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Prebiotic as immunostimulants in aquaculture: A review

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Significance of study:

we have opted for this topic because the farming and production of finfish and shellfish has become the fastest growing food industry in world and it may help us provide first hand knowledge to the society to improve this field of Pakistan (Roberfroid *et al*,. 2005) The study provides the practice of intensification that has become common in both finfish and shellfish culture to optimize the returns. Prebiotic termed as immunostimulants are considered as an attractive and promising agent for health and prevention of disease in fish in aquaculture.(Choque-delgado *et al*,. 2011)

Novelty of study :

This review report we have provided several benefits of prebiotics in field of aquaculture. Researchers have already documented the role of prebiotics that they play in the body of host (Roberfroid *et al*,. 2005). We have gathered information regarding prebiotics I.e they improve water quality , modulation of gut microbiota, increase nutrition,helps in decreasing disease and stress and intensifies immunity and tried to correlate this knowledge with previous findings (Kocher, 2004).

Gap in knowledge:

The gut microbiota gathered by individuals has proposed to donate to intestinal health as well as disease(Brown, 2002). Prebiotic supplements focuses on magnifying health by modifying composition of gut microbiota have already become widely available and acceptance is high for it(Yadav, *et al*,.2002). However our basic information of gut commensal bacteria variation on a population and its dynamics are still unknown as recent studies has suggested that microbiota adds to obesity, atopic disease, inflammatory bowel diseases and intestinal cancers(Bron *et al*,. 2012).

Prebiotic as immunustimulants in aquaculture: A review

Abstract
Prebiotic are non nutritious fibers that helps grow gut commensal bacteria developing improvements in host's health (Merrifeild *et al*,. 2010) The advantageous effects are because of the byproducts produced during fermentation by gut commensal bacteria (Ringo *et al*,. 2010). In this report review the undeviating effects of prebiotics on a fish's innate immune system are highlighted. Fructooligisaccharides, Mannanoligosaccharide, insulin and B-glucan are prebiotics that are included in **immunosaccharides** (Ganguly *et al*,. 2013). These directly intensify innate immune responses by acting at different levels such as: phagocytic, neutrophil activation, activation of alternative complement system, enhanced lysozyme activity. An increase in fish growth and an amelioration of their health status is brought about (Ringo ,*et al*,. 2014)

Introduction
Originally prebiotics are non digestible fibers that magnifies the beneficial gut bacteria in its host body (Smith *et al*,. 1991). It has been seen that the byproducts in fermentation by gut commensal bacteria increase immunity in host (Abbas *et al*,. 2012). So prebiotics are the basic energy resource for the gut bacteria and called as **functional saccharides**. Another type of functional saccharide further suggested by Kocher called as immunostimulant that prompts the innate immune system directly instead of fermenting by-products of prebiotic. So basically prebiotics are not necessarily an immunostimulant or the other way round. The immunomodularoty activity is stimulated by directions with their receptors (PRR) , such as **B-glucan** and **dectin-1** receptors that are expressed on macrophages (Beck S *et al*,. 1996). Saccharides might also interact with PRR through microbe associated molecular patterns like teichoic acid, peptidoglycan, glycosylated protein or the polysaccharide of bacteria triggering the innate immune response (Hellio *et al*,. 2007). Immune response is activated by prebiotics in two ways: **(1)** directly stimulating innate immune system , **(2)** increasing growth of commensal bacteria. This review focuses only on prebiotics that are used in aquaculture and which personally enhance the innate immune system in both finfish and shellfish. The informational details on finfish is gathered in the form of families on behalf of current taxonomical structures , and was discussed by gathering immunostimulant prebiotics into two groups according o chain length: oligosaccharides and polysaccharides (Alexander JB *et al*,.1992).

Mechanism of immune response of fish:
In phagocytic leukocytes (monocytes,dendritic cells,macrophages and neutrophills) active host mechanism occur i.e. phagocytosis, in the spleen , head kidney, or other lymphoid organs.There are no statistics on Peyer's patches or patch like lymphoid oragns in the intestine of fish. Phagocytosis is the endocytic and phagocytic leukocytes that is the ingesting and emgulfing of the cells or particles (Goethe *et al*., 1998) .It was discovered by measuring the degree of endocytosed zymosan in phagocytic cells the use of microscopy or colorimetric detection. Phagocytosis occurs in a sequence of steps: 1)

microbes are sensed with the help of PRRs such as toll like receptors (TLRs); 2) the microbes engulfed in phagosomes; 3) phagosomes merge with lysosomes, which contain a range of proteases; 4) the microbes are killed via proteolysis.Antigen processing steps followed the antigen presentation to T cells, leads T cells activation and consequently the complete immune device (Fuller et *al.,* 1998).

Macrophage activation:

Macrophages helps in killing the pathogenic microbes but they also have a closer connections in innate and adaptive immune system to generate maximum immune response. (Swanson *et al., 2000*) IFN-g activate the macrophages and direct interactions between MAMPs on bacteria and PRRs on the host cells.Variety of inflammatory cytokines including tumor necrosis factor (TNF), IL-1, IL-12, and others are secreted by activated macrophages.These cytokines are important measures of macrophage activation,they are detected either by PCR or ELISA. (Teitelbaum *et al.,* 2002)

Respiratory burst:

An indication of the oxidative potential of reactive oxygen species is called respiratory burst or oxidative burst, reactive oxygen species i.e.hydrogen peroxide, superoxide anions, and hydroxyl radicals(Sghir *et al.,* 1998).These species are produced by activated phagocytic cells and they are responsible for killing or destruction of engulfed materials such as microbes.Reactive oxygen species have been extensively used to evaluate the ability of the host to defend towards pathogens. Respiratory bursts from innate immune cells, which includes blood neutrophils, are measured using NBT (nitroblue tetrazolium) or MPO (myeloperoxidase) assays.(Manning *et al*., 2004).

Acid phosphatase:

Removal of phosphate groups from phosphorylated molecules by an enzyme is called acid phosphatase.In activated macrophages, acid phosphatase activates the inner pH of macrophage phagolysosomes growing inner acidity.Increase in internal acidity will increase the activation of protease that results in microbial activity.The activity of phosphatase along with macrophage activation, leads to increased phagocytosis and respiratory burst (Vogt L *et al*., 2013).

Serum complement activity:

In the immune system,the serum complement system is the non cellular effector response,activated by antigen-specific antibodies, microbial cell surfaces or lectin.Complement is activated through the proteolytic cleavage of precursors to structure new complement units (Helland B *et al*., 2008).Some features of complement system are: 1)invading pathogens by forming membrane attack complexes (MAC).(2) Inflammation at local infection site (3) opsonizing invading pathogens by attaching immunoglobulin or complement sub units to their surface that enhances phagocytosis (Zhang CN *et al*., 2013).

Phenoloxidase activity:

The status of the innate immune gadget of marine invertebrates such as crayfish, sea cucumber, shrimp or lobster can be measured by Phenoloxidase (PO) activity.The prophenoloxidase (proPO) consists of tyrosinases, catecholases and laccases. PO activity is integral for increasing microbial activity (Soleimani N *et al*., 2012).

Lysozyme activity:

Lysozyme activity is an enzyme that degrades the peptidoglycan in bacterial walls by hydrolyzing b-(1,4) glycosidic linkages in N-acetylmuramic acid and N-acetylglucosamin. In the mucus , serum, intestine and eggs of marine animals, lysozyme can be determined. Foremost producers of lysozyme are the activated macrophages (Ye JD *et al.*, 2011) .

Serum antibody level:

To recognize specific microbial antigens B- lymphocytes produce antibodies.Antibodies neutralize pathogens by binding to their surface antigens and preventing them from attaching to their target cells (Akrami R *et al*., 2013) .Antibodies facilitate phagocytosis of antibody bound pathogens by apsonization(Ai Q *et al*., 2011)

Hematocrit and leukocyte numbers:

The hematocrit or hemocyte count reflects the total number of cells in the blood i.e. red blood cells ,white blood cells and platelets.It can be used as a macroanalysis of the immunological popularity of fish, as the number of immune cells in blood will increase during immune activation.In the blood, the immune cells can be observed as neutrophils, eosinophils, basophils, monocytes and lymphocytes(Dong C *et al*., 2013).

Oligosaccharides

Fructooligosaccharides (FOS)

FOS are a fast and medium chains of **b-D-fructans** which are evidently present in a lot of factors which includes Jerusalem artichokes, barley, wheat, rye, triticale, banana, garlic, onion, and honey . The **fructosyl units** are certain by way of potential of b-(2-1) glycosidic linkages and connected to a terminal glucose unit . **FOS**, which includes all the non-digestible oligosaccharides composed of fructose and glucose units, are the most frequently studied prebiotics in terrestrial animals and human beings. (Sun Y 2012.,*et al*) Mammalian digestive systems can't hydrolyze b-(2-1) glycosidic linkages due to the fact they lack b-fructosidases . However, remarkable bacteria, which includes lactobacilli and bifidobacteria that do particular b-fructosidases can ferment FOS. Therefore, including FOS in the food graph can selectively enhance the growth and survival of those bacteria withinside the gastrointestinal (GI) tract of the hosts. (Sohn 2000.,*et al*) **FOS** interacts with TLR2, a membrane ground receptor expressed on macrophages, PMNs (Polymorphonuclear leukocytes or granulocytes), and dendritic cells, which results in immune phone activation through sign transduction pathways (Linehan 2000.,*et al*) . A evaluation of the impact of nutritional FOS supplementation as immu-nostimulants is added in Table 1. Readers with similarly pastime on the outcomes of FOS on fish performance, foods usage in fish, fish intestine morphology and microbiota are mentioned the critiques of Ringø and co-authors .

Table 1

Studies the use of fructooligosaccharides as immunostimulants in aquaculture. Abbreviations: ACH50; opportunity supplement activity; ACP, plasma alkaline phosphatase; PO,phenoloxidase; SOD, superoxide dismutase; TCC, overall coelomocyte count; [, boom; /, no change; Y, lower.

Atlantic salmon (200.2±0.6 g)	Dietary 1.0% (10 g kg-1)	4 months	Whole Blood Neutrophil Oxidative Radical Production /, Serum Lysozyme Activity /
Black amur bream (30.5 ± 0.5 g)	Dietary 0.3 and 0.6%	8 weeks	ACP [, PO [ACH50 [, Ig M [
Caspian roach (0.67±0.03 g)	Dietary 1, 2, 3%	7 weeks	Serum Ig [, Lysozyme activity [, ACH50 [, Resistance to salinity challenge [
Japanese flounder (21 g)	Dietary 0.005% (5.0 g kg-1)	56 days	Lysozyme activity [, Phagocytic percentage and index /
Red swamp cray fish (15 e 17 g)	Dietary 0.008, 0.01% (8, 10 g kg-1)	30 days	Immune related genes (crustin1, lysozyme, SOD, and proPO) [, Phagocytic activity [, SOD [, Survival against A. hydrophila [
Sea cucumber (5.06±0.10 g)	Dietary 0.25, 0.5%	8 weeks	0.5% FOS TCC [, Phagocytosis [, PO [, Resistance

			to V. splendidus [
Sea cucumber (3.72±0.16 g)	Dietary 0.4, 0.8 , 1.6%	50 days	No significant immunological improvement observed
Stellate sturgeon (30.16±0.14 g)	Dietary 1, 2%	11weeks	1%FOS; serum lysozyme activity [
Yellow croaker (7.82±0.68 g)	Dietary 0.2, 0.4%	10 weeks	No statistically significant innate immunity improvement observed

Salmonidae

Atlantic salmon (Salmo salar L.). Grisdale-Helland and co- authors accomplished a 4-month find out out about feeding Atlantic salmon 10 g FOS kg- 1 and published no massive distinction in feed performance or energy retention withinside the fish that were fed FOS. Moreover, there were no proper sized outcomes on blood neutrophil oxidative radical production (NBT) or serum lysozyme endeavor in the FOS nutritional groups. (Benites 2008., *et al*)

Cyprinidae

Black amur bream (Megalobrama terminalis). Three particular doses of FOS (0, 3, or 6 g kg- 1) fed for 8 weeks to black amur bream (triangular bream) especially prolonged the plasma alkaline phosphatase (ACP), PO, preference supplement (ACH50) activities, and immunoglobulin M content material.(Klebaniuk 2008., *et al*) However, no statistically significant versions were placed in leucocyte counts, entire serum protein, and globulin content. In addition, nutritional FOS did not make more the survival rate in reaction to an Aeromonas hydrophila challenge. Caspian roach (Rutilus rutilus). In a modern study, the consequences of nutritional FOS including 10, 20, or 30 g kg- 1 on caspian roach fry became investigated Immunoglobulin levels, lysozyme activity, and ACH50 have been significantly increased in the organizations fed 20 and 30 g FOS kg- 1 .(Yang 2009., *et al*) Only lysozyme undertaking was extended in the group fed 10 g FOS kg- 1 . Dietary FOS dietary supplements increased the resistance of the fry to salinity pressure demanding situations irrespective of the supplement level, however entirely the team fed 3% FOS had a drastically better survival rate..(Torricellas 2014.,*et al*)

Pleuronectiformes

Japanese flounder (Paralichthys olivaceus). Japanese flounder fed 5.0 g FOS kg- 1 for 56 days were tested for lysozyme activity, the proportion of phagocytic cells that took up a marker (phagocytic percent), and phagocytic index.(Staykav 2007., *et al*) FOS administration considerably better lysozyme activity, but no longer the phagocytic percentage or phagocytic index, in comparison to the manage weight-reduction plan group. . (Rodrigues-Estrade 2009., *et al*) However, while fed a combination of FOS and MOS (mannanoligosaccharide)(5.0 g kg- 1), the flounder proven a marginal boom in phagocytic activity. (Rodrigues-Estrade 2013.,*et al*)

Acipenseridae

8 Stellate sturgeon (Acipenser stellatus). Akrami and co-authors performed a studies about to determine the have an impact on of nutritional FOS; 10 and 20 g kg- 1 , on innate immune responses of stellate sturgeon juveniles in an 11 week trial.(Samrongpan 2009.,*et al*) Juvenile fish fed 10 g kg- 1 FOS-supplemented weight loss plan found out considerably elevated serum lysozyme activity. However, no development became as soon as positioned in the group fed 20 g FOS kg- 1 . Furthermore, 10 g FOS kg- 1 did not considerably have an effect on the respiratory burst undertaking of leucocytes, but the lowest activity was once observed in the 20 g FOS kg- 1 fed group, which was even lower than that of the manipulate group.. (Torrecillas 2011.,*et al*)

Salmonidae

Grisdale Hell and et.al analyze the result of dietary MOS supplements by nourishing Attlantic Salmon. The outcome of this work showed no expand in noticed in MOD. Extra studies are required to wind up anyhow, dietary MOS has any result on invate freedom and ailment receptivity.(Groff 2000., *et al*)

Rainbow trout (Oncorhynches mykiss Walbaum)

External cell wall of s.cerevisial originated thickening production. In earliest case supplement of 2g MOS kg crucially enhanced antigen production. In next case the outcome was less poweful which might revealed a small stability of MOS effects on immune response. Rodrigues Estrada considered that the effects of supplements of MOS in diet of rainbow trout Juvenile fish in a 12 weeks feeding trial. Phagocytic activity and hemolytic act contrasted to fingerlings fed control diet. Two level of MOS learn the result of MOS on freedom. The result revealed that Phagocytes and hematocrit act of fish sustain 5g MOS kg-1 were enhanced as constrast to control fed fish yet no improvement was noticed .It is also noticed that the fish fed had a higher frequency.

Cichlidae

Tilapia(Oreochomis niloticus)

B/w control and MOS fed groups the supplements increased acceptance in case of streptococcus aglactia bacteria.

Moronidae

European sea bass(Dicentrarchus labrax).
In mucus fish the immune activates and outcome in vivo revelation to V.anguillarum was looked into European sea bass sustained that it involved two level of MOS for 8weeks. In stomach mucus dietary MOS enhanced lysozyme act still there was no detectable result on antibody activity. Grouping in vivo revealation, the virus was improved from liver. In fish nourishment MOS pathogen was not found. In proximal intestine and distal intestine the feeding MOS enlarge the number of goblet cells. MOS feeding enlarged the lamina propia, included infiltrated cosinophilic granulocytes. This work indicates useful effects of nutritive MOS on some mechanism which provide instinctual defence. In fish G-1 area is a major disease.

Pleuronectiformes

Japanese flounder. Dietary MOS activated lysozyme act, still no remarkable distinction were noticed for phagocytes proportion and phagocytes indicator as contrast with fish nourishment.

Parastacidal

Marrom (Cherax tenrimanus). Two research have examined the dietary result of MOS on immune reaction. Sang revealed three stress cases. Marron were nourished with three different levels of MOS to challenge. Before showing the investigation group it was showed that NH3 was only nourished 4g MOS kg-1 for 42days. In bacterial study the MOS exhibited excessive survival rates. In all fishes the hemocyte were decreased. THCS were excessive in marron than the comparison group. The comparison group also revealed that the THCs were reduced whereas contaminated with microbe or exposed to air. MOS increased granular cells in live transport study and decreased hemolymph-clotting time. MOS enhanced the health of fish. The effect of six different MOS levels was examined on bacillemia and hemolymph. Bacillemia was lower in MOS supply group than the control fed animals. Marron had shorter hemolymph. In supplemtary groups Mos is high as contrast to control group.

Crayfish; On immunological parameters the proportion of hyaline cells, the proportion of semi granular cells and bacteremia were looked into crayfish.

Palinuridae

Tropical spiny lobster (Panulirus ornatus). Sang examined the outcome of MOS on Juvenile tropical spiny lobsters.At the end of culture period the lobsters were challanged for seven days with vibrio sp.The MOS supply enhanced the survival rate.The bacteria in hemolymph decreases during infection.

Stichopodidae

Sea cucumber. In sea cucumber the dietary MOS increase TCC, phagocytes of colomocytes, super oxide anion production and SOD activity than the control diet. The union of B glucan more strongly enlarged high level of immune parameters as contrast to supplementing diet . It enhanced the

survival rate of sea cucumbers. In sea cucumbers, TCC and superoxide anion formation were high than control group. However no distinction noticed.Sea cucumber had higher survival rate.
Immunogen(An antigen capable of including an immune response).

Cyprinidae

Common carp (Cyprimus cospio L)

Carp were given a diet augmented with immunogen. Immunogen is a trade product carrying two prebiotics, MOS & B-glucan. All amount increase leucocyte counts. The carp nourished Immunogen Weight. The mortality rate was lower. In this class the mortality rate is highest.

Galactoologosaccharide

Lactose consist of 2-20 molecules of galactose and glucose. The prebiotic result has been examined in endothermic animals.Only two studies have analysed.

salmonidae

Attlantic salmon. Atlantic salmon were nourished in a 4month study. In serum Lysozyme act no distinction were noticed. It is a main species in fish farming. The effect on immune parameters should be conducted.

Sciaenidae

Red drum (Sciaenops acellatus)

Juvenike red drums were nourished with GOS for 8weeks still no change in NBT levels. The peak of miciovilli in pyloric caeca, proximal and mid intestine were increased as contrast to base diet group.

Arabinoxylan oligosaccharide

The fermentation product which is found in cell wall of many grains is Arabinoxylan. Arabinoxylan are saccharide chains in which X-L arabinofuranose units are attached. Their structural diversity may vary.

Acipenseridae

Siberian strugeon

Two studies have analyzed the dietary effect of two different AXOS types.
>AXOS - 3 - 0.25
> AXOS - 32 - 0.30
Geraylon showed that both AXOS preparations increased phagocytes activities. The fish serum and respiratory burst activity were not effects affected by feeding.

Polysaccharides

With the great variety in molecular structure monocarbohydrates are bounded by glycosidic bonds ti form long chain of Polysaccharides. Inulin, B-glucan, and chitin/chitosan are Dietary polysaccharides which have been studied in detail as immunostimulants or prebiotic and many scientist have given review on those extensively studied polysaccharides . Nowadays insulin and B-glucan are widespread consensus among scientist that are classified as prebiotic (Geralylou *et al*, 2013).Chitosan and alginate have immunostimulatory activities , according to some studies ,in the host gut their capability to elicit advantageous microbes still remain to be explored . Prebiotic polysaccharides involved in stimulating the fish innate immune system through mechanism are also not identified. However, it is very acceptable that microorganisms developed some prebiotic polysaccharides from cell wall components and MAMPs interacting with specific PRRs expressed on innate immune cells are the functions of them. Innate immune cells become active. (Zhou *et al*., 2012)

Inulin

Different plants like chicory, cornflower, and dandelion have inulin which is a kind of fructan polysaccharide . When absorbed , the bacteria present in the colon just can digest the polysaccharide. Hydrolysis of insulin can produce FOS as an central artifact . It has been clearly accepted that the optimum dietary dose of inulin in the fish feed 1 g kg1 can change the immune system of fish. It is not obvious, however, can inulin alone have a function as immunostimulant(Lam *et al*., 2013). Many previous studies have been focal point that is produced from bacterial inulin fermentation such as butyric acid, propanoic acid, and FOS. Bifidobacteria, lactic acid bacteria (LAB), and clostridia are all known to ferment inulin are called as byproduct .The identification for the specific receptors of insulin should be remained . Inulin have a specific unit which is FOS ,related with TLR2(Chiu *et al*., 2008)

Cichlidae

Nile tilapia. by using Nile tilapia as a fish model, increase occur in hematocrit, NBT activity level, and lysozyme activity by the supply of 5kg of a dietary insulin(Geng *et al*., 2011) Innate immunity have a stimulatory effect of insulin . In the group there is a statistically important stimulation in NBT activity by feeding insulin for two

months. Moreover the adaptation rate following A hydrophila challenge was increased in the inulin fed group .

Acipenseridae

Beluga (Huso huso). For 8 weeks at three different levels 1,2 and 3g in the diet of beluga juveniles inulin was included.Compared to the other inulin dose groups and the control group ,the group fed 1g inulin kg1 had tremendously increased white blood cellcounts symbolizing stimulation of the immune system (Harikrishnan *et al*.,2011).In addition to this innate immune responses such as neutrophil electroactivity NBT tests and phagocytic activity were not eperimented in this study.

Sparidae

Gilthead seabream. According to the three studies that we have conducted show the effect of inulin on the immune system of gilt head sea-bream .To study the innate immune response both in vitro and in vivo ,the first study was conducted .In the in vitro experiment, inulin incubated HK leukocytes which were not importantly separate in terms of leucocyte per-oxidase content and phagocytosis. The in vivo study, the mixing of inulin to the diet also expressed nothing special improvement in per-oxidase activity complement activation, phagocytic ability, or natural cytotoxic activities. In the second study ,by adding 10 g kg1 inulin was effectively increased serum complement activity , IgM levels, leucocyte phagocytic activity, and leucocyte respiratory burst activity. Morever ,the gene function was obviously up_ regulated for T cell receptor (TCR) beta, MHC1 alpha, and beta defensin. However, the signers expressing augmentation of the immune system did not correlate with the results of a challenge performance using Photobacterium damselae sub sp piscicida. There were no significant stimulation in the cumulative survival compared to the control.

It was failed to increase innate immune makers by dietary administration of inulin (10 g kg1) to gilt-head sea bream for 28 days such as natural haemolytic complement activity; leucocyte per-oxidase and serum ; phagocytosis; and cytotoxic activity respiratory burst.

Pimelodidae

Hybrid surubim (Pseudoplatystoma sp.).According to an experiment with hybrid surubim ,when the fish were fed 5 g inulin kg1 supplement ,there was no significant increase in innate immune parameters .However in the surubim intestine large numbers of 2AB were propagalid ,which might be according to classical description of prebiotic given by Roberfroid .

Table:4
using insulin as imunostimulants in aqua culture, abbrevations, ACH50 : alternative compliment activity;ACP,plasma alkaline phosphate, Gc granular cells ; po,phenoloxidase; SOD, superoxide dimutase , TCC total coelomycetes count; THC total hematocytes count,increase, no change , decrease (kudrenko *et al.*, 2009).

fish model (weight)	Route of administration and dose	duration of administration	results
beluga great sturgeons 16.14+-0.38g	dietary 1.0,2.0,3.0% insulin	8 weeks	RBC count total WBC increase□ MCH□
glith&sea bream 50g	dietary 1.0 (10kg -1)insulin	2 and 4 weeks	dose dependent alkaline phosphate□ serum compliment activity□, IgM level□ leucocytes phagocytic level□
hybrid surubim	dietary 0.5% insulin	15 days	lactic acidbacteria□

(73.6+-19.5 g)			vibrio spp□ pseudomonoas spp□ total ig□
Nile tilapia (11.00+-0.2g)	dietary 0.5%(5gkg-1)insulin	1 and 2 months	hematocrit□NBT □lysosyme activity high

conclusion :

Fish farming has become one of the greater aquatic industries.In contrast to natural conditions in which fish freely use different types of food, the limitations of food sources available for acquacultured fishes may be limited.One indication of this may be lessen the diversity of the intestinal microbial community in farmed fish (Dhanasiri *et al.,* 2011). Feeding have many dietary addictives such as probiotics, prebiotics, vitamins, or crude plant waste may compenste for this process and result in beneficial effects for aquaculture (Galli *et al.,* 2009).Prebiotics, or immunosaccharides,can also active the innate immune system directly or by relation with MAMPs that interact with PRRs expressed on immune cells. Proper immune responses are useful not only for combating pathogens, but also for proper weight gain(Cerezuela *et al.*,2011)Many studies shows that feeding in both prebiotics immunosaccharides are useful in fish aquacultures of various types of vertebrates and invertebrates(Ganguly *et al.*,2010)To better the efficiency of the prebiotics and probiotics helped in aquaculture, and monitor more immunostimulatory prebiotics, additional work is provided to enhance the ligand receptor interactions, signal transduction pathways involved in this process and the types of cytokines secreted(shoelson *et al.*,2007).investigation into the effects of prebiotics and probiotics on the immune system of finfish and crustaceans could more better or high in their merit if innate immune responses were biologically linked to overall gut health (heridia *et al.,* 2012)

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