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A study of performances of (catla catla) growing promotion in feed ingredients

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Abstract
A comprehensive trial was undertaken to assess the effect of various types of feed ingredients on the biomass conversion rate in a 12- week feeding trials to evaluate the use of agro - based products, as locally available feed ingredient materials for fish catla (Catla catla) fingerling growth performances. Aquaculture is one of the quickest developing nourishment division of the world and records for right around half of the world fish creation. Practical creation is influenced primarily by elements, for example, poor water quality management, nutritionally imbalanced supplementary bolster and the sickness rate. To control of these illnesses, unpredictable utilization of antimicrobial drugs in fish cultivating lead to the rise of anti-infection safe microscopic organisms. Probiotics assume an imperative part in growth addition and stress moderation in fish. In the present examinations two sorts of business probiotics (PVS Labs, Andhra Pradesh) were utilized i.e. the outcomes obviously demonstrated that the groupings of ammonia, nitrite and orthophosphates are low in the exploratory ponds contrast and control pond. Facilitate the examinations uncover that growth and survival are gotten higher in probiotic treated ponds than that of control pond. The study suggests that the soybean diet which is more effective, than the mustard oil cake, in the deposition of nutrients in terms of flesh (at early growing stage of life), and led to be significantly higher growth than the other two diets in, Catla catla.
Materials and Methods: The hatchery-bred spawn of catla, after acclimatization, were fed with laboratory made egg-custard feed. The healthy fish were separated to conduct feeding experiment.
Result & Discussion: In the present study, the experimental feeds were formulations with different protein are based on previous reports. In the study, the experimental feeds F1, F2 and F3 with mustard oil cake, soybean and starch levels were formulated and the differences observed in the performance of the different feeds. Dietary proteins play a dominant role in fish growth. On the basis of average specific growth rate and % live weight gain, an improvement in growth response was noticed with increase in soy protein. Growth parameters of Catla fingerling with different feed clearly showed significant enhancement with Mustard oil cake, potato starch, and rice polish and soybean meal when compared with other concentrations of these four feed ingredients.
Conclusion: Results indicate that soybean incorporated feed was much acceptable than alternative plant protein source for the catla (Catla catla) however, the potential for including mustard oil cake protein in the feeds of fish need more evaluation.

Keywords: growth, promotion, catla catla, DNA and RNA, quality management, feed ingredients

Introduction
The Indian major carp, Catla catla, is a promising species for aquaculture exploitation with its rapid growth and good market potential. In terms of value-added, processed fish products, this species should have potential as the present market price of this fish is ranging between Rs. 80 to 140 per kilogram in Indian markets. One key biological component is the availability of suitable diets that are efficiently digested and supplement the required nutrients for optimizing growth performances (Franquinho *et al*., 2012) [1]. The suitability of using formulated feed sources will provide cost effective management practices for efficient fish growth with cheaper feed ingredient under culture system in this herbivore fish, Indian major carp (Catla catla) for aquaculture candidate species. Indian major carp, Catla catla, is a valuable herbivorous food fish in India. Polyculture of Indian major carps (IMC) viz: Rohu (Labeo rohita), Catla (Catla catla) and Mrigala (Cirrhinus mrigala) is mainly dependent on plant-based agroby-products. All three species of IMC (Rohu, Catla and Mrigala) are known to be capable of utilizing dietary protein and carbohydrates well, with even cellulolytic activity in Rohu (L.abeo rohita). Rohu are able to utilize complex polysaccharides more efficiently than simple sugars. Protein sparing effect of carbohydrate in fry and fingerlings of rohu, mrigal and common carp was demonstrated (Paisagem 2013) [2]. There was no weight gain difference recorded on fry fed diets with 40:30 and 45:25 w/w proteins carbohydrate levels and protein sparing effects have been recorded. Supplementary feeding is known to increase the carrying capacity of culture systems and can enhance fish production by many folds. It also offers the best means of fish production within the shortest possible time in the ponds (Pino, 2014) [3].
In the current scenario of capitalism and globalization, on the one hand we have achieved a cost effective method of producing electronics, industrial and other household goods but on the other hand we are still striving hard to provide adequate and easily accessible food, rich in protein and other nutrients, to the humans worldwide and the same has resulted in prevalent malnutrition specially among children and women. Fishes and other aquatic animals have always

remained one of the main dietary foods for the humans and in our endeavour to provide adequate and easily accessible food, aquaculture has been intensified (Askarian 2011) [4]. But this intensification has to be commercially viable, for both producer and consumer, apart from being environment friendly in order to fit within the perimeters of sustainable development. Intensification of aquaculture with high stocking densities, high food inputs and high organic load is said to be paralleled with a corresponding increase in the occurrence and spread of pathogenic and opportunistic bacteria causing infectious diseases. Cultivated fish becomes more susceptible to bacterial, viral, parasitic and fungal diseases, such as motile aeromonad septicaemia, vibriosis, columnaris, edwardsillosis and furunculosis. Aeromonas hydrophila is a gram negative ubiquitous organism, an opportunistic pathogen, causing haemorrhagic septicaemia, ulcerative conditions, abdominal distensions, fin/tail rot and exophthalmia in freshwater fish species (Balcazar, 2006) [5].

Aquaculture is one of the quickly developing systems on the planet, which has risen as an industry conceivable to supply protein rich food all through the world. Fish is an essential dietary animal protein source in human nutrition. Production of sea-going species through freshwater fisheries and aquaculture for protein supply is being energized all through the world. As indicated by nutritionists, fish is an astounding substitute of protein for red meat. Fish tissue contains all the basic amino corrosive and minerals viz., iodine, phosphorus, potassium, iron, copper and vitamin A and D in alluring concentrations. Fuse of Duckweed in diets of catla can be considered as a cost powerful approach lessening the utilization of relatively costly soybean. Better development execution and supplement maintenance requires the diminishment of release in holding water. The utilization of probiotics bacterium B. coagulans and duckweed additionally eases the pollution issues related with concentrated aquaculture system. It was discovered that particular action of digestive enzymes can be expanded with the joining of probiotics at optimum level which might be because of better dietary protein usage by colonization of probiotic microbes and its exogenous catalyst production (Bhatnagar 2014) [6].

Review of Literature

Franquinho *et al*. (2012) [1] depicted that the beads were composed from glycidiyl methacrylate (GMA) and methyl methacrylate (MMA) by means of deferral polymerization and the well-used beads parts were in the vicinity of 75 and 150 μm.

Madeira *et al*. (2010) brought up that the epoxy gatherings of the beads were changed into amino gatherings by the response of ammonia or 1, 6-diaminohexane as a spacer-arm. L-Histidine ligand was weak onto the two beads.

Flora *et al*. (2013) [2] portrayed that Cu (II) particles were covered onto spacer-arm appended and l-histidine feeble dabs. The IgG adsorption ability of the spacer-arm appended and Cu (II) chelated similarity beads prompted higher adsorption capacities around 1.64 and 2.94 crease, individually.

Marbot *et al*. (2014) [3] featured that the adsorption security investigates said that the adsorption isotherm of IgG complied with the Langmuir isotherm model.

Barroso *et al*. (2012) portrayed that purification information of IgG with spacer-arm appended and Cu(II) particles chelated (i.e. poly(GMA/MMA)- SAH-Cu(II)) beads meant that 87.5% of IgG was disposed of from human serum with a limpidness of 90%.

Galindo *et al*. (2012) portrayed that tissue building needs the adventure of polymeric folds that mirror numerous parts of extra cellular matrices (ECM). Controlling cell– framework communications is a standout amongst the hugest parameters for modifiable cell phenotype in tissue building, and a peptide with the arrangement of RGD has been broadly oppressed for this target.

Breton *et al*. (2012) featured that the spacer a safe distance of bond ligands appended to synthetic ECMs could be basic for order of cell– framework associations.

Cabrera *et al*. (2012) portrayed that alginate gels altered with RGD peptides containing shifting spacer arm lengths and refined essential human fibroblasts either on the gels (2-D) or inside the gels (3-D).

Dorado *et al*. (2012) portrayed that the spacer a arm length of the RGD peptides considerably biased the linkage and engendering of fibroblasts in both the 2-D and 3-D inquires about.

Guerra *et al*. (2011) featured that a minimum measure of four glycine units in the spacer arm was required for enhanced grip and advancement of the cells in vitro.

Joulain *et al*. (2013) featured that an ideal spacer arm length of the RGD peptides was additionally required for lessening cellular pressure reactions as assessed by watching articulation of heat stun proteins and Bcl-2 in refined cells.

Kowalski *et al*. (2012) portrayed that a system to oversee cell phenotype utilizing adhesion peptides with a few spacer arm lengths could be useful for scheming novel platforms in tissue designing utilizations.

Kubisa *et al*. (2012) depicted that effects of spacer arm heterology on immune response creation, screening and ELISA was contemplated with the guide of computational molecular modeling. Three schloramphenicol (CAP) haptens with different spacer arms were joined with tranporter proteins.

Ivin *et al*. (2011) depicted that theoretic mathematical and electronic parameters were ascertained, the likeness amongst haptens and CAP were analyzed.

Brunelle *et al*. (2013) said that another CAP immunogenic with para-methyl benzoate as spacer arm was readied. Spacer arm with para-situated aromatic ring actuated enormous basic change of haptens, yet enhanced the affectability of ELISA test.

Vairon *et al*. (2012) depicted that torsional crawl dimensions on four normal elastic vulcanizates, cross associated with a few degrees, were occurred in the temperature run from −50 to 90°C.

Raquez *et al*. (2013) portrayed that the investigations on undefined samples of the pressure unwinding conduct by Chasset and Thirion and of the dynamic mechanical reaction by Ferry, Mancke, Maekawa, Ōyanagi, and Dickie.

Hall *et al*. (2010) portrayed that the crawl dimensions contemplated are said to be in manage the pressure unwinding comes about. Also, a superposed curve was acquired for the long time answer utilizing the undeniable sub-atomic weight between cross-joins, Mc, as a lessening variable.

Diseases/Fish Health

Economic losses from diseases are probably going to increment as culture expands and escalates. Evaluating the effect of disease in culture systems isn't simple, as intense losses are perceived and measured. Chronic mortalities and poor development caused by disease are for the most part not perceived. With a specific end goal to measure disease losses, and ought to have the capacity to indentify disease as the purpose behind yield misfortune, slow development or poor reap. The unfavorable conditions and despicable administration may often prompt extreme outcomes bringing about mortality of sear to a degree of 90-98%. Advancement of aquaculture amid the most recent decade has brought about significantly more prominent consideration paid to issue postured by parasites and their effect on the fish health prompting constraints in the efficiency of aquaculture.

It is essential to say here that the parasitic infestations are allegedly assuming a noteworthy part in disease events (78%) in Indian freshwater aquaculture. The outcomes prove the perceptions of, who revealed that ectoparasitic diseases are the primary issue in freshwater fish homesteads of Andhra Pradesh, India which caused a yearly loss of US$ 1 million because of disease-incited mortality and impeded development. Further, the freshwater fish ranchers of Andhra Pradesh, India and West Bengal, India were assessed to deliver around 21% and 26% less, individually than the normal production because of diseases, poor homestead administration hones and debilitated development. A large assortment of fishes is helpless against different parasitic infections, out of which Myxozoa is developing as a noteworthy gathering. Myxozoans are one of the economically essential gatherings of infinitesimal metazoan parasites as they taint fish reaped for food. New myxosporean pathogens are consistently rising and undermining the advancement of pisciculture everywhere throughout the world. The variety is a standout amongst the most strongly contemplated class in the Phylum Myxozoa.

Lernaeid copepods are among the most hurtful parasites of freshwater fish, particularly young fish, which might be slaughtered by just a couple of parasites. The grown-up parasite enters the fish have and turns out to be profoundly installed in the tissues making it amazingly hard to evacuate them. Lernaeid spp. totals around the eye cause demolition of the focal point and visual deficiency. Gill infections cause some confined hyperplasia of the epithelial tissues and additionally cause extreme epithelial expansion which may truly meddle with breath and likewise bolster spread of bacterial contamination. Aside from this, the obsessive changes caused by the parasite result in heavy mortality and dismalness to the fish have and subsequently heavy economic losses.

By and by, Indian significant carp is a standout amongst the most essential gatherings of fishes cultured in India and Indian subcontinent. (Catla), rohu (Labeo rohita) and mrigal (Cirrhinus mrigala) are considered as the three noteworthy carps of India. Among these carps catla is considered as solid and quickly developing species and if appropriately sustained can achieve a weight of 4 kg just in one year and is great source of protein and vitamin A. Isolated Bacillus coagulans from the gut of catla and detailed change in the growth and nutrition physiology of the fish. Notwithstanding, it was felt that there is a need to decide the optimum measurements of the joining of this probiotic in fish diet and concentrate its impact on insusceptibility and absorbability parameters. Consequently, the present examination incorporated the investigations on the impact of differing inclusion levels of B. coagulans and its impact on fish growth, nutrition maintenance and insusceptibility levels.

Considering the way that duckweed can supplant the soybean based diet as they are effortlessly accessible, cost powerful and have high protein content, the endeavor has been made to supplant soybean with duckweed at various inclusion levels. No writing is accessible with respect to the consolidation of probiotics in duckweed based diet (Chavda 2010) [7]. In this way it has all the earmarks of being important to assess the reasonableness/plausibility of inclusion of probiotic bacterium isolated from the gut of mature fish of same species in diets containing less expensive duckweed.

Growth and Promotion of Catla

Catla demonstrated the most extreme growth (1256.7 g) in cow manure + nitrophos + supplementary feed.ground nut oil cake, cotton seed dinner, deoiled rice bran and sunflower feast and added substances in the encourage, for example, salt and mineral mix alongside organic manure (bison manure and poultry droppings), add to high yield in carp polyculture. Simulated diet including rice bran, soybean dinner, fish supper, vegetable oil, vitamin and mineral mixture affected the growth and survival of carp fingerlings based on particular growth rate and reaped fish biomass. The highest gross fish production of these three fish species was because of the part of both fertilization and supplementary bolster all through the investigation time frame. This may be because of the arrangement of fertilization and supplementary nourish.

A few factors have upgraded the status of the farming of the Indian significant carps:

- Improvements in actuated breeding and seed production, which have expelled the dependence on the catch of natural riverine seed.
- Improved develop out technology.
- Improvements in feeding and health management.

Then again, while the between bland hybridisation of mrigal, rohu, catla, grass carp and normal carp has been endeavored, the cross breeds did not demonstrate any hereditary favorable position over the parent stocks.

Different factors have caused problems. The appropriation of intensive farming practices, unregulated utilization of inputs and absence of logical know-how among the ranchers has prompted expanded disease incidence (Datta, 2006) [8]. Notwithstanding, proceeded with push on health management prompting development of therapeutics has helped the segment to overcome from such situations.

India has officially drawn up a strategic plan for multiplying freshwater aquaculture production through increments in profitability and territory. Since catla shapes an imperative component of the carp polyculture system, it can be normal that there will be a noteworthy increment in its production in India by 2015. Bangladesh is additionally anticipated that would improve cultivated catla production. The high growth

capability of the Indian significant carps has pulled in the consideration of a few tropical South-Eastern Asian and Middle-Eastern countries.

Other factors are relied upon to impact further growth in the farming of Indian significant carps, including:

- Selective breeding.
- Organic fish farming.
- Export to South-East Asian and Middle-East countries.
- Development of handling and value-included items.

The official production figures often don't speak to a genuine picture, because of the absence of suitable and uniform data collection mechanisms. The insufficient production measurable database has been a vital downside for the definition of strategic development plans. The accessible data from a few countries speaks to the aggregate carp production, rather than that of individual species. In this manner, uniform guidelines for database development would, all things considered, help in the evaluation of real production and in the development of plans for what's to come.

Materials and Methods

The hatchery-bred spawn of catla, after acclimatization, were fed with laboratory made egg-custard feed (Table 1). The healthy fish were separated to conduct feeding experiment.

Nutritional Studies on fingerling: Feed preparation and feeding during the acclimation the fish were fed ad libitum with the moist feed containing Mustard oil cake, Wheat flour, Soybean meal and vitamin and mineral mix mixed in a ratio of 30:20:48:2 w/w (Table 2) for further weaning and rearing on artificial feed. After seven days various economical feeds with gross protein as 26.14 – 26.56% (Table 3) were formulated and growth study was carried out for 12 week rearing period for the fingerling of C. catla with different feeds and the growth performances was recorded (Table 4).

Table 1: Feed compositions used during rearing of C. catla spawn

Ingredients	Percentage
Hen egg white	28.0
Lactogen powder	60.0
Fishmeal powder	10.0
Vitamin & Mineral Mix*	2.0

Table 2: Feed compositions used during acclimatization of C. catla fry

Ingredients	Percentage
Mustard oil cake	30.0
Wheat Flour	20.0
Soybean meal	48.0
Vitamin and Mineral Mix*	2.0

Table 3: Feed compositions used during rearing of Catla catla fingerling

Feed	Mustard Oil Cake (%)	Potato Starch (%)	Rice Polish (%)	Soybean meal (%)	Vitamin Mineral* (%)	Gross protein (%)
F 1	43	8	31	17	1	26.14
F 2	32	5	40	22	1	26.14
F 3	19	9	40	31	1	26.56

Physico–chemical parameters of water: The water quality of rearing tanks was analysed following the standard methods (APHA 1998) and was found in normal range with temperature 26+1 0C, pH 6.5-7.1, total alkalinity 129-136 ppm and dissolved oxygen 6.8-7.3 ppm.

Results

The growth performances, survival and proximate composition of C. catla are depicted in Table -4, 5, 6, 7 and 8. The final weight gain, after 12th week, ranged between 12.45+0.03 to 18.12+0.17 g in F1 to F3 feeding trials. Growth parameters of Catla fingerling with different feed clearly showed significant enhancement with Mustard oil cake, potato starch, rice polish and soybean meal when compared with other concentrations of these four feed ingredients. Catla fingerling showed maximum increase in length (45 mm), weight gain (16.57 g) were observed in F3 and similar trends were observed with F2 and F1 feeds. The biochemical parameters of Catla catla fingerling fed with different types of food showed most favorable enhancement in the levels of proteins, lipids, FCR and SGR in F3, F2 and F1 feeds. Catla fingerling fed with F3 feed, the FCR, SGR, PI and survival were 2.34+0.11, 19.73, 215.7 mg and 80+3.3% respectively. Similarly the results of F1and F2 were also encouraging.

Table 4: The growth performance of the fingerling of Catla catla

Feed	Initial weight (g)	Final weight (g) 4th week	Final weight (g) 8th week	Final weight (g) 12th week	Specific growth rate (SGR) after 12 weeks	Survival (%)	FCR
F-1	1.52±0.11^{a}	3.23±0.2^{a}	6.34±0.23^{a}	12.45±0.03^{a}	13.01^{a}	60±4.1^{a}	2.98±0.09^{b}
F-2	1.53±0.09^{a}	3.61±0.3^{a*}	7.76±0.21^{b}	15.23±0.15^{b}	16.31^{b}	70±2.3^{b}	2.55±0.10^{a}
F-3	1.55±0.07^{a}	3.84±0.1^{b}	8.87±0.12^{b}	18.12±0.17^{c}	19.73^{c}	80±3.3^{c**}	2.34±0.11^{A**}

Table 5: Initial and final weights and lengths, weight gain and percent weight gain of the Catla catla fingerling of different treatments during 12 week experimental period

Feed	In length (mm)	Fn length (mm)	In weight (g)	Fn weight (g)	length gain (mm)	% Length gain	Weight gain (g)	% Weight gain
F1	50±1^{a}	92±2^{a}	1.52± 0.11^{a}	12.45±0.03^{a}	42.0^{a}	84.0^{a}	10.93^{a}	719.1^{a}
F2	52±1^{a}	94±1^{a}	1.53± 0.09^{a}	15.23±0.15^{b}	42.0^{a}	80.8^{b}	13.7^{b}	895.4^{b}
F3	51±2^{a}	96±2^{a}	1.55± 0.07^{a}	18.12±0.17^{c}	45.0^{b}	88.2^{c}	16.57^{c}	1069.0^{c}

Table 6: Average initial and final weight, protein efficiency ratio (PER) and per day increment (PI) of C.catla fingerling fed various experimental diets for 12 weeks.

Feed	In weight (g)	Fn weight (g)	PER	PI (mg)
F1	1.52± 0.11^{a}	12.45±0.03^{a}	1.23± 0.01^{a}	148.2^{a}
F2	1.53± 0.09^{a}	15.23±0.15^{b}	1.34± 0.02^{b}	181.3^{b}
F3	1.55± 0.07^{a}	18.12±0.17^{c}	1.4± 0.03^{b}	215.7^{c}

Table 7: Survival percentage of Catla catla fingerling on every 4th week

Feed	Stocking Nos. (N=50 X 5 replicates)	4th Week (%)	8th Week (%)	12th Week (%)
F1	250	88± 1.2^{a}	72± 1.8^{a}	60± 4.1^{a}
F2	250	91± 4.1^{b}	80± 3.2^{b,*}	70± 2.3^{b,}
F3	250	87± 3.4^{a}	84± 6.2^{c,*}	80±3.3^{c,**}

Table 8: Whole body composition of Catla catla fingerling

Feed	Dry Matter (%)	Crude Protein (%)*	Lipid (%)*	Ash (%)*	Organic Matter (%)*
F1	20.6± 0.45^{a}	48.4± 3.3^{b}	5.5± 0.2^{a}	12.1± 0.3^{a}	87.1± 1.3^{a}
F2	21.3± 0.27^{a}	45.1± 1.2^{a}	5.8± 0.4^{b}	11.4± 0.4^{a}	86.3± 1.5^{a}
F3	21.1± 0.33^{a}	46.2± 1.4^{a}	5.6± 0.1^{a}	11.3± 0.2^{a}	88.4± 1.0^{a}

Discussion

In the present study, the experimental feeds were formulations with different protein are based on previous reports. In the

study, the experimental feeds F1, F2 and F3 with mustard oil cake, soybean and starch levels were formulated and the differences observed in the performance of the different feeds. Dietary proteins play a dominant role in fish growth. On the basis of average specific growth rate and % live weight gain, an improvement in growth response was noticed with increase in soyprotein. Results of this study substantiate the fact that various feed ingredients have direct growth promoting effects on Catla. The overall growth pattern of fingerlings also remained highest for sunflower meal. The findings are in agreement with the present study. They reported higher growth of Cirrhinus mrigala on sunflower meal, followed by maize gluten and wheat bran. Labeo rohita gained body weight on sunflower meal, which is less than the weight gained by Catla in the present study. The difference in weight gain may be due to variations in experimental fish and feed used. The present study showed that different protein types of even plant origin significantly affected the growth and feed utilization of Indian major Carp, Catla (Catla catla). As far as the value of FCR is concerned, the better (lower) feed conversion ratio was observed for sunflower meal, followed by cottonseed meal and bone meal. Ali and Salim noted higher FCR value for rice polish (5.27), followed by fish meal (3.026) and sunflower meal (3.021). The FCR values on rice polish meal were not comparable with present study. However, in the present study, FCR value on all the three rice polished mixed feeds were comparatively lower than the value observed. The negative effects of weight gain, FCR, PER in response to dietary plant protein from Mustard oil cake suggesting that dietary plant protein type from this origin is poorly suitable than soybean protein. Similar reports are recorded in Japanese Flounder using soybean meal more than 16% and, who found that 43% of fishmeal protein could be replaced by soybean meal (25%) in combination with blood meal (10%) or corn gluten meal (10%) in blue murrels meat @5%. The data in present study on Catla catla indicated that response to soybean meal protein substitution by mustard oil cake protein was somewhat better. According to, experiment conducted to know the effect of plant protein incorporated formulated feeds on the growth and nutritive value of Rohu fingerlings, the test feeds containing 35% dietary protein level, showed better performance in growth and fertilization than the control feed having only plant protein and also the test feeds having higher protein levels. This infers that the plant protein (MOC) can be replaced by Soybean meal (SBM), which is more efficient for growth promotion. Soybean meal has superior nutritive values over other plant proteins, because of its wellbalanced amino acid compositions and their bioavailability as reported on the influence of the performance of animal. The results of their findings are similar to our findings. Further, the foregoing results agree and extend the findings showing that groundnut and wheat bran was better utilized by fingerling Labeo rohita and Cirrhinus mrigala than that of mustard oilcake and rice bran. Prawn shell waste protein is rich in essential amino acids. In the present experiment conducted to know the effect of different feed, containing plant proteins and also may be having anti-nutritional factors, and may lead to cumulative effects on growth performance in longer days feeding trials. Based on the results of the present study, it was concluded that mustard oil cake, potato starch, rice polish and soybean meal can be included in combination in the feed formulation for catla fingerling.

Conclusion

Results indicate that soybean incorporated feed was much acceptable than alternative plant protein source for the catla (Catla catla) however, the potential for including mustard oil cake protein in the feeds of fish need more evaluation. Thus, there is an increasing research effort to evaluate the effect of probiotics on the fish health and immune system. The criteria for selection of probiotic is very important which demands that selected probiotic should be of same species origin, produces antimicrobial metabolites and should adhere to intestinal mucosa. Hence, there is elegant logic in isolating the putative probiotics from the host in which the probiotics is intended to use. In the earlier studies in our laboratory we have isolated Bacillus coagulans from the gut of Catla catla and successfully reported its positive effect on growth performance and digestibility of the fish. The main purpose of using probiotics is aquaculture is to include competitive exclusion of pathogenic bacteria because of its antagonistic activity against pathogenic bacteria. In the present study the novel strain of Bacillus coagulans isolated from the gut of Catla catla was tested for antagonistic effect on the growth of common indicator fish pathogen Aeromonas hydrophila by the appearance of clear inhibition zone by well diffusion assay.

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