

THE EXUDATE FROM NUTRIENT AGAR SLANTS—THE SO-CALLED WATER OF CONDENSATION

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As is well known, a variable quantity of liquid collects in nutrient agar slant tubes,—a condition which does not occur in the case of nutrient gelatin slants. For many years this liquid has been known as the water of condensation, and it is so called in a recent laboratory manual.¹

As many microbes grow more freely in this so-called water of condensation than they do on the surface of the agar slant or in nutrient broth, it seemed desirable to determine its composition. For this purpose 340 grams of nutrient agar containing 1.5 per cent agar and with a C_H of pH 8.2 were prepared, cut into small pieces, and placed on a large Büchner funnel at 9°C. for four days; during this period, the nutrient agar yielded about 50 cc. of exudate, or water of condensation. This exudate and a sample of nutrient broth were analyzed with the results shown in table 1.

Heat and acetic acid, 1–10, were used to determine the presence of albumen.

Of each sample, 29.5044 grams were evaporated and the residue dried at 105°C. to constant weight for total solids. The residue was burned at a red heat for ash. The ash was dissolved in 1 to 1 HCl and the solution tested for calcium with ammonia and ammonium oxalate; for magnesium with ammonia and sodium phosphate; for phosphorus with ammonia, nitric acid, and ammonium molybdate; for sulfates with barium chloride, and for iron with ferrocyanide solution.

¹ Laboratory Manual in General and Pathogenic Bacteriology and Immunity. V. A. Moore and W. A. Hagan. 1925, p. 54.

On testing for these minerals the results in table 2 were obtained.

These analyses demonstrate that the liquid which collects in nutrient agar slant tubes is richer in albumen, calcium, mag-

TABLE 1

	NUTRIENT AGAR EXUDATE	NUTRIENT BROTH
Color	Light brown	Pale straw
Specific gravity	1.0060	1.0043
Reaction	pH 6.2	pH 7.4
Albumen	Marked, disappears on addition of ammonia	Trace, disappears on addition of ammonia
Total solids	1.61 per cent	1.27 per cent
Ash	0.16 per cent (9.9 per cent of total solids)	0.07 per cent (5.5 per cent total solids)

TABLE 2

MINERAL	NUTRIENT AGAR EXUDATE	NUTRIENT BROTH
Calcium	Marked	Trace
Magnesium	Distinct	Trace
Phosphates	Marked	Marked
Sulfates	Marked	Distinct
Iron	Trace	None

nesium, sulfates, iron, total solids and ash than is nutrient broth, contains phosphates about equal to those of nutrient broth, and is an exudate from the nutrient agar, rather than water of condensation.

CONCLUSION

The so-called water of condensation which collects in nutrient agar slant tubes is an exudate from the nutrient agar, possessing nutrient substances suitable for sustaining bacterial growth.