

## Questionnaires on Attitudes Towards the Use of GMOs in Aquaculture

Genetically Modified Organisms (GMOs) are organisms such as microbes, plants and animals modified by a genetic engineering technique to enhance desired characteristics such as increased growth, resistance to disease and cold tolerance.

Genetic modification has been suggested as a way to address challenges in aquaculture and other industries. By means of this survey we would like to study knowledge of and attitudes among students towards the use of GMOs in aquaculture.

### General Questions

**How much do you agree or disagree on a scale from 1 to 6 with the following statements about genetic modification and GMOs?**

	Totally disagree 1	2	3	4	5	Totally agree 6	I don't know
Production of GMOs, such as transgenic animals, GM crops, GM microbes and GM vaccines, is carried out by deleting genes, by modifying genes or by adding gene constructs either from the same species or inter-species (e.g. insert a flounder gene into salmon).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GM technology is useful in solving important challenges with feeding the world's increasing population and fighting disease.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Genetic modification is genetic improvement of organisms by systematic breeding such as crossing and/or selection.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Development of GM technology is mainly driven by private companies and their desire for profit maximization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### General Questions

**How much do you agree or disagree on a scale from 1 to 6 with the following statements about researchers motivation or condition to do research on GMOs:**

	Totally disagree 1	2	3	4	5	Totally agree 6	I don't know
Scientists want to make an improvement that can contribute towards effective problem solving e.g. feeding an increasing world population, fighting disease and sustainable production.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scientists might get caught up in a working situation with a pressure towards higher short term profit, and get more or less forced to do research on GMOs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Researchers' motives are based on curiosity and a desire to improve our understanding of biotechnological methods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### General Questions

**How much do you agree or disagree on a scale from 1 to 6 with the following statements about the safety of using GMO:**

	Totally disagree 1	2	3	4	5	Totally agree 6	I don't know
Using GMOs in food implies in no risk to human health.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using GMOs in animal feed implies no risk to the animals' welfare.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using GMOs is not ethically acceptable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use of GMOs results in no negative environmental effects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**General Questions**

**How much do you agree or disagree with the following statements about reducing the possible risks of GMOs application: (check on a scale from 1 to 6)**

	Totally disagree 1	2	3	4	5	Totally agree 6	I don't know
In order to reduce the risk of genetic modification applications we need to do more research on GMOs and take the new knowledge about risks into account.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In order to reduce the risk of genetic modification applications we need to seek expert advice to get more understanding about the potential risks to health and the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In order to reduce the risk of genetic modification applications we need to make the production technology more transparent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In order to reduce the risk of genetic modification applications we need to improve communication between scientists and the public.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The consequences of using GMOs is too complex. We can't gain enough knowledge to reduce all possible risk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**General Questions**

**Regarding ethical issues on Genetically Modified (GM), how much do you agree or disagree on a scale from 1 to 6 with the following statements?**

	Totally disagree 1	2	3	4	5	Totally agree 6	I don't know
GM technology is against my belief /religion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
By using GM technology we are "playing God".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GM technology is not acceptable in animal production due to animal welfare concerns.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GM technology is not ethically acceptable in food production.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GM technology is not an ethically acceptable method for producing animal feed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GM technology is not an ethically acceptable method for medicine production.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using GM technology is "tampering" with nature.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GM technology is unnatural, and hence not acceptable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**General Questions**

## How much do you agree or disagree with the following statements about GM technology:

	Totally disagree 1	2	3	4	5	Totally agree 6	I don't know
Media provides information that build fears about GMOs without providing objective and scientific reasoning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Current research data tends to focus on the positive results of using GMOs while the long-term effects have not yet been sufficiently investigated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a lack of transparency to the public about research and information on GMO technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## General Questions

### To what degree (on a scale from 1 to 6) can you support the use of GMOs for the following purposes?

	Totally unacceptable 1	2	3	4	5	Fully acceptable 6	I don't know
Production of cheaper food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Saving human lives (e.g. by producing medicines and vaccines).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More sustainable meat production using farmed animals (e.g. more efficient production and less animal disease).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Production of animal feed (e.g. from plants, algae and microorganisms).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Production of non-feed (e.g. cotton and fabrics, cosmetics).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Production of vaccines (GM and DNA vaccine) to prevent disease.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## General Questions

### To what degree (on a scale from 1 to 6) can you support production of GM food assuming the following conditions?

	Non support 1	2	3	4	5	Full support 6	I don't know
It is more nutritious.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It looks more appealing (e.g. better color or shape).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It has better taste.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is cheaper.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It has longer shelf life (lasting ability).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## General Questions

### On average, how often do you eat salmon?

- More than once a week
- Once a week
- Two or three times a month
- Once a month or less
- Never
- I don't know

## General Questions

### What do you consider as important when you buy salmon? (rate on a scale from 1 to 6 for each criteria)

	Not important at all 1	2	3	4	5	Very important 6	I don't know
Price	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sensoric quality (visual appearance e.g. fillet color, taste, texture)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nutritional content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Freshness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The salmon has not been fed with GM feed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The salmon is wild caught (free range).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The salmon is organic.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The salmon has longer shelf life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The salmon is convenient to prepare/cook.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

## Transgenic Salmon

Transgenic salmon has been produced by inserting genes from e.g. flounder into salmon. Inserted genes can for example allow the modified salmon to grow twice as fast as non-transgenic salmon and to grow faster at lower temperatures. The transgenic farmed salmon are made sterile to avoid breeding with wild salmon.

## Transgenic Salmon

### Would you buy transgenic salmon if it is more nutritious?

- Yes
- Maybe
- No
- I don't know

**Would you buy transgenic salmon if it is more disease resistant?**

- Yes
- Maybe
- No
- I don't know

**Would you buy transgenic salmon if it is more environmentally friendly?**

- Yes
- Maybe
- No
- I don't know

**Transgenic Salmon**

**\*Would you buy transgenic salmon if it is 20% cheaper?**

- Yes
- Maybe
- No
- I don't know

**Transgenic Salmon**

**\*Would you buy transgenic salmon if it is 30% cheaper?**

- Yes
- Maybe
- No
- I don't know

**Transgenic Salmon**

**Will you buy transgenic salmon if relevant Norwegian authorities (e.g. Mattilsynet) have approved it as safe?**

- Yes
- Maybe
- No
- I don't know

Depends on:

## Transgenic Salmon

**Do you think labeling of GMO products is necessary in Norway if it is:  
(possible to choose more than one option)**

- GM food
- Transgenic salmon
- Salmon that have been vaccinated with GM vaccine.
- Labeling of GMO products is not necessary at all.
- I don't know

Other (please specify)

## GM plants as part of salmon feed sources

By using genetic modification, it is possible to change the characteristics of crop plants to make them more nutritious. Therefore GM plants are considered to be an alternative salmon feed source.

**To what extent do you think that using GM plants as salmon feed is acceptable that may replace for example fish oil from the fisheries?**

	Totally unacceptable 1	2	3	4	5	Totally acceptable 6	I don't know
*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## GM plants as part of salmon feed sources

**\*How much do you agree or disagree on a scale from 1 to 6 that it is necessary to label the salmon as a GMO if the salmon has been fed with GM plant feed?**

	Totally disagree 1	2	3	4	5	Totally agree 6	I don't know
*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Marker-Assisted Selection (MAS)

A technology called Marker Assisted Selection (MAS) makes it possible to breed salmon to improve disease resistance and growth more efficiently. By using information about a genetic marker, disease resistant fish can be identified and selected for breeding without having deliberately infected a lot of test fish first.

A current application of MAS is production of salmon with increased resistance to Infectious Pancreatic Necrosis (IPN). The viral disease IPN is a highly contagious disease that causes high mortality in salmon, poor animal welfare and economic losses in salmon farming. In Norway, a salmon breeding company currently uses MAS and markets fast growing salmon fry with high IPN-resistance.

**Which of the following methods do you find acceptable to improve growth and/or disease resistance of farmed salmon to get cheaper salmon or salmon that are more healthy to eat?**

**(rate on a scale from 1 to 6)**

	Totally unacceptable	1	2	3	4	5	Fully acceptable	6	I don't know
MAS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Traditional selective breeding without genetic engineering.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MAS combined with traditional selective breeding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Genetic modification of the salmon (transgenic salmon).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Demographic Information

**Your gender:**

- Man
- Woman

**In what year were you born?**

## Demographic Information

**Which of these descriptions best describes the place you grew up?**

- Big city
- Small town/village
- Scattered place in the countryside
- The coast with fishing and/or farms

Other (please specify)

## Demographic Information

**What is the highest level of education you have completed?**

- Primary school
- High school
- College
- Bachelor degree
- Master Degree

**Which field/discipline is your education background and/or interest? (possible multi-choices)**

- Engineering/technology
- Biology
- Nutrition
- Animal health/disease
- Environmental science/Ecology
- Social sciences
- Economics
- Genetics
- Pharmacy
- None

Other (please specify)

**\* Your present study programme:**

**Demographic Information**

**Are you:**

- Religious
- Atheist or Agnostic
- Prefer not to answer

**Demographic Information**

**If you could vote today, which political party would you vote for in a parliament election?**

- The Labour Party (Arbeiderpartiet)
- The Progress Party (Fremskrittspartiet, FrP)
- The Conservative Party (Høyre)
- The Socialist Left Party (Sosialistisk Venstreparti, SV)
- The Centre Party (Senterpartiet, SP)
- The Christian Democratic Party (Kristelig Folkeparti, KrF)
- The Liberal Party (Venstre)
- The Red Party (Rødt)
- None



## Demographic Information

### Are you a member of one or more of these organizations?

- World Society for the Protection of Animals, WSPA e.g. Norwegian Animal Protection Alliance, Norwegian Animal Rights Organization; NOAH (Dyrevernorganisasjon f.eks Dyrevernsalliansen, Dyrebeskyttelsen).
- The National Association for Hunting and Fishing e.g. Norwegian Association of Hunters and Anglers (Jeger- eller fiskerforening f.eks Norges Jeger- og Fiskerforbund).
- Environmental Organizations e.g. Bellona, Young Friends of the Earth Norway, Norwegian Society for the Conservation of Nature, The Green Warriors of Norway (Miljøvernorganisasjoner f.eks Bellona, Natur og Ungdom, Norges Naturvernforbund Norges Miljøvernforbund).
- The Norwegian Trekking Association (Den Norske Turistforening, DNT).
- None

Other (please specify)

## Lottery

**If you want to take part in the camera lottery, please write your e-mail address, such that we can contact you if you become the winner:**

**(Please note that your response will still be handled confidentially)**

Thank you for taking the time to answer the questions. You are now taking part in the lottery for the new 3D camera.