ISOLATION AND SCREENING OF OLEAGINOUS BACTERIA FROM DAIRY SLUDGE FOR BIODIESEL PRODUCTION

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INTRODUCTION

Between now and 2050 the world's population is predicted to increase to more than 9 billion people. Each person will also be consuming more calories per day and using more energy to power their lives. Food and fuel supplies will need to massively increase to meet these needs[1].

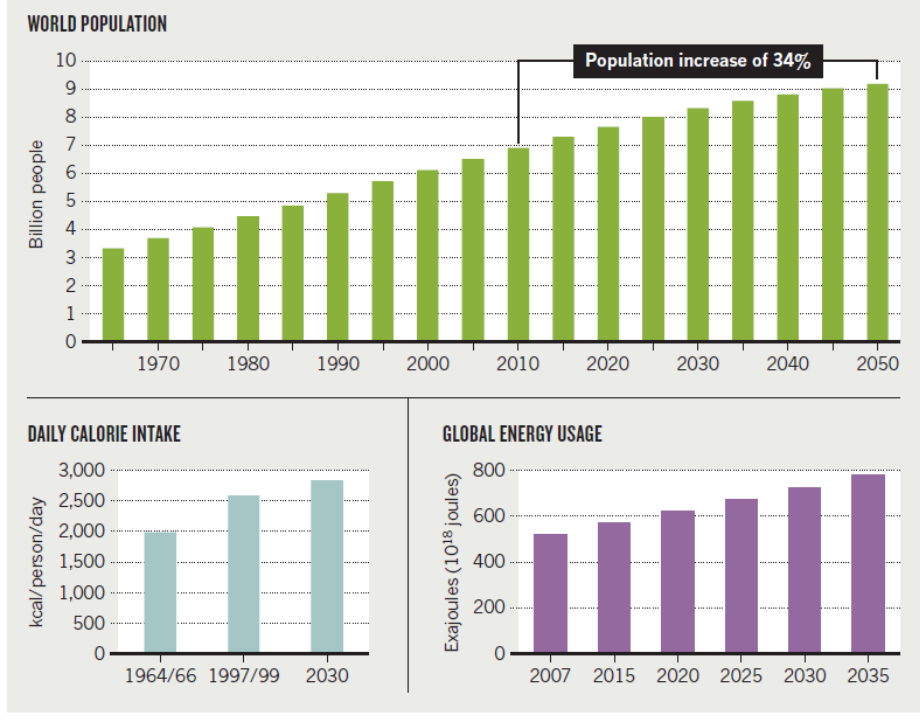


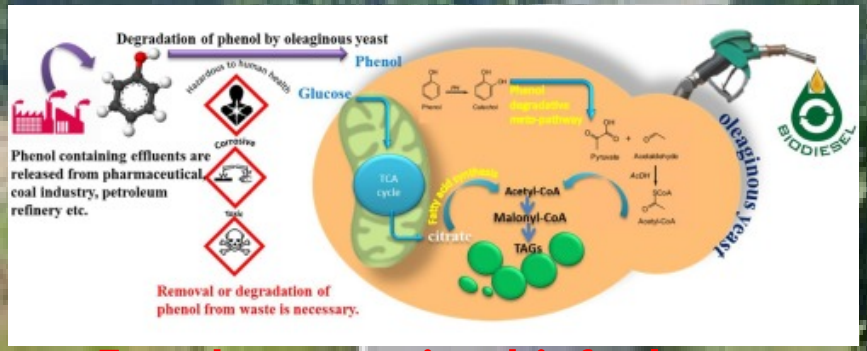
Fig. 1 The growing trend of population and energy usage[1]

[1]**Duncan Graham-Rowe, Beyond food versus fuel** 2011 | VOL 474 | NATURE | S6-S8

[2]http://www.epa.gov/climatechange/science/future.html

WHY BIOFUEL

- BIOFUELS ARE NATURALLY LOW IN SULFUR, AROMATICS, AND OTHER TOXIC COMPOUNDS THAT IMPACT HUMAN HEALTH.
- BIOMASS ARE SUSTAINABLE AND RENEWABLE SOURCE
- BIOFUELS ARE LESS TOXIC AND BIODEGRADABLE
- IMPROVE ENERGY SECURITY
- CONTRIBUTE TO RURAL DEVELOPMENT THROUGH DOMESTIC PRODUCTION
- LESS GREEN HOUSE GAS (GHG) EMISSION



Fourth generation biofuel


Third generation biofuel



Second generation biofuel



First generation biofuel

OBJECTIVES

- ISOLATION AND SCREENING OF OLEAGINOUS BACTERIA FROM DAIRY SLUDGE
- EFFECT OF CARBON SOURCES FOR BIOMASS AND LIPID PRODUCTION BY SELECTED BACTERIA

ISOLATION OF MICROORGANISMS

Figure 2: Dairy sludge collection site

Figure 3: Plating of bacterial strain at different dilutions

Isolation Media	Dairy Sludge extract media
Temperature	30^0 C
pH	6.8
Time	72 h

ISOLATION OF MICROORGANISMS

Table 1. Colony characteristics of isolated bacterial strains

Sl No.	Bacterial Strain	Colony Characteristics
1	DS 1	Light Brown, Dry
2	DS 2	Light Brown, Creamy
3	DS 3	Small, White, Transparent
4	DS 4	Big, Black, Mycelial
5	DS 5	Medium, White, Transparent
6	DS 6	Small, White
7	DS 7	White, Mycelial
8	DS 8	White, Transparent, Slimy
9	DS 9	Small, White

SCREENING OF MICROORGANISMS

Table 2. Medium for screening

Components	Concentration (g/L)
Na_2SO_4	0.2
KNO_3	0.2
Carbon sources	10
$ZnCl_2$	0.01
$MgCl_2.6H_2O$	0.2
$FeCl_3.6H_2O$	0.01
$MnCl_2.4H_2O$	0.01
$CaCl_2.2H_2O$-	0.01

Table 3. Conditions

Temperature (°C)	30
pH	7
Agitation (RPM)	150
Incubation Time (h)	96

BIOMASS PRODUCTION OF ISOLATED STRAINS

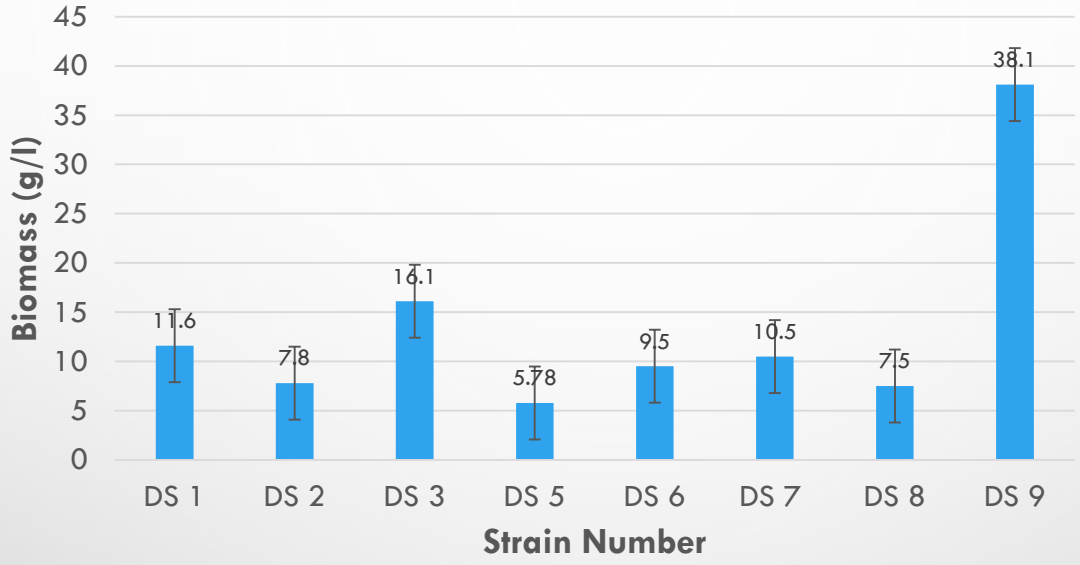


Fig. 4 Biomass production from isolated bacteria

LIPID CONTENT OF ISOLATED STRAINS

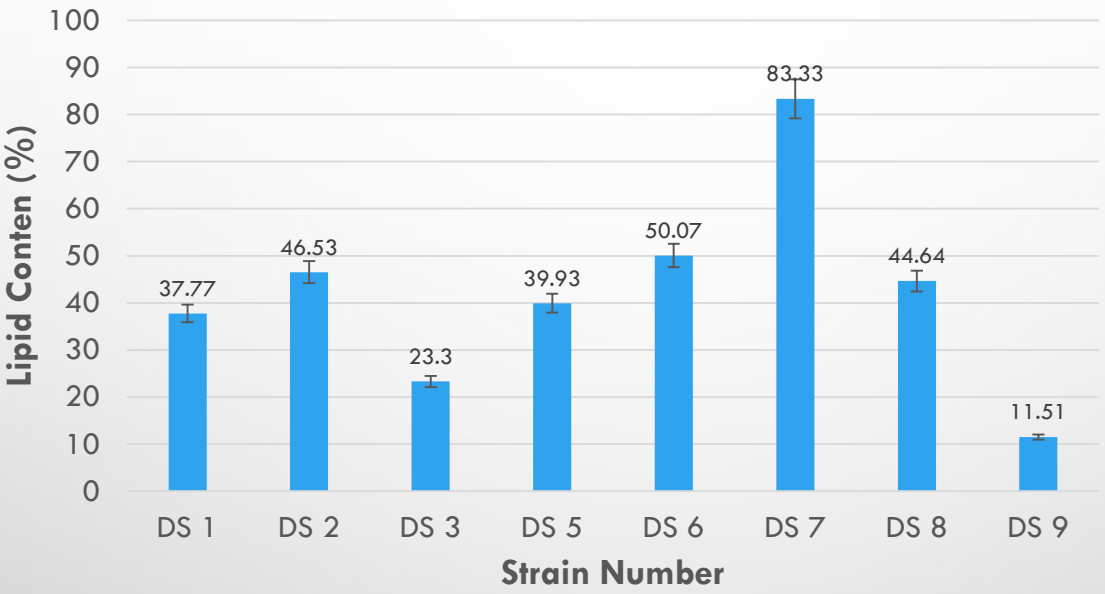


Fig. 5 Lipid content from isolated bacteria

LIPID PRODUCTIVITY OF ISOLATED STRAINS

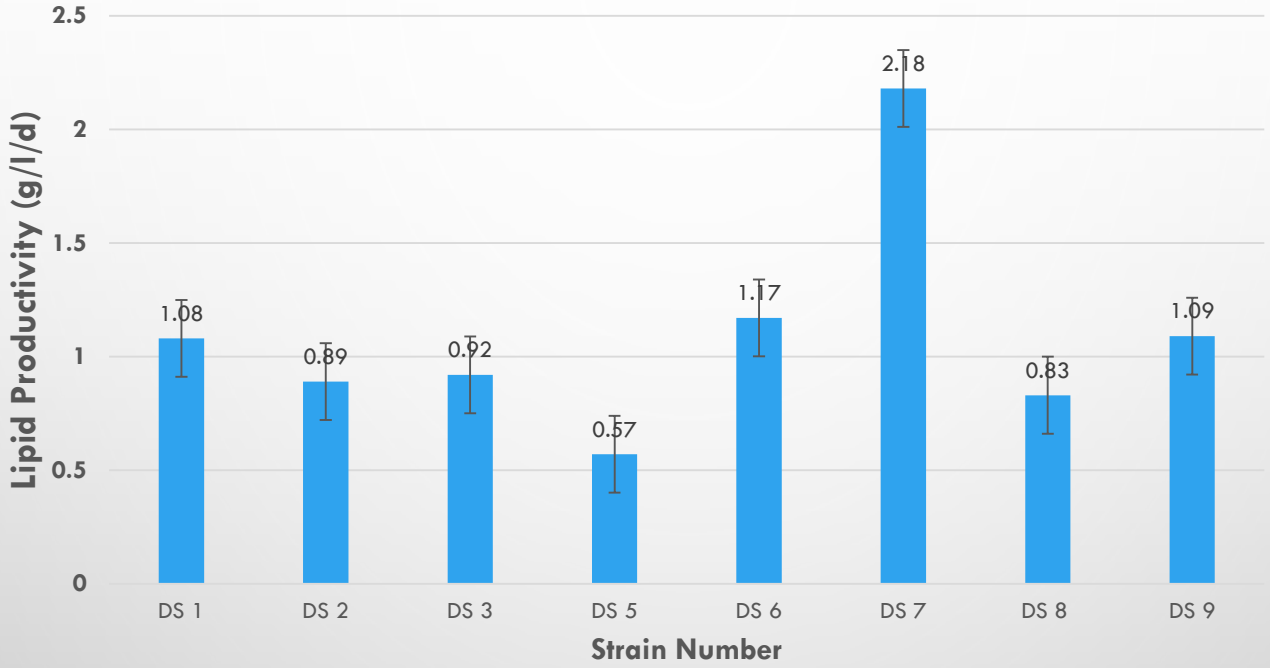


Fig.6 Lipid Productivity of isolated bacteria

BIOMASS PRODUCTION

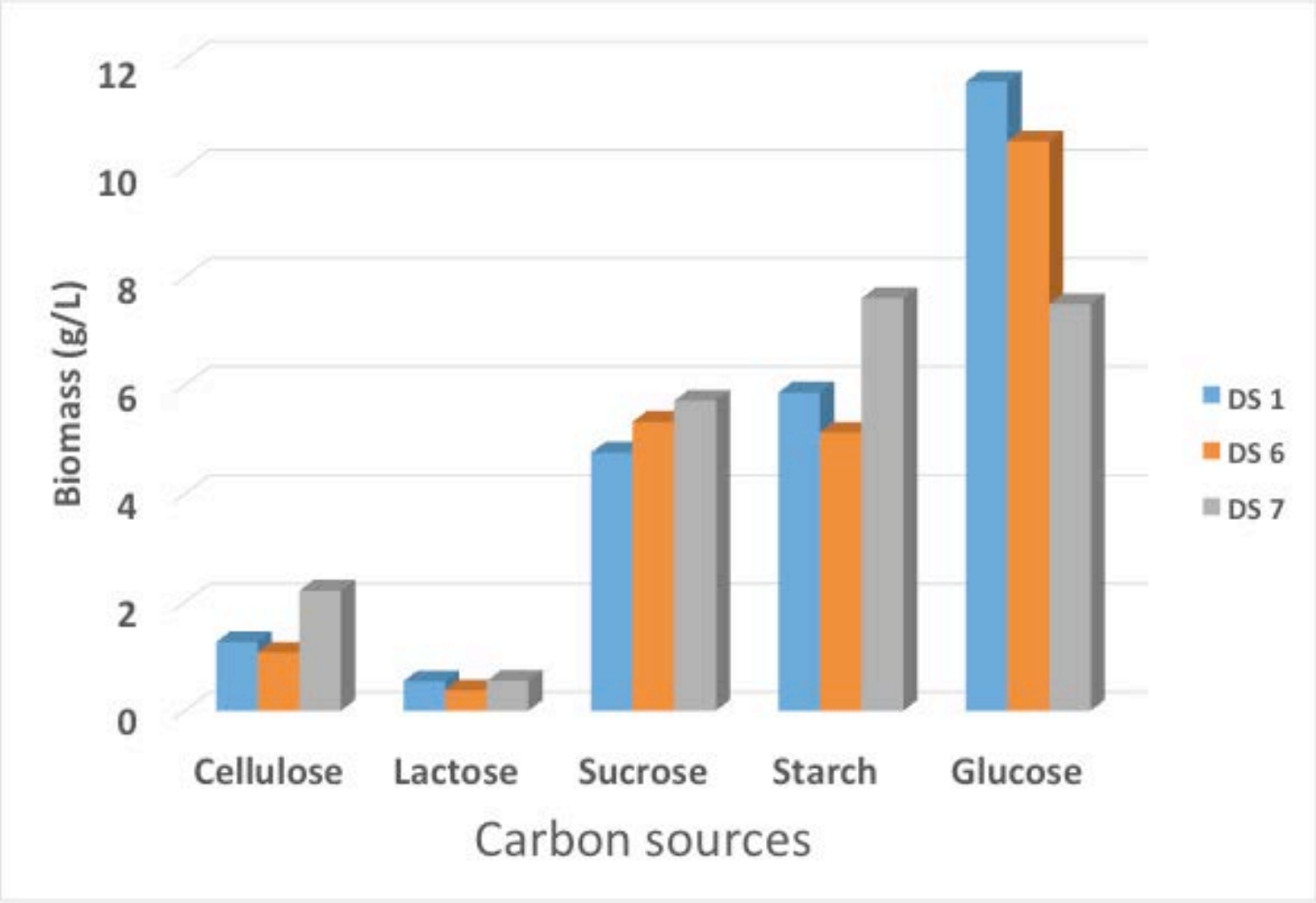


Fig. 7 Biomass production from isolated bacteria using different carbon sources

LIPID CONTENT

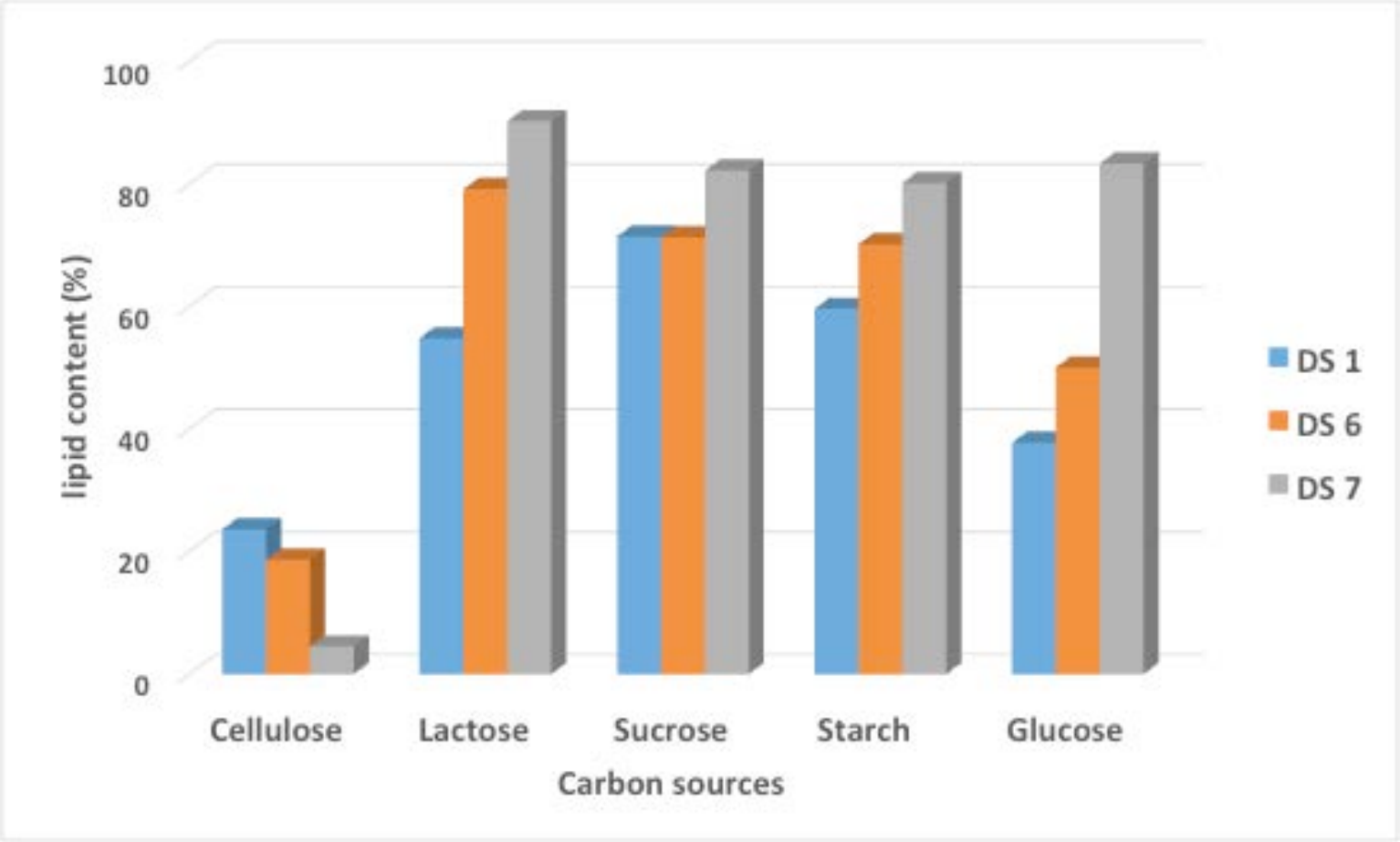


Fig. 8 lipid content from isolated bacteria using different carbon sources

LIPID PRODUCTIVITY

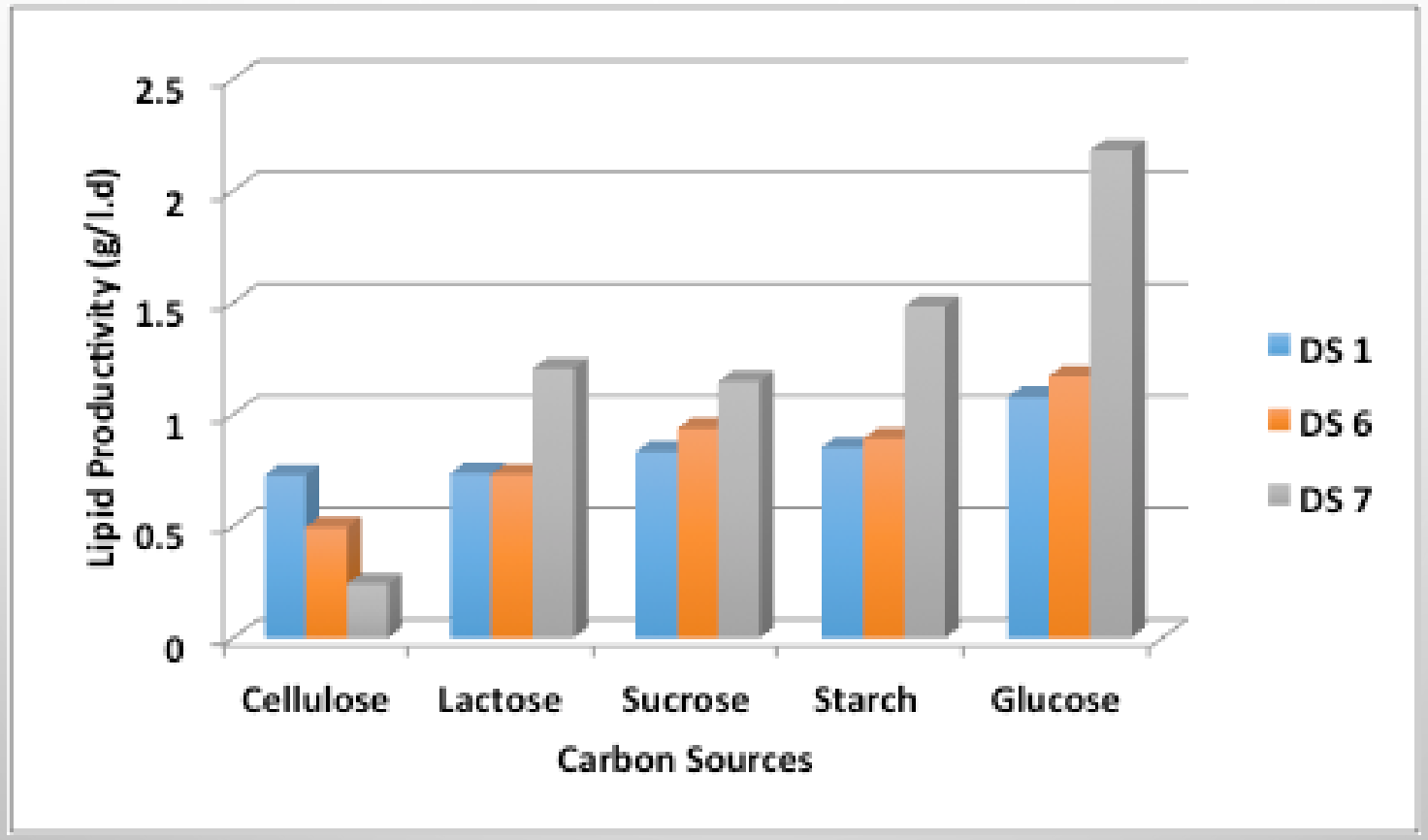


Fig. 9 lipid productivity of isolated bacteria using different carbon sources

CONCLUSION

DAIRY SLUDGE IS A HIGHLY POTENTIAL SOURCE OF OLEAGINOUS MICROORGANISMS.

AMONG THE ALL NINE ISOLATES DS1, DS 6 AND DS 7 SHOWED HIGH POTENTIAL AS FEEDSTOCK FOR BIODIESEL PRODUCTION.

BIOMASS PRODUCTION AND LIPID CONTENT OF ISOLATES ARE COMPETITIVE.

TO OBTAIN HIGH PRODUCTIVITY OPTIMIZATION WILL BE REQUIRED FOR MAXIMUM BIOMASS AND LIPID PRODUCTION.