

## “BIOBRAN MGN-3”;

Effect of reducing side effects of chemotherapy in breast cancer patients.

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**ABSTRACT... Objective:** The aim of study was to assess the effect of Biobran in reducing of chemotherapy induced side effects in terms of tiredness, anorexia, vomiting and hair loss and quality of life in terms of weight loss. **Setting:** Radiotherapy Department, Nishtar Hospital Multan. **Material and Methods:** Fifty patients of breast cancer were enrolled randomly in two groups. Group-A patients were given 3 gram dose of Biobran MGN-3 per day one week before and one week after chemotherapy. Group-B patient were given chemotherapy alone. Total six cycles of chemotherapy were given. No multivitamin or food supplements were given during this study. Chemotherapy induced side effects (tiredness, anorexia, and vomiting, hair loss) were assessed by questionnaire to the patients before start of each cycle. Weight was checked before each cycle to assess weight gain or loss. White blood cells were checked by complete blood count just before and one week after chemotherapy. **Results:** Between six months, 50 patients were enrolled in Radiotherapy Department, Nishtar Hospital Multan. There was a significant reduction in tiredness and anorexia in group-A patients. 20 (80%) patients of group-A felt increase in their diet and no tiredness without any appetizer or multivitamin. But group-B patients demanded for appetizer due to severe anorexia after chemotherapy except 3 (12%) patients who didn't use any appetizer or food supplement. In group-A, 15 (60%) patients didn't need any anti-emetic as compared to group-B all patient (100%) experienced severe nausea during and after chemotherapy. Group-A patients experienced less hair fall 7 (28%) patients as compared to other group which is 25 (100%) patients. **Conclusions:** The study showed that, by helping to optimize the immune system, Biobran MGN-3 can not only help maximize treatment success, but also minimize treatment side effects and improve quality of life during treatment and in recovery.

**Key words:** Biobran MGN-3, Chemotherapy side effects, Immune system

### Article Citation

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## INTRODUCTION

The immune system is the collective army of a trillion white blood cells, the bone marrow, antibodies and the thymus gland that identifies and then destroys the millions of microbes (bacteria, viruses, parasites, fungi) that penetrate our bodies every day. This system also needs to eliminate 500 to 10,000 of our own cells that have become genetically abnormal or cancerous<sup>1</sup>. In fact, the immune system is considered every bit as complex as our nervous system, and is not only able to produce a matching antibody for every one of the millions of different infective agents, but is able to remember how to produce these decades later. Central to the immune system are the lymphocytes, which include the T cells (70-80%), B cells (5-10%) and NK cells (15-20%). These cells, which work in conjunction with one another, are able to identify and destroy almost every intruder or infected/cancerous cell in the body. NK cells are of particular interest and

importance because, unlike other white blood cells, they are able to work more or less independently, without special instructions from the immune system, to recognize and destroy many types of cancerous and virally infected cells. They are therefore considered the body's first line of defense for these types of disease.

BioBran MGN-3 was developed in 1992 by Hiroaki Maeda, Director of Research and Development at Daiwa Pharmaceutical Co. Ltd in Tokyo. This is named BioBran MGN-3 (M - Maeda, G - Ghoneum, N - Ninomiya, 3 - third generation product). Small quantities of this food-based compound, which is made by breaking down rice bran using Shitake mushroom enzymes, have been clinically shown to stimulate the immune system when taken as a food supplement. It is also referred to as Biobran arabinoxylan compound because the arabinoxylan is one of its main components. As a blend of natural

compounds (hemicelluloses), Biobran is categorized as a glyconutrient or glyconutritional food supplement, and this natural array of short chain polysaccharides makes it much easier for the body to assimilate than single component substances (such as conventional drugs). This natural array of ingredients is also thought to be a reason for its non-toxicity and lack of unwanted side effects. When taken as a food supplement, BioBran MGN-3 increases the activity of the body's lymphocytes or white blood cells - more specifically T and B cell and especially NK cell function. The precise mechanism by which BioBran MGN-3 is able to do this is still uncertain, but it is thought that these hemicellulose compounds stimulate increased production of the body's own natural cytokines – including interleukins, interferons and tumour necrosis factors. As research shows that the biggest increase in immune function with BioBran MGN-3 is in NK cell activity, and as NK cells specifically target many types of cancer and viral-infected cells, this supplement has a promising role in the treatment of cancer<sup>2</sup>, for the purposes of this short review, we will focus primarily on cancer as most of the research with BioBran MGN-3 has so far been done in this area. NK cells are able to destroy cancerous and virally infected cells by attaching to the infected cell's membrane and injecting cytoplasmic granules (perforin). A single NK cell can repeat this process with up to 27 cells in its lifetime.

When body is stressed or in a diseased state, the immune system can become overloaded and the activity of immune cells becomes sluggish. This is often compounded by medical treatment – such as chemotherapy in the case of cancer which further depresses the immune system. A weak immune system is less able to prevent cancer cells and infections from taking hold and spreading in the body. Biobran MGN-3 is an immune modulator, enhances the immune system and also controls the side effects of cytotoxic drugs. The aim of study was to assess the effect of Biobran in reducing of chemotherapy induced

side effects in terms of tiredness, anorexia, vomiting and hair loss and quality of life in terms of weight loss.

## MATERIAL AND METHODS

Fifty patients of histologically proven locally advanced breast cancer were enrolled randomly in two groups. No chemotherapy or other treatment was given, normal hepatic and renal function at the start of treatment, and to give informed written consent.

Patients were divided into two groups randomly. Group A patients were given 3 gram dose of Biobran MGN-3 per day one week before and one week after chemotherapy. Group B patients were given chemotherapy alone. Total six cycles of chemotherapy were given to all patients. No multivitamin or food supplements were given to any patient during this study.

Chemotherapy induced side effects (tiredness, anorexia, and vomiting, hair loss) were assessed by questionnaire to the patients before start of each cycle. Weight was checked before each cycle to assess weight gain or loss. White blood cells were checked by complete blood count just before and one week after chemotherapy.

## RESULTS

Between six months, fifty (50) patients were enrolled in Radiotherapy Department, Nishtar Hospital Multan. There was a significant reduction in tiredness and anorexia in group A patients. 20 (80%) patients of group A felt increase in their diet and no tiredness without any appetizer or multivitamin. But group B patients demanded for appetizer due to severe anorexia after chemotherapy except 3 (12%) patients who didn't use any appetizer or food supplement. In group-A, 15(60%) patients didn't need any anti-emetic as compared to group B all patient (100%) experienced severe nausea during and after chemotherapy. Group-A patients experienced less hair fall 28% (7 patients) as compared to other group which is 100% (25

patients). There was a significant weight gain in Biobran group, 16 patients experienced 2 kg weight gain after each cycle and rest (09) had stable weight during chemotherapy. In group-B 21 (84%) patients had weight loss about 5 to 10 kg during six cycles of chemotherapy due to decrease diet and other side effects. Group B patient needed blood transfusion during chemotherapy due to low Hb and TLC count. There was no toxicity observed in Biobran group.

Chemotherapy induced side effects	Group A	Group B
Anorexia / Tiredness	80%	12%
Nausea / Vomiting	40%	100%
Hair fall	28%	100%
Weight gain	64%	00%
Weight loss	00%	84%
Blood transfusion	90%	01%

**Table-I. Comparison of chemotherapy induced side effects between two groups**

## DISCUSSION

Biobran MGN-3 arabinoxylan compound can stimulate a weak immune system more powerfully and safely than any other agent, natural or synthetic. Although nobody yet knows the exact mechanism, it appears to be able to do this by increasing the body's production of natural cytokines — substances such as interferon, interleukins and tumor necrosis factors, which not only help destroy rogue cells and viruses directly, but kick-start the immune system by increase the activity of the lymphocytes — B cells, T cells and especially NK (natural killer) cells. B cells focus on producing antibodies whilst the T and NK cells wander through the body directly destroying virally or bacterially infected cells, and cells that have turned cancerous. (In its lifetime, a single NK cell can kill as many as 27 cancer cells, sticking to them and then injecting lethal chemical granules that can destroy the abnormal cell in less than 5 minutes.) BioBran MGN-3 has shown

itself to be completely non-toxic, which is unusual for a substance that can enhance the immune system. Recently, synthetic interferon and interleukin-2 (IL-2) have made headlines as promising cancer drugs because of their ability to stimulate the immune system. However, these synthetic drugs can cause severe side effects, including kidney failure, capillary leaking syndrome and nausea/vomiting. Good results have been obtained combining low levels of IL-2 with BioBran MGN-3<sup>3</sup>.

This is unusual as the majority of cancer patients have very low NK cell activity which itself is a risk factor for malignancy or metastases quite apart from a negative prognostic indicator<sup>4</sup> (which indicates that BioBran MGN-3 may be useful for healthy individuals<sup>5</sup> or those with a risk of disease as a preventative supplement). This increase in NK cell activity continued and has been maintained for five years with continued supplementation - an indication of BioBran MGN-3's lack of hyporesponsiveness<sup>6</sup>.

Although BioBran MGN-3 is a useful adjunct to conventional treatments, it is not a replacement. Conventional treatments are able to reduce substantially the number of cancer cells in the body, either through surgery, chemotherapy or radiotherapy – a process called debulking. MGN-3 cannot and should not replace debulking therapy, especially in cases of advanced malignancies. In these cases, even an extremely active immune response is easily overwhelmed by the huge numbers of cancer cell present. Instead, it is recommended that cancer patients with solid tumours begin MGN-3 immunotherapy concurrently with, or immediately following, debulking therapies. With this strategy we have the best chance of winning what essentially becomes a war of numbers<sup>7</sup>. It is also important to take into account the quality of life of a patient. Most of the papers and many of the case studies repeatedly indicate that BioBran MGN-3 significantly increases the quality of life (QOL) in patients with low immunity.

This increase in QOL is most obvious with patients on conventional treatments such as chemotherapy and radiotherapy, which are renowned for inducing side effects such as extreme nausea, weakness, loss of hair and general poor health. BioBran MGN-3 is able to help mitigate some of these side effects by increasing immune strength<sup>8</sup>.

## CONCLUSIONS

The study showed that, by helping to optimize the immune system, Biobran MGN-3 can not only help maximize treatment success, but also minimize treatment side effects and improve quality of life during treatment and in recovery.

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