

# Criterion – 3

Research, Innovations and Extension

NAAC- SSR (2<sup>nd</sup> Cycle)



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# 3.3.1(6)

## Commercialize a wheat grass drink



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# Published articles on wheat grass by Eternal University

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## First report on *Bacillus subtilis* EU-WG-01 endophytic bacterium from wheat grass and development of probiotic formulation

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### ABSTRACT

Wheat grass, one of the members of Poaceae family, has been examined for therapeutic drugs efficiently. Wheat grass juice has become a popular beverage in various countries. Wheat grass is low in calories but high in nutrients, including antioxidants such as glutathione, vitamin C, and vitamin E. The juice is extracted from shoots of tender wheat grass and is an intensive source of minerals, vitamins, chlorophylls, antioxidants, polyphenols and active enzymes. The present investigation deals with the isolation of endophytic bacteria from wheat grass and development of probiotic formulation. A total of 25 endophytic bacteria were isolated from wheat grass and screened for pigment and hydrolytic enzyme production. The selected bacterial strains were screened for antimicrobial activity against pathogenic organisms *Bacillus cereus* (MTCC-430), *E. coli* (MTCC-1687) and *Yersinia* sp. (MTCC-4912). The efficient bacterial strain EU-WG-01 was identified using 16S rRNA gene sequencing as *Bacillus subtilis*. *Bacillus subtilis* EU-WG-01 was inoculated into mango juice to prepare a probiotic formulation. *Bacillus subtilis* EU-WG-01 at concentration of 15% was used to ferment the probiotic drink. The phytochemical (Total soluble sugars, reducing/non-reducing sugars, titratable acidity, antioxidant activity, protein content, color attributes and ascorbic acid), biomass and cell viable count were analysed. Among the phytochemical parameters a significant decrease was observed in total soluble sugar from 15.68° brix to 16.51° brix, total sugars from 13.30% to 7.50%, non-reducing sugars reduced from 10.20% to 1.30%, ascorbic acid from 21.60/100 mg mL<sup>-1</sup> to 14.90/100 mg mL<sup>-1</sup>. The antioxidant activity from 6.55% to 3.56% except for titratable acidity and reducing sugars increased significantly during 30 days storage under refrigeration. *Bacillus subtilis* EU-WG-01 viability was found to remain well above 2 log CFU/mL<sup>-1</sup> for 30 days. *Bacillus subtilis* EU-WG-01 could be used for probiotic formulation for human health.

### 1. Introduction

Probiotics are live microorganisms recommended with contend to consumers looking for the diets that increase and promote the health and wellness, and generally restore or improve the gut microbiota. Probiotic is a Greek word which means "for life" is defined as microbes that provide beneficial effects. Probiotics, when administered in suitable doses can provide several health benefits to the host. Probiotics are

generally considered safe for consumption but can sometimes cause bacterial host interactions and infrequent adverse effects. Probiotics have shown positive effects but the scientific evidence supporting many of the health claims associated with them is limited.

The available probiotic products are supplements of dietary, foods, and medicines. Usually, probiotic bacteria are present in dairy products. The probiotics accredited the health benefits are the lactose intolerance depletion, immune system stimulation, relief from constipation,

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