

UNIT V - ANIMAL TECHNOLOGIES

Lesson 4: The Impact of Biotechnology in Animal Agriculture

Objective/Competency: Summarize the impact of biotechnology in animal agriculture.

Study Questions

1. **What are some career opportunities in animal biotechnology?**
2. **What are some economic factors of animal biotechnology that affect producers?**
3. **What are health and safety concerns of consumers of animal biotechnology?**
4. **What are the global social impacts of animal biotechnology?**

References

1. *Biotechnology: Applications in Agriculture (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1998, Unit V.
2. Activity Sheet
 - a) AS 4.1: Careers in Animal Biotechnology

UNIT V - ANIMAL TECHNOLOGIES

Lesson 4: The Impact of Biotechnology in Animal Agriculture

TEACHING PROCEDURES

A. Review

Animal agriculture is a multibillion dollar industry in the United States. Biotechnology is just beginning to make a substantial impact on this industry. As discussed in the previous lessons, the livestock breeding and animal health sectors of animal agriculture have already felt the impact of biotechnology. As the technology advances, more areas of livestock production will be affected. Advancements in this field will increase the number of career opportunities available. However, the growth of animal biotechnology will bring with it a number of issues that must be resolved, including economic concerns for producers, health and safety concerns for consumers, and global social impacts.

B. Motivation

Some individuals who first entered careers in the computer industry when it was in its infancy in the early 1980s are among the wealthiest people in America today. Bill Gates, the founder of Microsoft, is a good example. Some people have classified biotechnology as the next explosive industry. Career positions in biotechnology are increasing in number between 10 and 20 percent per year. As this industry grows, so will the opportunities for those interested in biotechnology.

C. Assignment

D. Supervised Study

E. Discussions

1. Ask students to list career opportunities related to animal biotechnology. Group these jobs into the eight categories listed below.

What are some career opportunities in animal biotechnology?

- a) Research and development
 - 1) Glass washer
 - 2) Laboratory assistant
 - 3) Research assistant
 - 4) Postdoctoral fellow
 - 5) Research director/principle investigator
- b) Quality control
 - 1) Quality control analyst
 - 2) Environmental health and safety specialist
 - 3) Equipment validation engineer
 - 4) Validation technician
- c) Clinical research
 - 1) Clinical coordinator
 - 2) Clinical data specialist
 - 3) Clinical research associate
 - 4) Animal handler/technician
- d) Manufacturing and production
 - 1) Product development engineer
 - 2) Manufacturing engineer/technician
 - 3) Instrument calibration technician

- 4) Packaging operator
 - e) Regulatory affairs
 - 1) Regulatory affairs specialist
 - 2) Documentation specialist
 - f) Information systems
 - 1) Scientific programmer analyst
 - 2) Literature research assistant
 - g) Marketing and sales
 - 1) Market research analyst
 - 2) Sales representative
 - 3) Customer service representative
 - h) Administration
 - 1) Human resources representative
 - 2) Supply buyer
 - 3) Patent administrator
2. Ask students to describe how livestock producers decide whether or not to use a new technology. Explain that the economics of using a new product versus not using the product are very important.

What are some economic factors of animal biotechnology that affect producers?

- a) Benefit-to-cost ratio of biotechnology products
 - b) Cost of not using a biotechnology product
 - c) Reliability of the biotechnology products
 - d) Cost of additional management or training
3. Ask students to recall the results of the biotechnology opinion survey taken earlier in this course. Have students list some concerns about animal products. Ask students if most people in their community believe that biotechnology is safe.

What are health and safety concerns of consumers of animal biotechnology?

- a) Fear of new technology because of a lack of understanding about it
 - b) Skepticism about safety research
 - c) Fear about the wholesomeness of foods produced through the use of biotechnology
4. Explain that by the year 2030 the world's population is expected to double to 12 billion people. Ask students to speculate about how food production can be doubled by that year. Ask students to further speculate as to who will be able to obtain food if the demand exceeds the supply.

What are the global social impacts of animal biotechnology?

- a) Biotechnology has the potential to increase the global production of meat, dairy products, and eggs.
- b) International concerns must be addressed; the international political environment will determine the extent of the use of animal biotechnology.
- c) Biotechnology may change the number of livestock producers needed.

F. Other Activities

Have someone with a career in animal biotechnology speak to the class about the job and the field of biotechnology.

G. Conclusion

As biotechnology products such as feed quality enhancers, growth stimulants, protein feeds, and transgenic breeding stock become available to producers, the economic and social impacts of these products will have to be addressed. Career opportunities in animal biotechnology are increasing steadily as the industry expands. Animal biotechnology must, however, address the health and safety concerns of consumers for the products of animal biotechnology to be fully accepted.

H. Answers to Activity Sheet

AS 4.1

Answers will vary.

I. Answers to the Evaluation

1. d
2. c
3. d
4. g
5. b
6. e
7. f
8. a
9. c

10. Consumers are concerned about the new technology because of a lack of understanding about it, skepticism about safety research, and a fear about the healthiness of foods produced through the use of biotechnology.

EVALUATION

Circle the letter that corresponds to the best answer.

1. What is a possible global social impact of biotechnology?
 - a. Advancements in biotechnology may decrease the global production of meat, dairy products, and eggs.
 - b. Advancements in biotechnology will decrease the costs of management for producers.
 - c. Advancements in biotechnology will decrease consumer concerns about the safety of food products.
 - d. Advancements in biotechnology may change the number of livestock producers needed.
2. Which of the following is not an economic factor that affects producers?
 - a. Reliability of biotechnology products
 - b. Cost of not using a biotechnology product
 - c. Fear of the new technology
 - d. Cost of additional training or management

Match the following positions to the major area of employment by writing the letter from the right-hand column in the correct blank.

- | | |
|---------------------------------------|------------------------------------|
| 3. _____ Research and development | a. Literature research assistant |
| 4. _____ Quality control | b. Animal handler/technician |
| 5. _____ Clinical research | c. Customer service representative |
| 6. _____ Manufacturing and production | d. Postdoctoral fellow |
| 7. _____ Regulatory affairs | e. Product development engineer |
| 8. _____ Information systems | f. Documentation specialist |
| 9. _____ Marketing and sales | g. Equipment validation engineer |

Answer the following short answer question.

10. What are health and safety concerns of consumers of animal biotechnology?

Name _____

Objective: Investigate a specific career opportunity in animal biotechnology.

1. What are the responsibilities of someone with this job?

2. Where are available jobs located?

3. What is the average salary?

4. What personality traits are needed for someone working in this job?

5. What level of education is needed to obtain this position?

6. Where can this education be obtained?

7. What is the job market like for someone looking for a position?