University of Baghdad

College of Pharmacy

Department of Pharmacognosy

Cichorium intybus

(Chicory)

1947-1983

اعداد

فاطمة فاضل عودة

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B2

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*Cichorium intybus*L.(Compositae)

(Hindiba,location:Mosel)

Chicory,WildSuccory,Wild Endive

The aerial part used as diuretic,stomachic,aperient,sedative while the root in addition to diuretic effect it is used as sudorific,depurative and cholagogue.

(1947-1956)

cult. II. Preparation of fructose sweetening agent from Cichorium intybus. *Ibid.* 20, 221–6(1944).—The dried tuber of *C. intybus* contained moisture 3.390, crude protein 8.898, crude fat 1.650, crude fiber 7.209, N-free ext. 74.444, ash 4.409, total sugar 59.650 (as fructose), and reducing sugar 8.270%. Inulin was extd. from this tuber at 100° for 2 hrs. with 8 times its wt. of water. Fructose sweetening agent was prepd. as in Part I. Purification of fructose ext. with bone C and kieselguhr was used to remove bitterness and dark color. Sin'itirô Kawamura

Action of some lactones related to coumarin on germination of chicory seeds. Spectral study of the compounds. G. Graillot (École natl. agr., Grignon, France). *Bull. soc. chim. biol.* 33, 1584–90(1951).—Seeds of *Cichorium endivia* were moistened with a 0.01% soln. of the compd. and kept 5 days at 25°, then the plantlets were weighed. Coumarin, 3-methylcoumarin, and 7-hydroxycoumarin inhibited growth 30–35%; 4-hydroxy- and 6,7-dihydroxycoumarin were slightly inhibiting; and 3-methyl-4-hydroxy-, 3-propyl-4-hydroxy-, and 3-chloro-4-hydroxycoumarin had no inhibiting action. The ultraviolet absorption curves of all the compds. are shown. L. E. Gilson

Seed coating which improves germination. Wm. J. Hale and Phelps Vogelsang. U.S. 2,553,577, May 22, 1951. Improved germination of seeds of sugar beets, chicory, and carrots is obtained by coating them with a mixt. of 7% fungicide, 10% superphosphate, 800 p.p.m. dried blood, and 100 p.p.m. ketosuccinic acid (I) in a water-sol. binder, such as methylcellulose, starch, polyvinyl alc., dextrin, or Na alginate. Chlorophyll, dried yeast, proteins, and infinitesimal amts. of growth hormones, such as indoleacetic or indolebutyric acid, may be added. Other

pure solvent.

Preparation of levulose from chicory. J. Vocu. *Chem. Obzor* 22, 201–3(1947).—A method is described for prepg. aq. levulose solns. capable of crystn. from chicory juice. The most important point is to obtain coarse crystals of calcium levulinate. The protein constituents of juices cause difficulties in purifying and washing the calcium levulinate. They decomp. during the hydrolysis, forming condensation products with the sugar which are very hard to remove and decrease the crystn. of the final sirup. As there was no advantage in lime purification, proteins were coagulated by adding HCl either at once or continuously. pH 3.15 was found to be the best for the pptn. of protein and also for the inversion of inulin under pressure. Calcium levulinate was pptd. from the juices after inversion; after filtration, washing, and satn. it yielded watery solns. of 95–98% purity. These solns. crystd. easily and gave satisfactory yields of levulose from the original chicory mass.

Jan Micka

Fructose sirup from chicory. Makoto Kawamura. Japan. 4101('50), Nov. 20. The ext. of chicory tubers is treated with SO_2 gas below room temp. to pH < 2 and concd. by heating.

K. Kitsuta

The development of the production of sugars and sirups in the U.S.S.R. from nonbeet-sugar plants. N. V. Vinogradov and A. I. Vostokov. *Sakharnaya Prom.* 25, No. 3, 8–14(1951).—The possibilities of producing sugars and sirups from sorghum, sugar cane, chicory, Jerusalem artichoke, and a hybrid of Jerusalem artichoke with the sunflower is discussed.

V. E. Baikow

Medicinal properties of wild chicory (Cichorium intybus). François Decaux. *Rev. phytotherap.* 10, 9–12(1946). **The depurative properties of Viola tricolor.** *Ibid.* 24–6.—Discussions and reviews of chem. compn. and pharmacol. properties.

W. C. Tobie

Auxin in the differentiation of root and shoot primordia from root cuttings of Taraxacum and Cichorium. H. E. Warmke and Germaine L. Warmke (U. S. Dept. of Agr., Mayaguez, Puerto Rico). *Am. J. Botany* 37, 272–80 (1950); cf. Czaja, *C.A.* 30, 506².—The role of auxin (I) in the regeneration of root cuttings (II) of *Taraxacum officinale* and *Cichorium intybus* was studied. Alteration

Influence of nitrogenous fertilizer applications on the composition of Catalogna chicory. Maria Perniola (Staz. agrar. sper., Bari). *Ann. sper. agrar.* (Rome) [N.S.] **5**, 667–77(1951).—The seedlings were transplanted into field plots and grown during the winter in 4 replications each of controls and 4 different levels of fertilization with $(NH_4)_2SO_4$. The harvested plants were weighed and analyzed, and other results will be reported later. The results were analyzed

vetch, soy, oats, hemp, and tobacco. The seeds of chicory, beets, lucerne, carrots, sorrel, tomatoes, basil, leeks, and spinach were not particularly sensitive. Seedlings (20 mm. long) of II and III were placed at 20° (in diffuse daylight) with their roots in solns. of I for 10–15 days. With II, 10^{-4} *M* or higher concns. of I almost completely arrested root growth after the 2nd day, 10^{-5} *M* I had some inhibitory effect on root growth up to 15 days, but 10^{-6} *M* permitted growth as good as in control solns. without I.

Analyses of coffee, husk, and chicory brews (in g. per 100 ml. of 10% brew) showed, resp.: $d_{27.5}$ 1.0080, 1.0126, 1.0160; $n_{27.5}$ 1.3370, 1.3380, 1.3400, Brix 2.60, 3.50, 4.60; total solids 2.10, 3.10, 4.50%; ash 0.37, 0.42, 0.38%; protein (N × 6.25) 25.00, 17.00, 9.00 mg.; tannin 0.08–0.12, 0.07–0.097, 0.06–0.07%; caffeine 0.095, 0.048, —%; acidity 10.00, 16.00, 23.00 ml. 0.1 *N* alkali (phenolphthalein); and pH 5.26, 4.62, 4.10. L. Wilson Greene

cases out of 3. Ampules contg. 2 cc. of II dild. with 9 cc. of physiol. salt soln. were injected at a rate of 3 ampules a day, injections being made with one ampule at a time at 5-hr. intervals. I and II together were as effective as I alone but without toxic effects of I. Trypanosomes of sleeping sickness were absent from the cerebrospinal fluid 3 months after the last injection with I. N. M. P.

Fermentation of inulin-containing roots. Ludwig Malsch. Ger. 811,223, Aug. 16, 1951. Inulin as naturally occurring in Jerusalem artichoke, chicory, or other roots is fermented to alc. by the addn. of *Aspergillus niger* cultures for 30 hrs. at 28° and pH 4.7.

Joachim Anschel

The feeding value of chicory tops and roots. N. D. Dijkstra. *Verslag. Landbouwk. Onderzoek.* No. 55.11, 24 pp.(1949).—The feeding value of chicory tops contg. dry matter 9.7, org. matter 77.76, crude protein 14.8, true protein 12.5, amides 2.3, fat- and N-free ext. 48.51, crude fiber 14.4, and mineral matter 22.2%, was tested first fresh on 3 wethers, who ate them readily. The di-

The role of metabolism in the reciprocal effects between organism and surrounding medium. B. A. Rubin. *Izvest. Akad. Nauk S.S.S.R., Ser. Biol.* 1950, No. 6, 61–76; *Chem. Zentr.* 1951, II, 394.—A study was made of the temp. curves of the enzymic synthesis and the distintegration of starch in the potato at various stages of its development. The dependence of the enzyme activity on the external temp. changes during the life cycle of the plant. The processes of starch formation in the leaves of chicory plants showed similar regularities. Rhythmic displacements of the temp.

A rapid method for the detection of small amounts of chicory in coffee. S. N. Mitra and S. C. Roy (W. Bengal Public Health Lab., Calcutta). *Current Sci.* (India) 22, 116(1953).—Chicory in amounts of 1% or more in coffee can be detected by the Seliwanoff test for fructose.

Morris H. Goldberg

The bitter principles of chicory (Cichorium intybus). I. Lactucin and lactucopicrin. A. Zinke and K. Holzer (Univ. Graz, Austria). *Monatsh.* 84, 212–14(1953).—Among other substances there were isolated from the juice of chicory two bitter principles, lactucin (I), white plates, decomp. 213–17° (from EtOH), and lactucopicrin $C_{23}H_{22}O_7$ (II), white leaflets, decomp. 148–51° (from H_2O). Acyla-

Standards for coffee and coffee mixture. S. N. Mitra and S. C. Roy (W. Bengal Public Health Lab., Calcutta). *J. Proc. Inst. Chemists* (India) 26, 38–42(1954).—Samples of native coffee and coffee mixed with chicory were analyzed. Requirements suggested for pure roasted ground coffee are: total ash 3.5–5%, with $\leq$ 70% of the ash sol. in boiling H_2O; acid-insol. ash trace; and H_2O ext. 24–28.5%. In a coffee-chicory mixt. contg. > 50% chicory, the H_2O ext. was 29–50%; total ash 4.5–6%; acid-insol. ash < 0.5%; H_2O-sol. ash $\leq$ 70%. Gordon Asher

Sclerotial disease of chicory. M. Staehelin. *Forsch. Ergeb. Gartenb.* 1942, No. 1, 15; *Rev. Applied Mycol.* 25, 537(1946).—Good control of chicory wilt and soft rot caused by *Sclerotinia sclerotiorum* and *S. minor* was secured in extensive plantings at Lausanne by the use of a well-balanced fertilizer with K and P as the predominate constituents, N and org. matter being inadvisable. Both fungi are perpetuated from year to year exclusively by means of their sclerotia, which develop into mycelia under favorable moisture and temp. and infect the roots of the new crop. Soil disinfection with formalin or Hg dusts and by steam sterilization have given good results. The disease is not seed borne. Oden E. Sheppard

Action of maleic hydrazide on hardening of vegetable tissues in vitro. F. Bertossi and A. Capozzi (Univ. Pavia). *Boll. soc. ital. biol. sper.* 28, 1117–18(1952).—Tissue cultures were made of sections of the roots of *Cichorium intybus*, which proliferates spontaneously, and of tubers of *Helianthus tuberosus*, which requires an auxin for proliferation. Cell proliferation of the latter induced by 10^{-5} β-indoleacetic acid (I) was completely inhibited by maleic hydrazide (II) at concn. 10^{-4}, and 10^{-6} I was inhibited by 10^{-5} II. II at 10^{-4} inhibited budding of *Cichorium* and slight, transitory inhibition was obtained at 10^{-5} II. M. Elliott

Coffee frauds. J. B. Ferraz de Menezes, Jr. (Inst. Adolfo Lutz, São Paulo, Brazil). *Rev. inst. Adolfo Luts* 12, 111–44(1952)(English summary); cf. *Rev. inst. Adolfo Luts* 11, 13–47(1951).—The most usual fraud of ground coffee in coffee-producing countries is coffee hulls. The usual limits in roasted and ground coffee of volatile substances, caffeine, H_2O-sol. ext., HCl-sol. ashes, HCl-insol. ashes, and alky. of ashes are given, as well as descriptions of microscopical morphology of roasted coffee (*Coffea arabica*), coffee-hulls, corn (*Zea mays*), cacao (*Theobroma cacao*), barley (*Hordeum sativum*), rice (*Oryza sativa*), kidney beans (*Phaseolus vulgaris*), colza seed (*Brassica napus* var. *oleifera*), *Cassia occidentalis* seed, soja (*Glycine soja*), and chicory root (*Cichorium intybus*). Alfredo Levy

Coating for the preservation of foods. Marcello Rizzardi. U.S. 2,668,121, Feb. 2, 1954. Foods having a shell or envelope are temporarily protected from spoilage by coating with a film of paste comprised of 14 oz. of pure virgin wax, 20 oz. of a vegetable oil, such as soybean oil, 5 oz. of ext. of chicory, and 10 drops of creosol. D. Fitz-Gerald

Recovery of oat germ from oats. Wm. F. Hanser (to National Oats Co.). U.S. 2,670,290, Feb. 23, 1954. Hulled oats (40 lb.) are steamed, flaked, and screened to effect a partial sepn. of the germ stock. This stock is sepd. into fractions of very nearly the same size, after which the fractions are agitated on screens with the flakes passing over an upward-moving air stream which suspends the lighter flake fragments. The heavier germs roll laterally upon the

The availability of calcium in three herbs of grassland. R. H. Armstrong, Brynmor Thomas, and K. Horner (Univ. Durham, Engl.). *J. Agr. Sci.* **43**, 337–42(1953).—The availability of Ca in narrow-leaved plantain, chicory, and burnet was investigated with the rat. Methods for the detn. of Ca balance involved analysis of feed, feces, urine, and carcass. The availability of the Ca, while high in all 3 species, was in the order plantain, chicory, and burnet. There was shown to be some evidence of inverse relationships between fiber content and Ca availability, and between oxalic acid content and Ca availability. P. C.

Grana formation and synthesis of chloroplastic proteins induced by light in portions of etiolated leaves. M. de Deken-Grenson (Univ. Brussels, Belg.). *Biochim. et Biophys. Acta* 14, 203–11(1954).—Electron microscopy of plastids from etiolated and green *Cichorium* leaves shows radically different structures in the leucoplasts and chloroplasts. The leucoplasts contain no grana, show a finely granular structure, and are smaller than the chloroplasts. They are converted to chloroplasts on exposure of fragments of etiolated leaves to light, the change being accompanied by a net synthesis of chloroplastic proteins at the expense of a reserve of free-amino compds. present in etiolated leaves.
Morton Pader

Calcium, phosphorus, iron, and ash determinations in some vegetables in the Compositae. Roberto Roperto, Virgílio Bonoldi, and Isaltina Prestes Monzoni (Univ. São Paulo Brazil). *Rev. fac. med. vet., Univ. São Paulo* 4, 529–32 (1952).—In 16 samples of each vegetable, the detn. of ash, Fe, Ca, and P gave the following mean values (in mg./100 g.): *Lactuca sativa:* 621, 2.7, 48.4, 32.2; *L. scariola:* 807, 3.0, 33.6, 34.6; *Chicorium endivia:* 949, 6.2, 35.3, 16.6; *C. intybus:* 1360, 7.9, 73.2, 35.3. Only the raw, edible, parts of the plants were analyzed.
Alfredo Levy

Vitamin content of produce and products used on the farm. II. Vitamin C content of vegetables. L. Federico and T. Valle (Stazione sperimentale freddo, Milan, Italy). *Ann. sper. agrar.* (Rome) 4, 219–22(1950); cf. *C.A.* 44, 3629*d*.—The vitamin C (I) contents of the dry substance of vegetables immediately after harvesting and after purchase on the market, resp., were in mg. %: *Allium cepa* 128, 75; *A. sativum* —, 1.9; *A. porrum* 165, 152; *Apium graveolens* 45, 16; *Asparagus officinalis* 364, 246; *Brassica oleracea* var. *capitata* 533, 106; var. botrytis leaves —, 446; flower —, 616; *Capsicum annuum* 925–976, 560; *Cichorium intybus* 153, 92; *Cucumis sativus* 220, 68;

Food Agr. 4, 205–8(1953).—A rapid method for [illegible] caffeine is given. Its application to the analysis of coffee and chicory essence is described. An ext. or soln. of the material contg. 25–200 mg. of caffeine/100 ml. is clarified by (1) the addn. of solns. of $Zn(OAc)_2$ and $K_4Fe(CN)_6$, (2) filtration, (3) addn. of Na_3PO_4 soln. to the filtrate to pH 11, and (4) filtration again. The clarified ext. is extd. with $CHCl_3$, and the $CHCl_3$ soln. is washed with dil. H_2SO_4 and filtered. The purified ext. is then evapd. to dryness, and the residue is digested for 45 min. with an aq. soln. of K_2SO_4, $CuSO_4$, and H_2SO_4. Finally, the digest is transferred to an NH_3-distn. app., Zn and excess NaOH are added, and liberated NH_3 is trapped in H_3BO_3 soln. and estd. by titration with standard acid. The caffeine content of the sample is then calcd. from the amt. of acid used.

Morton Pader

The ash constituents of some herbage plants at different stages of maturity. Brynmor Thomas, A. Thompson, V. A. Oyenuga, and R. H. Armstrong (King's Coll., Newcastle on Tyne). *Empire J. Exptl. Agr.* 20, No. 77, 10–22 (1952).—Analyses of 16 herbage species, including 4 legumes, 4 herbs, and 8 grasses, at different stages of growth, are given. Herbs and legumes are much more mineral-efficient than the grasses, especially in Ca, Mg, Mn, and P. Herbs have the highest content of Na, K, and Fe. The herbs, chicory and plantain, are more mineral-efficient than any common grassland plant. Among the legumes, lucerne and alsike are superior to trefoil and sainfoin, and are high in Ca. Meadow fescue is the most mineral-efficient grass, followed by rye-grass, cocksfoot, and timothy. In general

Role of plant organs treated with auxin in developing curvature. François Nysterakis. *Compt. rend.* 232, 1005–7(1951).—Tendrils from vines of the same plants were treated in a chamber with β-indoleacetic acid at temp. from 15 to 35° and at humidities from 40 to 100%. Concn. of auxin ranged from 10^{-15} to 10^{-8} *M*. Curvature was measured after 3 hrs. Humidity above 80% favored curvature while a humidity below 60% was unfavorable. Most curvature was shown for tendrils taken in April, May, or June.

Thomas B. Niven

aliment. (Paris) 65, 5–8(1948).—The inulin in the Jerusalem artichoke undergoes important chem. changes during storage between October and March. The levorotation decreases and finally turns into dextrorotation through the formation of glucose and sucrose. These changes do not occur in the dahlia, and only to a limited extent in chicory. They are more pronounced in the round than in the elongated varieties of the Jerusalem artichoke.

phala, botrytis, and *caulorapa*), *Daucus carota* [I], *Apium petroselinum, A. graveolens, Hyoscyamus niger* [I], *Cichorium intybus* [II], *Tragopogon porrifolius* [I], *Scorzonera hispanica* [I], *Solanum tuberosum* [II], and *Beta vulgaris.* Biol. and biochem. factors in growth with and without I and II are analyzed. 81 references. **Remarks on a recent memoir by Gautheret.** P. Nobécourt. *Ibid.* 7, 222–3(1944).—Errors in the preceding paper are discussed. W. C. Tobie

was used as a 0.1% emulsion (10 ml. acetone Na dodecyl sulfate). Compd. IV at a concn. of 0.1% in this emulsion killed 100% of pea aphids and 100% of thrips feeding on chicory. Compd. VI killed 49% of the red-spider mite on bush bean. Compds. V and VII were repellents for the Mexican bean beetle. Compds. of these series were toxic to the house fly. Nellie M. Payne

Alkylnicotinium arylsulfonate pesticide. Charles F. Prevost, Jr. (to United

Daucus carota, Spinacia oleracea, *Petroselinum hortense* 4; *Trifolium* spp., *Pisum* spp., *Vicia sativa, Phaseolus* spp., *Linum usitatissimum, Cichorium intybus,* and *Rubus idaeus* and also a few decorative plants (*Helianthus annus* and *Calendula officianlis*) 2; rye, winter wheat, oats 0; summer wheat showed malformation of "ears"; barley length reduced by 10 cm. *Pirus malus, Ribes* spp., *Fragaria grandiflora, Solanum lycopersicum, S. tuberosum, Nicotiana rustica, Armoracia rusticana, Cucumis sativus, Allium* spp., and *Rheum rhaponticum* 0–1. E. R. Schierz

Analysis of domestic rubber-bearing plants. Obdulio Fernández (Faculty Pharmacy, Madrid). *Ion* **7**, 2–10 (1947); cf. *C.A.* **41**, 2599*b*.—The benzene-extractable material and rubber were detd. by Korneck's method (*C.A.* **5**, 1339) in a no. of Spanish plants. The plants, the benzene ext., and rubber (by N_2O_3 method) were: *Hex aquifolium* bark, 18.273, 2.332%; *Cynanchum acutum* roots, 0.544, 0.035%; leaf stalks, 1.853, 0.461%; *Asclepias cornuti* roots, 0.244, 0.008%; *Vincetoxicum officinale* leaves and roots, 2.753, 1.190%; *Sambucus nigra* roots, 0.377, 0.054%; *Andryala ragusina* stems, 1.279, 1.405%; roots, 1.820, 0.860%; *Chondrilla juncea* stems, 1.43, 0.263%; roots, 1.70, 0.870%; *Cichorium intybus* roots, 0.424, 0.042%; *Crepis lampsanoides* roots, 0.577, 0.082%; *Lactuca satira* stems, 0.503, 0.040%;

Trace elements in Spanish foods of vegetable origin. II. Garden vegetables. Miguel Deán Guelbenzu, Juan Manuel López de Azcona, and Angel Santos Ruiz. *Anales fís. y quím.* (Madrid) **42**, 508–15(1946). cf. preceding abstract.—Among 47 products examd., Ag was fo nd (10^{-4}) only in the field mushroom (*Agaricus campestris*). Ba lines appeared in the spectra only as ghosts; thus none of the samples contained Ba in a proportion as great as 10^{-4}. Co was found in one sample of the group consisting of chicory, artichoke, thistle, endive, periwinkle, cauliflower, red cabbage, turnip, cabbage, and in 3 samples of asparagus. Cu, Fe, Li, Mn, Si, Ti were in

mersion), but not at the recommended 0.5%. In general the Cu compds. do not significantly impair germination or growth, but cause marked injury to the Bon Jardinier and Enfant de Mt. Calme haricot bean (*Phaseolus vulgaris*). The seeds tested fell into 2 categories in respect of their reaction to Hg treatments, radish, pea, cucumber, chicory, and haricot bean being tolerant (except that prosat injured the last named) and lettuce, onion, celery, carrot, and tomato sensitive, especially to ceresan; zyma 3 is nontoxic. Among the yield increases over the controls

U.S. 2,558,955, July 3, 1951.

Concentrated fructose solution. Kozo Nishiki. Japan. 178,982, May 24, 1949. Ext. from the chicory tuber is treated with H_3PO_4 to pH 2.5, is hydrolyzed at 80–90° for 1 hr. with decolorizing C, and is neutralized with $Ca(OH)_2$ to pH 7. Ca fructate is sepd. by filtration, is treated with H_3PO_4 to pH 5–8, is filtered, and is concd. K. Kitsuta

Self-enzyme cacao process. Norman W. Kempf and Harvey K. Murer (to General Foods Corp.). U.S. 2,558,854, July 3, 1951. The status of current curing processes, [illegible] of fermentation, is discussed

At the end of the season, $CaCO_3$ deposits on the grates were only 8 mm. thick, and were easily removable. A big storage vessel is needed between the saturators and the filter-press pumps. A conductometric control method and app., installed in 1948/9, are described, with a diagram; this is intended to give automatic regulation. R. D. H.

Tetraphosphoglucosate and the fouling of evaporators. G. Molina Pichardo and J. J. L. Romero. *Proc. 22nd Ann. Meeting, Asoc. Téc. Azucar.* 1948, 173–178; *Sugar Ind. Abstracts* 11, 178(1949); cf. *C.A.* **43**, 9500*h*.—Tests on

Thiamine in Italian vegetables [and fruits]. Giuseppe Fabriani and M. A. Spadoni. *Quaderni nutriz.* **10**, 88–97 (1947).—Detns. by the thiochrome method gave the following av. data (in γ/100 g. of the eatable part of the vegetable concerned): dry chickpea 400, dry kidney bean 450, dry lentil 448, dry lupine 780, dry pea 470; asparagus 105, *Beta vulgaris* 0, *Brassica rapa* 14, broccoli 43, artichoke 32, carrot 50, cauliflower 105, *Cucumis sativus* 29, onion 18, bean 15, fennel 17, *Agaricus campestris* 130, *Lactuca sativa* 0, mad apple 6, fresh potato 46, stored potato 84, *Capsicum annuum* (red and yellow) 78, *C. annuum* (green) 31, *C. minimum* (dry) 73, fresh pea 267, tomato 3–30, *Cicoria intybus* 5, turnip 5, *Lactuca scariola* 62, celery traces, spinach 86, *Heliantus tuberosus* 229, [illegible]

Antibacterial and antifungal substances from Vermont plants. Thomas Sproston, Jr., J. E. Little, and M. W. Foote. *Vermont Agr. Expt. Sta., Bull.* 543, 3–7(1948).—Virgin's bower (*Clematis virginiana*), corn, fireweed (*Epilobium angustifolium*), pigweed (*Chenopodium album*), nasturtium (*Tropaeolum majus*), muskmelon (*Cucumis melo*), hardhack (*Spiraeat omentosa*), common chicory, touch-me-not (*Impatiens biflora* Walt), tomato, and common purslane were examd. for stimulatory or in-

Plant extractives for flavors. E. G. Allison (S. B. Penick & Co., New York, N.Y.). *Am. Perfumer Essent. Oil Rev.* 58, 129–31(1951).—The use of fluidexts., solid exts., oleoresins, alkaloids, and glycosides and the use and properties of angelica root, celery seed, chicory root, coffee, deer tongue leaves, fenugreek, gentian root, ammoniated glycyrrhizin, horehound herb, kola nut, St. John's bread, and tamarinds are discussed. Morris B. Jacobs

The cytological effects of water. R. Buvat. *Rev. cytol. cytophysiol. végétales* 10, 5–51(1948).—Osmotic and other effects on cells and tissues of cut portions of chicory (*Cichorium intybus*) and viper's grass (*Scorzonera hispanica*). 32 references. **Cytological monograph on cultures of chicory tissues.** *Ibid.* 53–101.—Cytological and histological changes in sections of chicory roots grown on sucrose agar (made with Knop's fluid) in presence or absence of indoleacetic and naphthylacetic acids are described. Cells which ordinarily form inulin begin to produce starch when adjacent to newly formed buds. 36 references.
W. C. Tobie

phenoloxidase. The sugar beet accomplishes 80% of its respiration by means of *o*-polyphenoloxidase. In the chicory leaves, both *o*- and *p*-polyphenoloxidase are active to the same extent. H. Priestley

Arsenical contamination of chicory during drying. R. M. Atkinson, D. Dickinson, and F. J. T. Harris (Samuel Hanson & Son, Ltd., Glasgow, Scot.). *J. Sci. Food Agr.* 1, 264–6 (1950).—Chicory is liable to contamination by As in the coke used for drying. The av. As content for single-dried chicory was found to be slightly over 1 p.p.m.; the coke used in drying averages about 9 p.p.m. Approx. $^1/_6$ of the total As in the coke is transferred to the chicory; the contamination is very unevenly distributed. A further portion accumulates in the residue (contg. up to 76 p.p.m. As) which falls through the bulk of the chicory and is not used for human consumption. Most of the As appears to be present in dried chicory in the form of dust, but it is not definite that this dust is entirely flue dust. Both the volatile and nonvolatile As contents of coke must be considered. It is concluded that there is no great risk to the consumer since part of the As in the dried chicory is lost in the subsequent roasting and grinding processes and part is insol. Data are given to show that a limit of 5 p.p.m. As in dried chicory might be a practicable figure and would not give rise to more than the recommended limit (0.1 p.p.m.) in a prepd. beverage.

Ned E. Jaffa

W. J. Godkin, H. G.

max. rates and quantum [illegible]

detd. for strawberry, asparagus, turnip cabbage, Chinese cabbage, white succory, tomato, cucumber, and endive leaves, under varying conditions. The photosynthetic quotient ranged from 0.90 to 1.18, with 3 high values (1.24–1.36) obtained with turnip cabbage. The av. efficiency of the leaves was 25% (the theoretical min. of the quantum no. was assumed to be 4). Graphs showing a temp.-insensitive light satn., the limiting effect of CO_2, the influence of various CO_2 tensions and the influence of culture conditions on the photosynthetic rate are given. The

Mo did not furnish the most Mo to plants. In general the more fertile soils supplied the most Mo to plants. Plant species varied markedly in Mo content. Smartweed, Jimson weed, red clover, and lambsquarters were some of the plants contg. high amts. of Mo, up to 5.9 p.p.m. Chickory, prickly lettuce, timothy, and lespedeza were lowest in Mo. Soil Fe may make Mo less available to plants. Some of the Mo may be held in indurated Fe concretions. Maurice Fried

usable for general sweetening. II. Preparation of fructose sirup from the rhizome of Brussels chicory. *Ibid.* 20, 221–6(1944).—Inulin extd. from the rhizome of *Cichorium intybus* with H_2O (8 times the vol. of air-dried root) at 100° 2 hrs. was saccharified almost completely (96.56%) by the above mold to fructose sirup (yield 72.86%) which after refining with 0.7% bone black and filtering with diatomaceous earth showed pH 6.2 and contained H_2O 28.13, fructose 55.04, total N 0.84, ash 5.53%, and a minute amt. of org. acids. This sirup is yellow and transparent, very sweet without sour or bitter taste, and completely odorless. I. G. Yoshioka

dated); cf. *C.A.* 47, 2389*d*.—The sum of the values for Fe, Zn, Cu, Pb, and As in fresh spinach, endives, leeks, chicory, skirret, and sometimes tomatoes exceeded the legal max. of 200 mg./kg. of dry matter set by some countries for canned vegetables. Min. values of Zn for the dry matter of fresh green leafy vegetables exceeded the 20 p.p.m. max. set by France for canned vegetables. There appeared to be a relation between the level of Zn and the level of chlorophyll in plants. High values of Cu were assocd. with high Fe values. George K. Davis

to oxidize 1 g. Volatile value *A* was calcd. as $a/b \times 100$, where *b* is the % sol. solids in coffee, detd. by boiling 1 g. powder with 50 ml. water 15 min., filtering, repeating this process, making the combined filtrate to 100 ml., and drying a 50-ml. aliquot at 100° to const. wt. *a* and *A* of Arabica and Robusta varieties of coffee were in the range 4.6–6.2 and 18.86–24.10, resp. *a*, % extd, and *A* were for coffee (av. of 52 samples) 5.72, 26.35, 21.71; date (av. of 10 samples) 1.20, 9.38, 12.79; chicory 3.50, 69.00, 5.07;

Estimation of the proportion of coffee and chicory in mixtures. J. Lyons & Co., Ltd. *Chemistry & Industry* 1955, 549.—In this method (cf. *C.A.* 28, 5148[1]), standard av. values for sp. gr. of 5% wt./vol. exts. for general use are now 1.0064 for coffee and 1.0154 for chicory, instead of the previous 1.0058 and 1.0143, resp., to allow for changes that have taken place in these ingredients. Per cent total solids

ash were found useful in detecting adulteration. For date seed marketed as Indian chicory (7 samples), known date seed *Phoenix dactylifera* (2 samples), tamarind shell (2 samples), tamarind seed (2 samples); tapioca (2 samples), chicory, tapioca outer skin, Arabica cherry husk, Robusta cherry husk, and parchment, percent water-sol. ext. was 9.98, 6.85, 6.55, 15.3, 19.65, 68.6, 10.6, 30.0, 35.0, —; cc. *N*-HCl per 100 g. was 4.4, 4.5, 16.5, 7.9, 6.65, 12.0, 50.6, 49.4, 37.1, 1.3. For coffee (not described), date seed, tamarind shell, and chicory, percent total ash was 3.7–4.7, 1.8–2.3, 5–7, 4.8; percent water-sol. ash was 2.64–

(1957_1961)

phenyl)-3-hepten-6-onecarboxylic acid. Henry B. Hastie

Chicoric acid (dicaffeyltartaric acid). Isolation from chicory (Chicorium intybus) and synthesis. M. L. Scarpati and G. Oriente (Univ. Rome). *Tetrahedron* **4**, 43–8(1958); cf. *C.A.* **51**, 11495g.—The title acid (I) was isolated from chicory and its structure detd. and confirmed by synthesis of the optically active and racemic modifications from caffeic acid chloride cyclic carbonate (II) and D(−)-, L(+)-, and *meso*-tartaric acids (III, IV, V), resp. Chicory leaves (1000

Components of chicory. V. The hydrolytic breakdown of inulin to lower polysaccharides and the question of their glucose content. K. Holzer, H. Wittmann-Zinke, and A. Zinke (Univ. Graz, Austria). *Monatsh. Chem.* **88**, 11–24 (1957); cf. *C.A.* **51**, 5908b.—A detailed description is given of the evidence previously presented (*C.A.* **51**, 4288e) that

in all types within 10 min. but after 40 min. was more rapid in I or III than in II or IV. II elicited the greatest absorption of drug. David Stefanye

Effect of preparations of certain plants on sugar tolerance in animal organism. A. I. Karaev, R. K. Aliev, G. A. Guseinov, and A. G. Dadashev. *Izvest. Akad. Nauk Azerbaĭdzhan. S.S.R., Ser. Biol. i Sel'skokhoz. Nauk* 1958, No. 3, 81–92(in Russian).—Exts. of *Cichorium intybus*, *Lactuca sativa*, *Cordiandrum sativum*, *Aloe arborescens*, and

The paper is then exaind. under an ultraviolet lamp either immediately or preferably after drying. Particles of both fresh and roasted coffee are surrounded by brilliant yellow fluorescent spots, whereas coffee which has previously been leached with hot H_2O yields none. The extent of the adulterant can be estd. by counting the fluorescent and nonfluorescent spots. Chicory particles yield brown, nonfluorescent spots and cereal substitutes yield a yellow-brown fluorescence. A. L. Underwood

(1959).—A standard infusion is graded on the basis of color (Duboscq colorimeter). The color limits (Swedish) of 4 grades are given. M. M. Piskur

Analysis of coffee mixtures. Ilona Gál. *Mitt. Lebensm. u. Hyg.* **50**, 57–76(1959).—Mixtures of coffee beans, chicory, cereal "coffees" made from malt and rye, and their decoctions were analyzed with the aim of evolving new or improved methods of identification and analysis. In ground products, the coffee content was detd. from the total fat. In decoctions, essentially 3 methods were used: for coffee contents

(1958).—Tests on 131 types of honey show that the bacteriostatic action (I) as reported by Dold, *et al.* (*C.A.* **32**, 2971) varies considerably. The I parallels the saccharase activity (II). It is suggested that a measure of I along with II may be useful in characterizing or evaluating honeys. M. M. Piskur

Chemical composition of roasted Indian chicory. C. P. Natarajan, C. S. Viraktamath, K. M. Narayanan, N. Gopalakrishna Rao, and D. S. Bhatia. *Food Sci.* (Mysore)

values and recommended solvents are given for the following materials tested: anthocyanins, alizarin (from *Rubia tinctorum*), sulfonated alizarin, Campeche wood (ext. of *Haematoxylon campechianum*), brasilin (from *Caesalpinia brasiliensis*), cachou (from *Acacia*), caramel, carotene, chicory, chlorophyll, cochenille (from *Coccus cacti*), curcuma (from rhizomes of *Curcuma longa*), ext. of *Rhamnus infectoria*, indigo (from *Indigofera*), indigo carmin, myrtillin (from *Vaccinium myrtillus*), ext. of *Alkanna tinctoria*, orseille (ext. of *Roccella*), purpurin (from *Rubia tinctorum*), quercitron, saffron (from