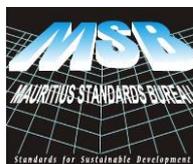

Microbial bio-fertilizers

**Part 1:
Specifications for nitrogen fixing bacteria**

PREVIEW

ICS 65.080



**Mauritius Standards Bureau
Moka**



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Foreword

This Mauritian Standard was drawn by the **Chemicals Standards Committee** through its Subcommittee on **Bio-fertilizers** and approved by the **Standards Council** on 28 September 2016. It was notified in the Government Gazette on **22 October 2016***

In preparing this standard assistance was derived from the following publications:

1. Biofertilizers and Organic Fertilizers in Fertilizer (Control) order, 1985
2. IS 8268:2001, *Rhizobium inoculants – Specification*
3. IS 9138:2009, *Azotobacter chroococcum inoculants – Specification*
4. IS 14806: 2000, *Azospirillum inoculants – Specification*
5. KS 2356:2011, *Bio fertilizer - Specification*

Acknowledgement is made for the use of information from the above publications

MS 185 consists of the following parts, under the general title *Microbial bio-fertilizers* –

Part 1: Specifications for nitrogen fixing bacteria

Part 2: Specification for phosphate solubilising bacteria (PSB)

Part 3: Specification for potash solubilising bacteria (PGCR)

*** General Notice No. 1484 of 2016**

Introduction

Commercial farming to meet food security involving intensive land use relies heavily on agricultural inputs such as chemical fertilizers and synthetic pesticides. However, increasing continuous use of chemical fertilizers over years has caused environmental damage such as ground water contamination, eutrophication of water bodies. Long term sole reliance on excessive use of chemical fertilizers and synthetic pesticides has also adversely impacted on soil quality, fertility and soil microbial biodiversity.

With the increasing demand for food to meet the growing population, food production can be enhanced by increasing the productivity of existing agricultural land sustainably and/or bring additional land under cultivation. Ensuring sustainable long term land productivity can be achieved through an integrated nutrient management system involving a combination of environmentally friendly sources of plant nutrients including organic microbial fertilizers and chemical fertilizers.

Biofertilizers are defined as preparations containing living cells or latent cells of efficient strains of microorganisms that help crop plants' uptake of nutrients by their interactions in the rhizosphere when applied through seed or soil. They accelerate certain microbial processes in the soil which augment the extent of availability of nutrients in a form easily assimilated by plants. Biofertilizers generate plant nutrients like nitrogen and phosphorus through their activities in the soil or rhizosphere and make available in a gradual manner to plants.

Types of bio-fertilizers

1. Nitrogen fixers
 - Bacteria – eg. Rhizobium, Bacillus, Mycobacterium, Azotobacter and Azospirillum
 - Blue green algae – eg. Anabaena, Nostac, Tolypotlurix,
2. Phosphate solubilising – eg. Pseudomonas spp.
3. Plant growth promoting Rhizobacteria
4. Sulphur solubilising microbes
5. Azolla – eg. Azolla filicoides, Azolla rubra
6. Vesicular Arbuscular Mycorrhiza (VAM fungi)

MS 185 limits itself to microbial bio-fertilizers only. The other types of bio-fertilizers are not covered.

Microbial bio-fertilizers are preparations containing live microbes which help in enhancing soil fertility by fixing atmospheric nitrogen, solubilisation of phosphorous, mobilization of nutrients or decomposing organic wastes or by augmenting plant growth by producing growth hormones with their biological activities.

Potential benefits of using microbial bio-fertilizers are:

- i) To provide an eco-friendly alternate renewable source of nutrients.
- ii) Sustain soil health
- iii) Decompose plant residues, and stabilize C:N ratio of soil
- iv) To enhance soil biological activity and improve availability of plant nutrients.
- v) To improve chemical, physical and biological properties of soil.
- vi) To promote plant growth and improve crop yield.
- vii) Solubilize and mobilize nutrients

Microbial fertilizers are supplement to chemical fertilizers but not substitute to it. They usually cause 20 to 30 percent increase in crop yield. However, they do not cause marked increase in productivity like chemicals.

Efficiency of microbial fertilizer is markedly dependent on soil character, for example moisture content, pH, temperature organic matter and types of resident microorganism. When these factors are unfavourable microbial fertilizers may not be effective in increasing the soil fertility.

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* - document under development

Microbial bio-fertilizers – Part 1: Specifications for nitrogen fixing bacteria

1 Scope

This Mauritian Standard specifies the requirements and methods of test for three types of nitrogen fixing microbial bio-fertilizers:

- (i) Rhizobium sp
- (ii) Azotobacter sp
- (iii) Azospirillum spp

This Mauritian standard is applicable to both solid as well as liquid nitrogen fixing microbial bio-fertilizers.

This part of MS 185 is not applicable to other types of bio-fertilizers such as algae, ferns, fungi and others.

The requirements specified in this standard are limited to laboratory performance and it does not cover field efficacy test.

2 Normative references

The following document is indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest document (including any amendments) applies.

- ISO 11133 *Microbiology of food, animal feed and water - Preparation, production, storage and performance testing of culture media*

3 Terms and definitions

For the purpose of this standard the following definitions apply.

3.1

Azospirillum inoculant (ASI)

a product having large population of a strain or a combination of several strains of Azospirillum for particular graminaceous plants which develop efficient roots in the plant and enrich soil with nitrogen and thereby enhance nitrogen fixation, crop growth and productivity

3.2

Azotobacter inoculants (AI)

a product having a large population of a strain or a combination of several strains of Azobacter for a particular group of non-leguminous plants