

**CITRUS BY-PRODUCTS
AND
UTILIZATION OF WASTES.**

S. K. Mitra M. S., Ph. D.

**CITRUS BY-PRODUCTS
AND
UTILIZATION OF WASTES.**

BY

S. K. Mitra M. S., Ph. D.

Economic Botanist to the Government of Assam.

FIRST IMPRESSION.

1923.

Price Re 1-8.

PUBLISHED BY
KALIPADA GHOSH,
"Krishi-Sampada" Office,
31, Sutrapur Road, Dacca.

PRINTED BY
Jogendra Chandra Das
at the Associated Printing Works
of the Associated Printing & Publishing Co., Ltd.
40, Kaltabazar, Dacca.

PREFACE.

Considering the abundant production of citrus fruits in India it seems that we have not availed ourselves of the great industrial opportunity that this delicious fruit offers to many parts of the Semi-tropical world. During the last two decades the industrial development of citrus in the Western world has advanced very rapidly. It is on the basis of utilization of the surplus and waste fruits by well-developed scientific methods to manufacture various kinds of by-products that the citrus industry in Europe and tropical America has been brought to a success.

The main purpose of this publication is to give the people a general idea of the by-products that can be easily made by those interested on the subject on a rather small capital. Besides, it will, without doubt, give an opportunity to our housewives to prepare various kinds of chatneys etc. for every day use.

The materials for this work have been collected from various sources of which a partial bibliography has been added to the end.

SYLHET.
March 3, 1922.

} **S. K. Mitra.**
Economic Botanist to the
Govt. of Assam.

CONTENTS

	Page
1. Introduction ...	1
2. Present Status of Citrus ...	4
3. Area and Distribution of Citrus ...	7
4. Oils and Perfumes from Citrus Fruits	23
5. Citrate of Lime and Citric Acid ...	44
6. Canning and Preserving of Citrus Fruits	48
7. Citrus Fruit Juice	54
8. Citrus Fruit Syrups	64
9. Citrus Fruit Extracts and Spirits ...	68
10. Candied Preparations	73
11. Citrus Fruit Preserves	81
12. Pastry Preparations	87
13. Confectionary Preparations	92
14. Miscellaneous Use of Citrus Fruits	94
15. Conclusions	95
16. Bibliography	98
17. Appendix.	101

In conclusion, I have this much to say that our educated men should turn to business and thus organize the industrial side of our agriculture. This may easily be done, provided the work is begun on a co-operative basis. Certainly the time is now ripe enough for industrial organisation in agriculture which seems to be the essential need to further the cause of our farmers and farming in India.

XVI. BIBLIOGRAPHY.

The following is a partial list of books and publications that have been consulted in this work:—

1. 1887. Orange Wine : Pacific Rural Press ; Feb, 8, P. 107.
2. 1889. Method of making citric acid : Calif. Expt. Sta. Rept., P. 146,
3. 1895. Essential oil of the orange : Jamaica Bot. Dept., B. 9. P. 177-180.
4. 1901. The Art of canning and preserving by Dr. Jean Pacrette of Paris.

5. " Industrial Organic Chemistry by Molinari, pp. 345—350.
6. " Food Analysis by Leach, pp. 870-885.
7. " What can be done of orange peel : Scientific American Vol. 84, P, 88.
8. 1909. Italian lemons and their by-products: B. P. I. Bul. No. 160, U. S. D. A.
9. " How lemon oil is made : Scientific American Vol. 101, P. 372.
10. " Process of preserving citron in brine and world's production of citrons ; U. S. Consular repts.
11. " Principles of Jelly making : Jour. of Ind. and Eng. Chem., P. 333.
12. 1910. The production of Volatile oil and perfumery plants in United States : B. P. I. Bul. No. 195, U. S. D. A.
13. 1911. The district of orange flowers at Grasse. Jour. Royal Soc. of Arts, June 30, P. 807,
14. 1912. Uses of citrus fruits : Good house-keeping, Vol 54, P 103—8.
15. 1913. Acid content of fruits : Science, Oct. 31 P. 639.

16. 1913. The lime juice industry of West Indies : Imp. Dept. of Agric., West Indies, Pamphlet No. 72.
17. " Making orange vinegar : California Cultivator, Oct. 30.
18. 1914. Orange flower cultivation in France : Gardener's Chronicle, April 11, P. 253.
19. " Utilization of Waste oranges, by W. V. Cruess, Calif. Expt. Sta. Bul. No. 244.
20. " Candied fruits, Calif. Cultivator.
21. 1915. By-products of Seville oranges: Good House-keeping.
22. " How to bottle fruits, vegetables, game etc : Agric. Jour. of the Dept. of Agric.. Bihar and Orissa ; Vol. 3. Part 2. P. 71.
23. " Pine apples : Ibid P. 74.
24. 1915. Krishi-Sampad, Vol 5, No. 10, P. 268.
25. 1916. Marmalade and jelly making from citrus fruits : Calif. Agric. Expt. Sta. Cir. 146.
26. 1918. Krishi-Sampad, Vol. 8, No. 10., P. 253.
27. 1921. Ibid. Vol. XI. No. VI & VII.

XVII APPENDIX.

For cottage industry purpose simple machineries can be brought from the following companies :—

1. Sprague Canning Machinery Company,
Chicago, Illinois.
U. S. A.
2. Berger and Carter Company,
San Francisco,
California.
U. S. A.
3. Eroom and Company,
Dhurrumtola Street,
Calcutta.
4. North Western Steel and Iron Works,
Eau claire, Wisconsin.
U. S. A.

THE END.