



RESEARCH PAPER

ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF *ALLIUM SATIVUM* AND *ALLIUM CEPA*

Deepak Kumar Shrestha^{1*}, Himal Sapkota¹, Purnima Baidya², Sudarshan Basnet¹

¹Department of Pharmacy, School of Medical Sciences, Banasthali, Kathmandu, Nepal

²Central Department of Microbiology, Institute of Science and Technology, Tribhuvan University, Kirtipur, Kathmandu, Nepal

*E-mail: shresdeepak@gmail.com

Tel.: 00977-9851158638.

Received: Jul 01, 2016 / Revised: Jul 23, 2016 / Accepted: Aug 10, 2016

Garlic and onion have been used widely as common household spices from the ancient period and have also been regarded as traditional healers. This study was designed to evaluate the antioxidant and antibacterial activities of fresh extracts of garlic and onion. Activities of enzymatic antioxidants (superoxide dismutase and catalase) and non-enzymatic antioxidant (ascorbic acid content) activities were measured and compared in between garlic and onion extracts. Superoxide dismutase and catalase activities in garlic were found noticeably high ($p < 0.05$) compared to onion but significantly reverse in case of the ascorbic acid content ($p < 0.05$). Likewise, six bacteria were chosen to study antibacterial activities of garlic and onion. The zones of inhibitions exhibited by the extracts against *B. cereus*, *S. aureus*, *Micrococcus* sp., *E. coli*, *Klebsiella* sp. and *Proteus* sp. were compared with the reference antibiotic chloramphenicol (1%). Antibacterial activity of the garlic extract singly and its mixture with onion extract in the ratio 1:1 against the tested bacteria were found significantly higher ($p < 0.05$) than the onion extract.

Key words: Garlic, Onion, Antibacterial activity, Antioxidant activity, *Allium cepa*, *Allium sativum*.

INTRODUCTION

Antioxidant compounds in food are found to have a health-protecting factor (Rahman *et al* 2012). Various enzymatic and non-enzymatic constituents present in foods show antioxidant activities. Enzymatic antioxidant, *i.e.* superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx) (Bray and Bettger, 1990; Powell, 2000), peroxidase (POD), glutathione reductase (GR) and glutathione S-transferase (GST) (Csiszár *et al* 2007), operate in concert together with several non-enzymatic molecules such as glutathione, α -tocopherol, ascorbic acid and β -carotene (Mahadik and Scheffer, 1996) to contrast the reactive oxygen species action and to avoid oxidative damage (Bray and Bettger, 1990; Powell, 2000) and thereby prevent the propagation of free radical

chain reactions (Pavlović *et al* 2002; Mahadik and Scheffer, 1996).

Similarly, due to the ability to donate two hydrogen atoms, ascorbic acid can react with many different free radicals and has an antioxidative effect (Belitz and Grosch, 1992; Packer *et al* 2002).

Allium species such as onions (*Allium cepa*) and garlic (*Allium sativum*) are used as foodstuff, condiment, flavouring, and folk medicine (Figure 1). Onion has been revered throughout the time not only for its culinary use, but also for its therapeutic properties (Skrinjar and Nemet, 2009).

Onion bulbs contain a good number of phytochemicals, most of which are hydrocarbons and their derivatives (Griffiths *et al* 2002). Several authors have reported pharmaceutical