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Spirulina in Pregnancy & Lactation:

The effect of Spirulina supplementation was studied in relation to maternal serum retinal (55). Spirulina given to pregnant women from 7th month of pregnancy till delivery at 1.4g/day was effective for better maternal Vitamin A status and better pregnancy outcome. Percentage increase in the serum retinal levels ranged from 44-46% of the initial value.

A follow-up study (56) was undertaken by the same author to study the effect of supplementing their diets with Spirulina on the Vitamin A status. Serum retinal, beta-carotene and breast milk retinal were estimated at various stages of pregnancy. Spirulina supplements fulfilled around 100 and 65% of betacarotene requirement for Indian pregnant and lactating mothers. Spirulina supplementation from third trimester of pregnancy determined to be the most propitious and breast milk retinal was maintained at higher level in pregnant women group. Lactating mothers who received Spirulina for 45 days showed 20 & 30% increase in serum retinal and betacarotene concentration respectively. There was 58 & 46% increase in serum retinal and betacarotene concentration respectively in pregnant women group. The study also confirmed the bioavailability of betacarotene to the fetus. The study revealed no impact of Spirulina supplementation of fetoplacental function test. An increase in haemoglobin levels was found in women belonging to the pregnant group. The study confirms that low-physiological-daily dose of betacarotene from Spirulina is efficacious in improving maternal and neonatal vitamin A status during pregnancy and lactation.

Consumption of Spirulina was shown to support the iron status and haemoglobin of rats during pregnancy and lactation (63). The results of the study (65) with the supplementation of Spirulina at 1g/day in pregnant women for a period of 60 days have shown that there was a significant increase in the body mass index of the subjects after supplementation with Spirulina at 5% level. There was also a slight increase in the serum protein, serum iron level and blood haemoglobin level.

Reference:

1. Mridula Malandkar. Effect of *Spirulina* supplementation on Vitamin A status during pregnancy March 1995-55
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3. Kapoor R, Mehta Supplementary effect of *Spirulina* on hematological status of rats during pregnancy and lactation. U Department of Home Science, Sri Sathya Sai Institute of Higher Learning Anantapur, Andhra Pradesh, India. *Plant Foods Hum Nutr* 1998; 52(4):315-24 - 63
4. Mubheena Ghori. Dept. of Nutrition Food Service Mgt & Diet. Islamiah Women's Arts & Science College, Vaniyambadi. Effect of Supplementation of *Spirulina* on the nutritional status of pregnant women 2001.

TI: **Effect of Spirulina supplementation on Vitamin A status during pregnancy (March 1995)**

AU: Mridula Malandkar,

AD: Dept. of Post-Graduate Studies and Research in Home Science. S.N.D.T. University, Bombay

AB: The effect of Spirulina supplementation was studied in relation to maternal serum retinol. After assessing the nutritional status, 40 pregnant women (7 month of pregnancy) were randomly allocated either to the experimental (supplemented) group or to the control (un-supplemented) group. The treatment group received 1.4 gm/day of Spirulina, which is equivalent to 1344 mcg of beta-carotene till delivery. The results of the present study suggest that the supplementation with Spirulina is effective for better maternal Vitamin A status and better pregnancy outcome. Percentage increase in the serum retinol levels ranged from 44-46% of the initial value for all the categories.



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TI: Effect of Spirulina Supplementation on Vitamin A status During Pregnancy and Lactation (September 2001)

AU: Mridula A. Naik

AD: Dept. of Food Science and Nutrition, Dept. of Postgraduate Studies and Research in Home Science, S.N.D.T. Women's University, Mumbai

AB: A longitudinal study of 133 pregnant and lactating women residing in slum areas of Mumbai suburbs was undertaken to study the effect of supplementing their diets with Spirulina – a cyanobacterium on the vitamin A status. Only 94 of the recruited women exhibited continual participation through out the study. Serum retinol, β -carotene and breast milk retinol were estimated at various stages of pregnancy and lactation by High Performance Liquid Chromatography. The dietary survey revealed insufficient intake of vitamin A and other nutrients, which was reflected in subnormal biochemical profile. The overall baseline values for maternal serum retinol and β -carotene were 22.2 \pm 0.99 μ g/dl and 67.3 \pm 4.50 μ g/dl for pregnant women and 23.4 \pm 1.34 μ g/dl and 73.0 \pm 5.36 μ g/dl for lactating mothers respectively indicating marginal vitamin A deficiency. Spirulina supplements fulfilled around 100 and 65 percent of β -carotene requirement for Indian pregnant and lactating mothers respectively. Spirulina supplementation from third trimester of pregnancy till forty-five days post-partum (Group I-PL) determined to be the most propitious with 72 and 51 percent increase ($p < 0.01$) in serum retinol and β -carotene concentration respectively from its baseline values. This group also reported the highest retinol concentration in colostrum (144.2 \pm 8.01 μ g/dl) compared to its unsupplemented counterpart (98.2 \pm 6.59 μ g/dl). The increased breast milk retinol in women from Group I-PL was maintained at higher level (68.0 \pm 4.02 μ g/dl) compared to other groups which received Spirulina supplementation either during pregnancy – Group I-P (43.2 \pm 3.46 μ g/dl) or lactation – Group II (51.1 \pm 1.99 μ g/dl). Lactating mothers belonging to the Group II that received spirulina supplements for 45 days post-partum showed 20 and 30 percent increase in serum retinol and β -carotene respectively. There was 58 and 46 percent increase in serum retinol and β -carotene concentration respectively in pregnant women belonging to Group I-P. The study also confirmed the bioavailability of β -carotene to the fetus as indicated by the increased ($p < 0.01$) cord blood levels of serum retinol and β -carotene (27.3 \pm 1.34 μ g/dl and 50.1 \pm 1.99 μ g/dl resp.) in the supplemented group, which was not observed in the control group (15.0 \pm 1.32 μ g/dl and 36.6 \pm 3.61 μ g/dl respectively). The study revealed no impact of Spirulina supplementation on fetoplacental function test as measured by maternal serum progesterone levels and serum total proteins. A statistically significant ($p < 0.05$) increase of around 25% in hemoglobin levels was found only in women belonging to the Group I-PL. The study confirms that low-physiological-daily dose of β -carotene from Spirulina is efficacious in improving maternal and neonatal vitamin A status during pregnancy and lactation. Spirulina seems to be the safe, biological food supplement with multi-nutrient admixture that can address the multiple-nutrient deficiencies highly prevalent in Indian women.



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TI: Effect of Supplementation of Spirulina on the Nutritional Status of Pregnant Women (2001)

AU: Mubheena Ghori

AD: Dept. of Nutrition Food Service Management & Dietetics, Islamiah Women's Arts & Science College, Vaniyambadi

AB: The present study was designed to determine the effect of supplementation of Spirulina on the Anthropometric measurements, serum total proteins, albumin / globulin ratio, serum iron and blood haemoglobin levels of pregnant women. The study group was divided into two Experimental and Control with 20 subjects in each group. The subjects in the experimental group were supplemented with Spirulina at 1gm/day for a period of 60 days. The results of the study have shown that there was a significant increase in the body mass index of the subjects after supplementation with Spirulina at 5% level. There was also a slight increase in the serum protein, serum iron level and blood haemoglobin levels. Since the supplementation period was for a very shorter time, there was overall improvement in the nutritional status of the subjects though not significant