



Research Article

Comparative studies on eco-friendly management of tomato leaf curl using cow, goat and buffalo's milk whey protein

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ABSTRACT

The experiments were conducted to know the effect of milk whey protein on tomato leaf curl disease. For comparative studies, milk of cow, goat and buffalo was used. Trial fields which were treated with milk whey proteins showed less disease incidence as compared to the trial field which was not treated. Studies also showed that buffalo's milk had highest inhibitory effect against tomato leaf curl followed by cow and goat's milk. These investigations shows that milk whey protein could be used as an eco-friendly measure to control tomato leaf curl disease.

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INTRODUCTION

Tomato (*Lycopersicon esculentum* Mill.) of family Solanaceae is one of the important vegetable crops grown throughout the world. UP is one of the major tomato growing states of India. The most widespread and destructive disease of tomato is tomato leaf curl, as sometimes it leads to cent percent crop loss (Butter and Rataul, 1981, Ansari *et al.*, 2005). The tomato leaf curl virus (TLCV) is transmitted by whitefly (*Bemisia tabaci*, Genn.) (Vasudeva and Somaraj, 1948).

In order to control TLC, farmers normally use chemical insecticides which leads to serious consequences affecting human physiology on consumption of such fruits. The use of insecticides also disturbs the ecobalance of soil and the environment by killing non targeted insects, which harbour beneficial parasites and predators. So an alternative eco-friendly method is necessary to avoid the undesirable effects of the insecticides. In 1940s several investigators suggested the use of milk as spraying or dipping of seedlings for reducing the incidence of virus infections. Recent studies demonstrated the effectiveness of milk in reducing infection of tobacco mosaic virus (TMV) in pepper, tomato, and tobacco.

There are two major categories of milk protein that are broadly defined by their chemical composition and physical properties. The casein family contains phosphorus and will coagulate or precipitate at pH 4.6. The serum (whey) proteins

do not contains phosphorus, and these proteins remain in solution in milk at pH 4.6. Out of total protein content of milk, 80 per cent is casein protein and 20 per cent is whey protein. The main constituents of whey are α -lactalbumin (ALA), β -lactoglobulin (BLG) and two small globular proteins that account for approximately 70-80 per cent of total whey protein. The biological components of whey proteins, including β -lactoglobulin, α -lactalbumin, lactoferrin, lactoperoxidase, immunoglobulins and glycomacropetides, demonstrate a wide range of immune enhancing properties, and act as antioxidant, antihypertensive, antitumor, antiviral, antimicrobial and chelating agent. The objective of the present work is to study the comparative inhibition of tomato leaf curl disease using cow,goat and buffalo's milk.

MATERIALS AND METHODS

Simplified short timed method for the esterification of milk protein is used for esterification of whey protein fraction using >99.5 per cent methyl alcohol, at 4°C for 10 h. as follows:

Native whey proteins fractions were dispersed (5%, w/v) in methyl alcohol 99.5 per cent. Amounts of hydrochloric acid equivalent to 50 molar ratio of acidity (MR, mole acid/mole carboxyl group) were added drop-wise at the start of the reaction time. All the reaction mixtures were kept at 4°C under continuous stirring. At the end of the reaction (6 h), the samples