allicin

Plants accumulate high concentrations of different chemicals that constitute the basis for modern drug equivalents (Srivastava *et al.*, 1982). The plants of the genus *Allium*, having anti-microbial activity and widely used in the human diet, are garlic and onion (AI-Dalaimy and Ali, 1970). Garlic is the second most widely cultivated allium used for home consumption in foods, pharmaceutical preparations and for earning foreign exchange. Garlic sap inhibits the growth of several gram positive and gram-negative food spoilage and pathogenic bacteria including *Escherichia*, *Enterobacter*, *Salmonella*, *Shigella* and *Pseudomonas*. Aqueous extract of garlic contains the water soluble thiosulfinates (allicin etc.) and therefore have strong antimicrobial activity (AI-Dalaimy and Ali, 1970; Augusti, 1996; Thompkinson and Singh, 2000). The use of powder from fresh garlic was proved to be much effective than that from one year old garlic against *Escherichia coli* and 1% solution of fresh garlic powder eradicated the *E. coli* O-157 in 6h (Sasaki *et al.*, 1999). The antimicrobial activity was resistant to heat treatment of 100°C for 20 min. Garlic therapy has also been suggested in flatulence, constipation, faulty digestion, inadequate food intake, chronic coughs, leprosy and in many other diseases (AI-Dalaimy and Ali, 1970; Augusti, 1996; Thompkinson and Singh, 2000; Sasaki *et al.*, 1999).

Keeping in view the variegated facts and tangible uses of garlic, the present study was designed to examine

the effect of aqueous garlic extract of five varieties on some of the microorganisms commonly populated in the human intestine.

MATERIALS AND METHODS

Plant materials:

Five garlic varieties (HG-1, HG-6, HG-17, HG-19, G-1) were grown in a randomized block design in three replicates at the Vegetable Research Farm of Chaudhary Charan Singh Haryana Agricultural University, Hisar. The recommended doses of fertilizers and other agronomical practices were adopted to raise the crop as per package and practices of the university (HAU, 1981). Garlic bulbs were collected at 195 days after sowing.

Bacterial cultures:

The microbial cultures of *Escherichia coli* and *Salmonella typhimurium* were obtained from Department of Veterinary Microbiology, CCS HAU, Hisar and of *Staphylococcus aureus* and *Enterococcus faecalis* from Department of Microbiology and Biotechnology, SBS (PG) Institute of Biomedical Sciences, Balawala, Dehradun. All the bacterial cultures were maintained on nutrient agar slants at 4°C with repeatedly transfer on fresh slants after one month.

Preparation of garlic extract:

Aqueous garlic extract was prepared by crushing 1g of garlic bulbs with 100 ml of distilled water in a pestle and mortar and filtered through Millipore filter (0.45 µm) and stored in presterilized 250 ml conical flask. Periodically 0.5, 1.0, 1.5 or 2.0 ml of garlic extracts was drawn aseptically and added to the nutrient broth.

Procedure for antibacterial activity:

Antibacterial activity of aqueous garlic extract was

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