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# Study The Effect of *Triticum aestivum* on plasma protein Treated with Fat Rich Diet

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***Abstract***
*The effect of Triticum aestivum of different doses and Fat Rich Diet (FRD) on the plasma protein estimated by gel electrophoresis technique. By Gel electrophoresis technique, proteins are separated according to their size and molecular weight. Wheatgrass refers to the young grass of the common wheat plant, Triticum aestivum Linn. , family Poeaceae (Graminae). Wheatgrass is low in calories but in nutrients including antioxidants such as glutathione, beta-carotene (pro-vitamin A), vitamin C, vitamin E, vitamins K, vitamins B, calcium, iron, magnesium, phytonutrients and chlorophyll. Wheatgrass contains all of the essential amino acids, mainly alanine, aspartic acid, glutamic acid, arginine, serine which are helpful in providing a sufficient amount of protein in the body. FRD was prepared by using Edible coconut oil and vanaspati ghee mixture in the ratio of 2:3 respectively and it was administrated at a dose of 10ml/kg body weight with normal chow diet for 10 days. The fresh wheatgrass juice of different doses administrated for 10 days. Albino laboratory mice (Mus musculus),40-50 days old, average initial weights 20-40gm, was be used in this study. The animals was divided into 5 groups.*

*From this experiment I was found total 9 different molecular weight protein such as 104.71 KD , 97.72 KD ,87.096 KD ,67.60 KD ,61.659 KD, 50.118 KD, 46.773 KD, 42.65 KD, 31.622 KD in control group. But due to effect of FRD 87.096 KD and 42.65 KD protein lost in group B. Lower dose of Triticum aestivum was able to regenerate only 87.096 KD protein because in this group FRD show their effect and lost 42.65 KD protein. Higher dose of Triticum aestivum was capable to regenerate both 87.096 KD and 42.65 KD molecular weight protein which is lost due to the effect of FRD. It means that higher dose of Triticum aestivum has positive effect on protein level as compare to lower dose of Triticum aestivum.*

***Keywords***
*Fat Rich Diet ( Vanaspati ghee and Coconut oil), Triticum aestivum, Plasma Protein, Gel Electrophoresis.*

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## I. Introduction

Wheatgrass refers to the young grass of the common wheat plant, *Triticum aestivum* Linn. , family Poeaceae (Graminae)( Suriyavathana, *et al.* 2016**).** Wheatgrass is low in calories but in nutrients including antioxidants such as glutathione, beta-carotene (pro-vitamin A), vitamin C, vitamin E, vitamins K, vitamins B, calcium, iron, magnesium, phytonutrients and chlorophyll (Rana *et al.* 2011**).** Wheatgrass contains all of the essential amino acids, mainly alanine, aspartic acid, glutamic acid, arginine, serine which are helpful in providing a sufficient amount of protein in the body and high content of bioflavonoids such as apigenin, quercitin and luteolin (Devi *et al.* 2019). It has superoxide scavenging and ferric reducing abilities. The presence of superoxide dismutase (SOD) in helps in lowering the effect of radiations and thus digests the toxin.( Bar-Sela, *et al.* 2007); Cao *et al.* 1996)**.** The pH of wheatgrass juice is similar to blood i.e., 7.4. Because of this wheatgrass juice gets quickly absorbed into the blood and helps in detoxification of the body, digestion, improves blood flow, etc **(**Virdi *et al.* 2021**).** Indole compounds in wheatgrass increase the activity of the xenobiotic metabolic enzyme in the liver and intestinal mucosa, which might be responsible for the deactivation of carcinogens *(*Bonnesen *et al. 2001)* wheatgrass is rich in chlorophyll, minerals like magnesium, selenium, zinc, chromium, calcium, iron, magnesium, potassium, phosphorus, sodium, sulfur, zinc, cobalt, antianemic factors like vitamin B12, iron, folic acid, pyridoxine and many other minerals, amino acids and enzymes, which have significant nutritious and medicinal value (GE El-Sahar, *et al.* 2021)**.** Chlorophyll present in wheatgrass can protect us from carcinogens; (Ghumman *et al.* 2017) it strengthens the cells, detoxifies the liver and blood stream, and chemically neutralizes the polluting elements. It is the best available source for living chlorophyll

offering high level of energy (Rana *et al.* 2011). It is a natural anti-oxidant and health rejuvenating product. It is also rich in fibre, which makes up around 42% of powder. This helps the digestive system and can play a role in reducing cholesterol levels( Lae *et al.* 2014) It has presence of 17–20 amino acids, 8 of which were essential amino acids. It has higher proportion of glutamic acid, histidine, threonine, citrulline, arginine, GABA and leucine (Ghumman *et al.* 2017**)**

Coconut oil (CO) is an edible oil and it contains lauric acid which is primary fatty acid. It is derived from kernels , meat and milk of the coconut palm fruit (Oseni *et al.* 2017); **(** Boemeke *et al*. 2015)**.**It is a white solid fat below around 25°C and a clear thin liquid oil at higher temperature (Shijna *et al. 2015* **).** Vanaspati Ghee (VG) is a cheaper substitute for ghee and butter. Nickle is used as catalyst in the hydrogenation process to convert edible vegetable oils into VG. Traces of nickel might be found in Vanaspati as an impurity, which is hazardous for the health. Vanaspati Ghee and Coconut oil are partially hydrogenated oil which contain trans fatty acids (TFAs) has adverse impact on serum cholesterol and plasma protein (Attarde Daksha *et al*. 2010)TFAs are unsaturated fatty acids that contain 1 or more unconjugated double bond in trans configuration. It is manufactured by industrial process by partial dehydrogenation of vegetable oils, heating at a very high temperature. TFAs is new artificial isomers which is formed after destroying natural essential fatty acid. TFAs increases the Low density lipoprotein (LDL) and decreases the high density lipoprotein (HDL). Changes in the fatty acid composition of the diet affect the physiological process because it lacks the essential metabolic activity of the parent compound. TFAs has negative effect on physiological, metabolic and molecular pathway (Dhaka *et al.* 2011). TFAs increases the plasma alanine aminotransferase activity, acute phase protein hepatoglobin , hepatic and plasma cholesterol concentration, steatosis in comparison to cis-unsaturated fatty acid and saturated fatty acid (Kumar *et al.* 2011).

## II. MATERIAL AND METHODS

**Plants Material**

The Wheatgrass (*Triticum aestivum* ) used in this experiment was grown in the P.G department of Zoology garden. When grass was about 6 inches tall, it was cut ½ inch above the surface of the soil. Twenty grams of harvested fresh grass was grounded by grinder with 10 ml of sterile water and the juice was squeezed out through four layers of wet muslin cloth. The filtrate was made to 20 ml final volume with sterile water and administrated as grass juice each day the fresh extract was prepared prior to administration (Rokhsana *et al.* 2015).

**Method of Preparation of Fat Rich Diet**

Edible Coconut oil and Vanaspati ghee was procured from the market and a mixture of the two was prepared in the ratio 2:3 respectively v/v as per method of (Shyamala *et al.* 2003) . It was administrated at a dose of 10 ml/kg body weight with normal chow diet for 10 days.

**Experimental Design**

Albino laboratory mice (*Mus musculus*),40-50 days old, average initial weights 20-40gm, was be used in this study. These animals was kept in Polypropylene cages under standardized conditions of temperature and light in animal house of University Department Of Zoology, T.M.B.U. The animals were divided into 5 groups . Doses were given for 10 days. All the animals were taken care of under ethical consideration and the experimental protocol. Each group received treatment as follows:

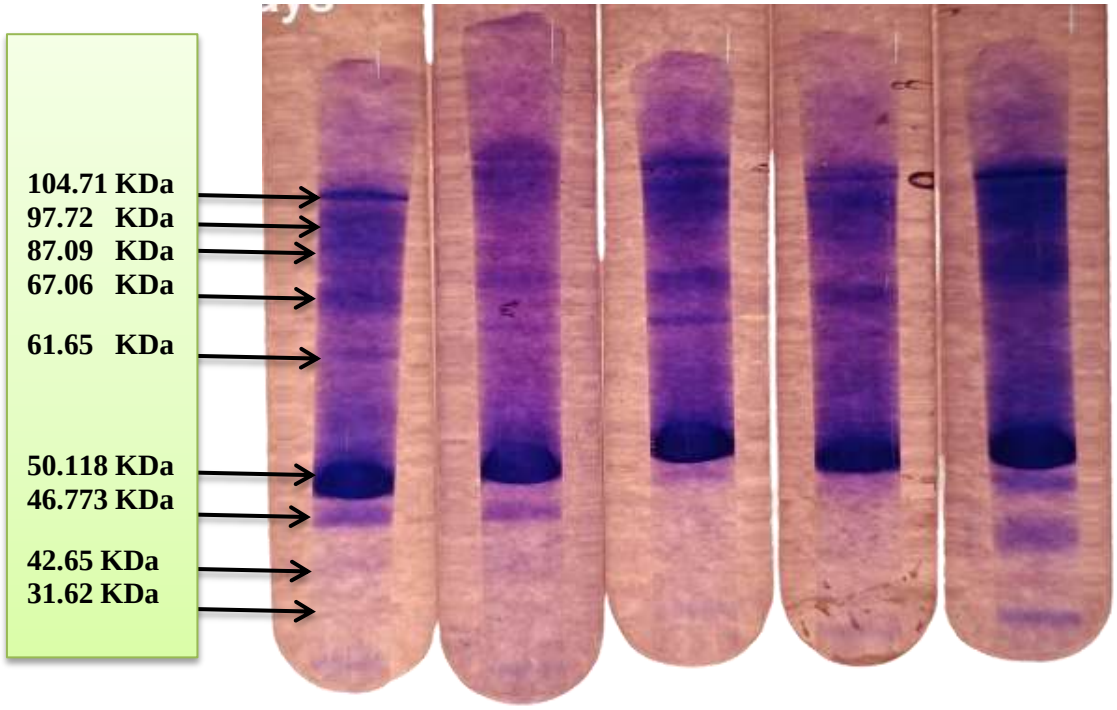
Group A : Control Group
Group B: Fat Rich Diet (10ml/kg Body weight/day)
Group C: FRD((10ml/kg Body weight/day) along with *Triticum aestivum* (10ml/kg Body weight/day)
Group D: FRD((10ml/kg Body weight/day) along with *Triticum aestivum* (20ml/kg Body weight/day)
Group E: FRD((10ml/kg Body weight/day) along with *Triticum aestivum* (50ml/kg Body weight/day)

**Method of estimation of Plasma Protein**

Plasma Proteins was estimated by gel electrophoresis technique. Proteins are separated according to their size and molecular weight. In this technique electric current was passed through the polyacrylamide gel with small pores and the molecules travel through the gel at different speeds depending on their size and charge. Smaller molecules move faster and further through the gel than larger molecules. So that higher molecular weight protein is on the upper side and smaller molecular weight protein move at lower side.

Relative mobility (Rf value) refers to the movement of a type of polypeptide through a gel relative to other protein bands in the gel. Relative mobility (Rf value) of a protein band is calculated by dividing the distance the protein migrated in the gel by the distance migrated by a reference marker (often a dye front). Relative mobility is inversely related to molecular weight of protein. Smaller proteins migrate faster and have higher Rf value.

## III. Results



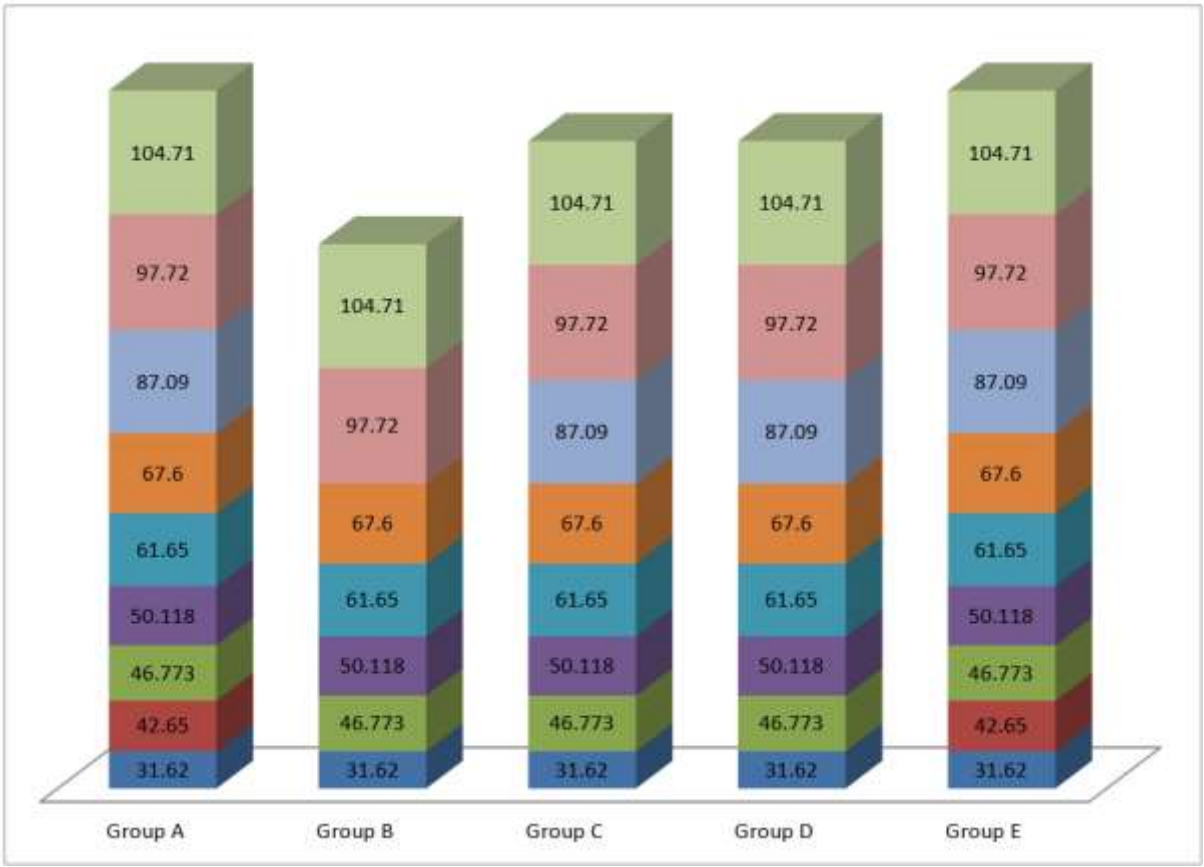




**Fig. Graphical representation of molecular weight of proteins (in kilo Dalton) of control and different experimental groups of Albino mice obtained after gel electrophoresis.**

## IV. Discussion

From this experiment. I was showed the Effect of Fat Rich Diet (FRD) and *Triticum aestivum* on plasma protein level.

Results of blood plasma protein profile analysis of Albino mice showed that group A (control) consisted of 9 protein bands were consistently presented with sizes 104.71 KDa , 97.72 KDa ,87.096 KDa ,67.60 KDa ,61.659 KDa, 50.118 KDa, 46.773 KDa, 42.65 KDa, 31.622 KDa.

87.096 KDa and 42.65KDa Protein were disappeared in group B as compared to control which shows the effect of FRD on these 2 protein.

87.096KDa protein reappered in Group C, D, and E which is treated with FRD along with *T. aestivum.* It shows that there was effect of *T. aestivum* which is capable to regenerated this proteins. *T. aestivum* contains many compounds which may be helpful to regerenate this molecular weight protein. It also helps to overcome the effect of FRD.

42.65 KDa protein is only appeared in Group E which is treated with FRD along with higher dose *T. aestivum*. It clearly shows that the higher dose of *T.aestivum* is capable to completely remove the effect of FRD from the plasma protein.

Lower dose of *T. aestivum* is capable to recover only high molecular weight protein not the low molecular weight protein and also not completely overcome the effect of FRD.

As I found that Group A and Group E both have the total 9 proteins bands. Higher dose of *T.aestivum* shows best result on plasma protein level as compare to lower dose. Consistency of presence of blood plasma protein bands is influenced by the physiological condition of albino mice.

Epo is a glycoprotein hormone which have range of molecular weight 34 – 39KDa and have role in erythropoesis (erythrocyte production ) found in blood plasma protein (Hidayati *et al.* 2008). According to (Vohra *et al.* 2014) found five bands of plasma protein in the globular region whose molecular weights are 205 ,102 and 97.4 KDa . The one band of 66KDa in Post-albumin region and two bands of 45 and 29 KDa molecular weight of protein in Pre- albumin region in female albino rats.

(Colak *et al.* 1898) and (Yigit *et al.* 2001) performed electrophoretic studies on the blood serum proteins of Mesocricetus brandti, Mesocricetus auratus, Apodemus mystacinus, Apodemus agrarius, Apodemus hermonensis, Apodemus flavicollis, Rattus rattus and Rattus norvegicus, respectively. They detected a single band in the albumin zone and variations in other zones such as globulin, postalbumin and prealbumin.

(Nagase *et al.* 2014) stated that the postalbumin zone has one band in normal and analbuminemic Sprague–Dawley rats. It was showed that normal Sprague–Dawley rats have one albumin band but it is absent in analbuminemic Sprague–Dawley rats. Freguedakis-

(Tsolisand *et al.* 1986) showed that there are two bands in the post albumin zone of Mus musculus, one band in A. flavicollis and no band in Pitymysatticus.

In healthy mice, prevalent protein bands were found at 15, 30, and 45 kDa, which represent monomeric, dimeric and trimeric hemoglobin (Berg *et al.* 2007). Proteins having lower molecular weights of 15, 65, 68 and 100 kDa, respectively are hemoglobin-α, homologue of α-fetoprotein (AFP), serum albumin, and haptoglobin( Donenko *et al.* 2007). It can be seen that the thickest protein band was 64 Kda which known to be albumin and it is the highest concentration protein in blood plasma consisted of 55% to 60%. This albumin functioned in preserving blood osmotic pressure. (Nicholson *et al.* 2000). Most of rodent has shown albumin protein band in very thick and laid from 60 to 69 KDa ( Kreyling *et al.* 2014). Very Limited literature is found on electrophoretically analysis of plasma protein of albino mice *Mus musculus.*

## V. Conclusion

From this study it was clear that the higher dose of *Triticum aestivum* gives best result on plasma protein level. It regenerate 87.096 KDa and 42.65 KDa molecular weight protein which was lost due to effect of FRD but lower dose of *Triticum aestivum* not able to regenerate 42.65 KDa molecular weight protein. In Presence of higher dose of *Triticum aestivum* there was no effect of FRD on plasma protein level but Mice treated only with FRD cause degeneration of 87.096 KDa and 42.65 KDa molecular weight protein.

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