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Evaluation of immunomodulatory activity of Suvarnamalini vasant,® a generic Ayurvedic herbomineral formulation

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Suvarnamalini vasant-a generic Ayurvedic herbomineral preparation was studied for its immunomodulatory activity by 1) evaluating it's effect on phagocytic function of polymorphonuclear white blood cells of rats and 2) it's effect in *E.coli*-induced peritonitis in albino mice. Pretreatment of rats with Suvarnamalini vasant improved the phagocytic function of polymorphonuclear white blood cells and also protected mice against *E.coli*-induced peritonitis. The results indicate the potential of Suvarnamalini vasant as an immunomodulator.

Keywords: Suvarnamalini, Herbomineral formulation, Phagocytosis, Immunomodulation

Suvarnamalini vasant (SMV) is a generic Ayurvedic formulation[1-3], which is used in Rajayakshma (Tuberculosis). It is generally used to strengthen the immune system of an individual. Suvarnamalini vasant consists of Jasad Bhasma as one of its ingredient. Zinc is the element present in Jasad Bhasma. Zinc plays a vital role in various catabolic and anabolic functions of the body. It is also involved in immune responses of the body[4]. Similarly SMV also contains gold in the form of Suvarna Bhasma. Gold compounds have important therapeutic applications in the treatment of arthritis[5-7]. Gold preparations are claimed to possess general tonic, hepato tonic, Cardio-stimulant, nervine tonic, aphrodisiac, detoxicant, anti-infective and anti-aging (rejuvenating) properties[8,9].

The present study was undertaken in order to reconfirm and revalidate the claims of Ayurvedic physicians that SMV has immunomodulating potential.

The formulation Suvarnamalini vasant® was manufactured by Shree Dhootapapeshwar Ltd. Veer Savarkar Chowk, Panvel, India as described in the Ayurvedic text[1-3].

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Different ingredients and their quantities (concentration) in the formulation of SMV are as follows:

Ingredient	Quantity/Tab of 62.5 mg
Suvarna bhasma	3.47 mg
Mouktik bhasma	6.94 mg
Sh. Hingul	10.42 mg
Maricha	13.89 mg
Jasad bhasma	27.78 mg
Cows butter	Q.S.
Nimboo rasa	Q.S.

The important stages in the manufacture of Suvarnamalini Vasant are as follows:
(1) Mixing of all ingredients except cows butter; (2) Addition of cows butter; (3) Bhavana-limbo swarasa; (4) Testing of bulk for quality assurance; (5) Addition of excepients and mixing; (6) Granulation of the bulk; (7) Tableting of the bulk; (8) Testing of the tablet for quality assurance; and (9) Filling, packing and labeling of the product.

The immunomodulatory potential of SMV was studied by conducting two experiments as follows:

Experiment I—Effect of treatment of SMV on phagocytic function of polymorphonuclear (PMN) leucocytes in experimental animals.

In order to study the effect of treatment of SMV on phagocytic function of PMN, the *in vitro* slide culture technique described by Gifford and Malawista[10] was used.

The healthy albino rats (Wistar strain) of either sex, weighing 150 and 250 g were included in the study. They were divided into two groups. The number of animals in each group was 8. The SMV was suspended in 2 % solution of CMC in distilled water. It was administered orally, daily to test group of animals for 21 days in a dose of 3.6 mg/200 g body weight. The volume of the suspension (dose) administered was 1.0 to 1.5 ml. The control groups of animals were administered 1 ml of 2% CMC suspension orally, daily for 21 days.

The *Candida albicans* culture was inoculated into Saboraud's broth aseptically. The tubes were suspended in phosphate buffered saline containing 20% serum (of the homologous species, i.e. obtained from rats of Wistar strain only). The count of *C. albicans* was adjusted to 1×10^8 cells/ml.

Table 1 — Percent phagocytosis in control and SMV treated group of animals.

Control (Placebo)		SMV-Treated	
Before	After	Before	After
14.80± 0.198	14.82± 0.155	14.77± 0.290	17.75± 0.265*

*$P < 0.001$

The glass slides with the phagocytic cells were then flooded with the suspension of *C. albicans*. The slides were incubated at 37°C for 1 hr. They were washed gently with buffered distilled water at *p*H 7.0 and stained by Giemsa's staining method[11].

The slides were observed under oil immersion lens (100x) and PMN cells identified. The numbers of PMN with and without *C. albicans* in their cytoplasm were counted. The percent phagocytosis was then calculated for both the groups before and after the treatment. Results were expressed as mean ± SE were subjected to Student's t test. Values of $P < 0.05$ were considered statistically significant (Table 1).

Experiment II — Effect of SMV in E.coli induced peritonitis in mice[12]

The study was conducted in albino mice, weighing between 20 and 30 g of either sex. The animals were divided into two groups consisting of 15 mice each. The test group of animals were administered SMV (suspension in 2% CMC) orally, daily, for one month. The dose of SMV was 0.52 mg/20 g body weight. The volume of the suspension (dose) administered was 1.0 to 1.5 ml. The control group of animals were administered 1 ml. of 2% CMC suspension orally, daily, for one month. At the end of the treatment the animals belonging to both the groups were inoculated with the pathogenic strain of *E.coli* intraperitoneally. The count of the organisms was adjusted to 1×10^8 organisms/ml in sterile saline. This suspension 0.2 ml was injected intraperitoneally into each mice. The animals were kept under observation for 72 hr. The percent mortality in treated and untreated groups was found to be 47.05% and 73.33% respectively. On applying Chi square test[13], these values of treated group were found to be significant ($\alpha = 0.05$).

A significant increase in per cent phagocytosis of PMN after treating the animals with SMV was observed. Similarly SMV treatment protected the mice against *E. coli* induced peritonitis. The percent mortality in untreated group of mice was high (73.33%) and was statistically significant ($\alpha = 0.05$).

The increase in per cent phagocytosis and protection against *E.coli* induced peritonitis in SMV treated group of animals may be attributed to its elemental content of zinc and gold. The other ingredients such as Mouktik Bhasma, Shuddha Hingul, Shweta Marich and Kalkhapri may act synergistically in order to potentiate the immunomodulatory activity of SMV. On the basis of the observations it could be suggested that Suvarnamalini vasant-a generic Ayurvedic herbomineral formulation has potential of immunomodulation.

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