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(54) Title: NOVEL KIMBERLITE BASED FERTILIZER PRODUCTS

(57) Abstract: Novel Kimberlite based fertilizer products are produced with or without lignite, with or without alkali and with or without existing fertilizers to enhance crop yields.

NOVEL KIMBERLITE BASED FERTILIZER PRODUCTS

FIELD OF THE INVENTION

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In general, this invention relates to the field of material sciences. In particular, this invention pertains to production of fertilizers from Kimberlite. This invention also relates to a method of manufacturing fertilizer products from Kimberlite having applications in the field of agriculture.

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BACK GROUND OF THE INVENTION

Diamonds are formed when carbon deposits are exposed to high pressure and temperature for prolonged periods. Deep within the earth, there are regions that are at a high enough 15 temperature and pressure that the formation of diamonds is thermo dynamically possible. Under the continental crust, diamonds form starting at depths of about 90 miles where pressure is roughly 5 giga pascals and the temperature is around 2200° Fahrenheit. Diamonds are mined in 'kimberlite pipe'. Kimberlite is an ultra potassic, ultra mafic, igneous rock composed of garnet, olivine, phlogopite, and pyroxene with a variety of 20 other trace minerals. Kimberlite occurs in the earth's crust in vertical structures known as Kimberlite pipes. India is host to the largest known number of proterozoic Kimberlite clan rocks.

Large amounts of Kimberlite is required to produce a carat of diamond. Few tonnes are 25 required to yield a carat of diamond. Large amount of Kimberlite after removal of diamond is available around the globe without any appropriate utility. Kimberlite contains magnesium, trace metals and silica in rich proportions. Therefore, present invention objective is to invent method of producing Kimberlite based fertilizers.

30 OBJECTS OF THE INVENTION

Accordingly, the primary object of this invention is to invent fertilizers products from Kimberlite which can be used as fertilizer.

Another object of this invention is to develop production method of Kimberlite based 5 fertilizer products. Yet another objective of this invention is to invent Kimberlite based products with organic nature. Still another objective of this invention is to provide a necessary method for production of organic based Kimberlite products.

SUMMARY OF THE INVENTION

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To meet the above objects and others, present invention provides novel fertilizer products from Kimberlite having utility as nutrients to supply silica, magnesium, trace elements with or without organic substances, and also having scope to design products with various combinations with other fertilizers and / or plant based nutrients.

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DETAILED DESCRIPTION OF THE INVENTION

Now this invention will be described in detail so as to illustrate and explain various salient features of the invention. One embodiment of the invention is to provide 20 Kimberlite based fertilizer products by reacting and / or blending with alkali. Another embodiment of the present invention relates to a method of production of organic based Kimberlite products by blending with lignite along with alkali.

In a preferred embodiment, the present invention provides method of producing 25 Kimberlite based fertilizer products and the said method comprising the following steps:

(a) Micronization of Kimberlite

(b) Addition of Alkali (Sodium Hydroxide or Potassium Hydroxide or
Ammonia etc.) to Kimberlite

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(or)

Addition of Nitric Acid or Phosphoric Acid and later neutralizing with alkali (Sodium

Hydroxide or Potassium Hydroxide or Ammonia etc.)

(or)

Addition of Kimberlite as filler material with other fertilizers such as DAP and other single -direct and / or complex fertilizers of NPK.

5 (c) Mixing thoroughly the reactants

(d) Adjusting the moisture content and temperature for optimum reaction

(or)

Addition of lignite and adjusting the moisture content and temperature for optimum reaction

10 (e) Pelleting or powdering by removal of moisture

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

Figure (1) relates to the various steps involved in the manufacturing process of various fertilizer products from Kimberlite.

15 Figure (2) relates to the comparative FTIR analysis of Kimberlite, Kimberlite treated with alkali, Kimberlite treated with Nitric Acid, Phosphoric Acid and Ammonia, Kimberlite treated with Nitric Acid and Ammonia.

Now the invention will be described in the following description. The nature of the invention and the manner in which the invention is to be carried out will be described in
20 detail.

Figure (1) relates to the various steps involved in the manufacturing process of various types of fertilizer products from Kimberlite.

Figure (2) relates to the comparative FTIR analysis of Kimberlite, Kimberlite treated with alkali, Kimberlite treated with Nitric Acid, Phosphoric Acid and Ammonia,
25 Kimberlite treated with Nitric Acid and Ammonia. The characteristic absorbance of the peaks with variability was observed for the treatments in relation to non-treated Kimberlite.

Now the applicant provides following specific description by way of examples and illustrations of the invention and this should not be construed to limit the scope of the invention in any manner.

5 Alkali (Sodium Hydroxide or Potassium Hydroxide or Ammonia etc.) to Kimberlite was added at a ratio of 1:3 to 1:50 (w/w). The mixture of alkali and kimberlite was blended by grinding properly, then water was added appropriately to mix thoroughly. The resultant material was pelleted for usage as the fertilizer.

10 Nitric Acid or Phosphoric Acid was added to Kimberlite (5 to 50 % v/w) and later neutralizing with alkali (Sodium Hydroxide or Potassium Hydroxide or Ammonia etc.) was done.

Kimberlite was added as filler material with other fertilizers such as DAP and other single -direct and / or complex fertilizers of NPK.

15 Lignite was added to Kimberlite at a ratio of 10: 1 to 1: 10 and later alkali was added to the mixture of lignite and kimberlite at a ratio of 1:3 to 1:50 (w/w). The mixture of alkali and lignite-kimberlite was blended by grinding properly, then water was added appropriately to mix thoroughly.

20 When kimberlite based fertilizer products were tested on various agricultural crops enhanced yields significantly. When silica supplementation has been done through these kimberlite based products, on crops, it imparted resistance to diseases apart from yield enhancement.

Present invention explains production of various types of Kimberlite based fertilizer products for enhancement of yield of various agricultural crops.

25 The results derived from the present invention gives a scope of using Kimberlite based fertilizer products for effective and economic integrated fertilizer management.

This invention has been explained by way of few examples and is not restricted to various combinations and feasibilities of the basic aspect.

CLAIMS:

1. Novel fertilizer products from Kimberlite having utility as nutrients to supply silica, magnesium, trace elements with or without plant based nutrients such as organic substances or fertilizers.

5 2. Kimberlite based fertilizer products as claimed in claim1 and the said products manufacturing method comprising the following steps with single or multiple permutations and combinations:

(a) Micronization of Kimberlite

(b) Addition of Alkali (Sodium Hydroxide or Potassium Hydroxide

10 or

Ammonia etc.) to Kimberlite

(or)

Addition of Nitric Acid or Phosphoric Acid and later neutralizing with alkali (Sodium Hydroxide or Potassium Hydroxide or Ammonia etc.) (or)

15 Addition of Kimberlite as filler material with other fertilizers such as DAP and other single -direct and / or complex fertilizers of NPK.

(c) Mixing thoroughly the reactants

(d) Adjusting the moisture content and temperature for optimum reaction (or)

addition of lignite content with adjusting temperature for optimum reaction

20 (e) Pelleting or powdering by removal of moisture

3. Kimberlite based fertilizer products as claimed in claim1 have exhibited the characteristic IR absorbance peaks with variability (as shown in Figure(2) indicated by comparative FTIR analysis of Kimberlite, Kimberlite treated with alkali, Kimberlite treated with Nitric Acid, Phosphoric Acid and Ammonia, Kimberlite treated with Nitric Acid and Ammonia

FIGURE-1

