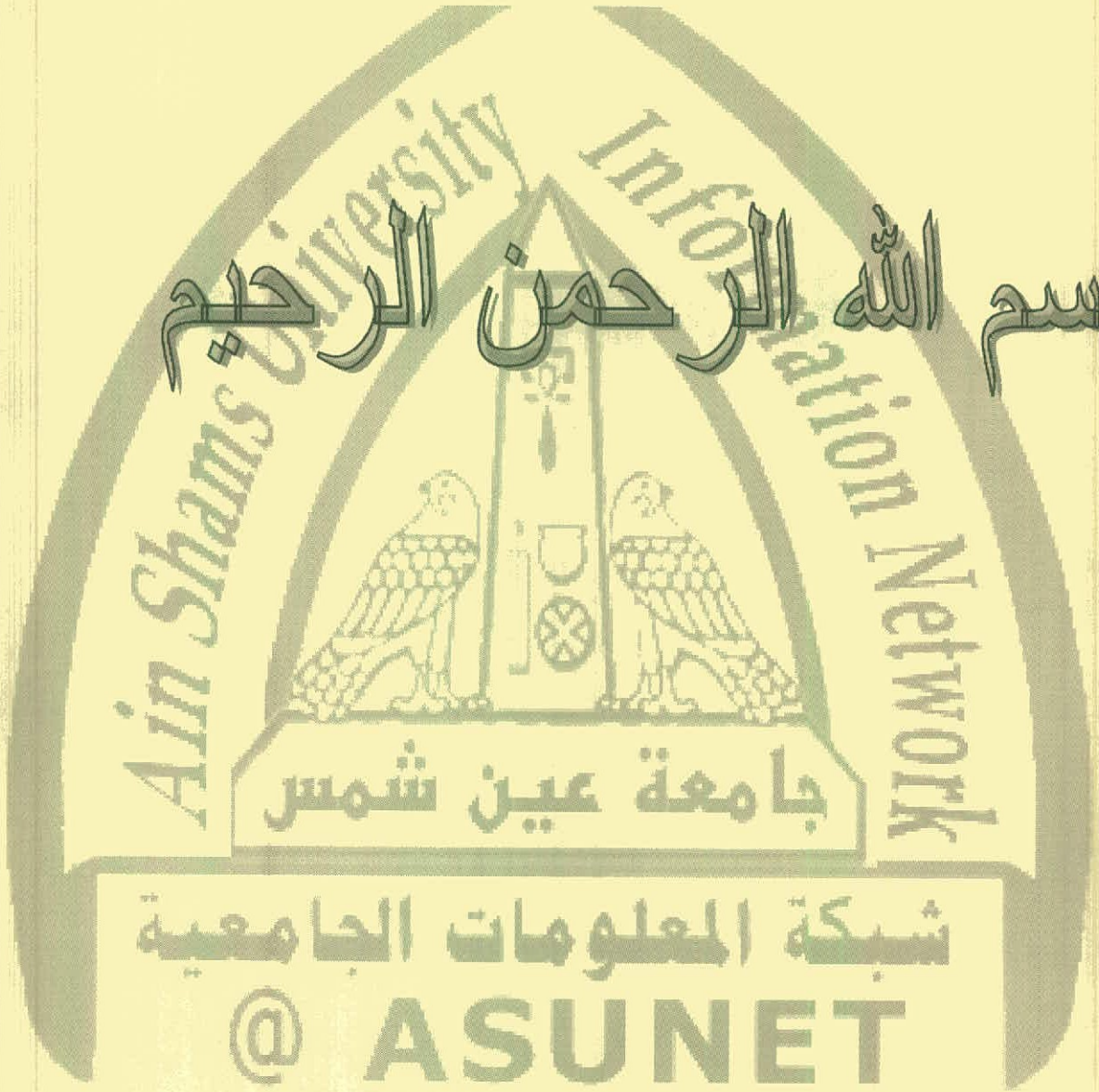
شبكة المعلومات الجامعية



بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

بعض الوثائـــــــق الاصليـــــة تالفـــة

بالرسالة صفحات لم ترد بالاصل

TECHNOLOGICAL AND ENGINEERING STUDIES ON THE SPRAY DRYING OF ROSELLE EXTRACT CONCENTRATE

By

EKRAM ABD EL-SALAM ABD EL-SALAM
B.Sc. Agric. Sci. (Food Science), Fac. Agric. Cairo Univ. Egypt, 2001

THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

In

Agricultural Sciences
(Food Science)

Department of Food Science
Faculty of Agriculture
Cairo University
Egypt

2008

APPROVAL SHEET

TECHNOLOGICAL AND ENGINEERING STUDIES ON THE SPRAY DRYING OF ROSELLE EXTRACT CONCENTRATE

M.Sc. Thesis
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Branch: Food Science **Approval:** 12 / 14 / 2008

ABSTRACT

This study was carried out to apply spray drying method to produce roselle extract powder. The effect of different operating conditions and drying aid agent on the physicochemical properties and the yield of produced powder was studied to reach the optimum operating conditions and the best type and proportion of drying aid agent. Also, this study was carried out to conduct a basic engineering design of an industrial scale spray dryer based on the best obtained operating conditions.

Results showed that the yield percentage of roselle powder was increased by increasing the inlet air temperature up to 170 °C, and leveled off for higher values. Also, the results illustrated that the highest powder yield percentage was achieved by using maltodexrin (DE 22) at the ratio of (55: 45) for (maltodextrin: roselle extract solids).

Results showed that the increase in drying air flow rate increased the powder yield percent, moisture content, the percent polymeric color and solubility and decreased its monomeric anthocyanins content, while the increase in compressed air flow rate to operate the spraying nozzle increased the powder yield percent and monomeric anthocyanins content and decreased its moisture content and solubility. Also, Results indicated that the highest powder yield percentage and best physicochemical properties of produced powder was achieved when maltodextrin (DE 22) used as drying aid agent.

Results showed that concentration of roselle extract from 4% to 20% resulted in increasing roselle extract density from 1.0123 to 1.0569 gm/cm^3 and increasing apparent viscosity from 1.30 to 2.56 Pa. s.

An industrial scale spray dryer was designed depending on the following basis: production rate 5 ton/day, concentration of the feed solution 26.5%, inlet air temperature 170 °C, outlet air temperature 105 °C, residence time 25 second, atomizer type rotary atomizer, heater type fin air heater, drying chamber dimensions 5.61 m diameter and 4.95 m height with 60° angle cone and separation unit high efficiency cyclone.

Key words: spray drying, roselle extract, maltodextrin, powder yield and physicochemical properties

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